Nelson

Design

FOR QCE UNITS
1&2

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ABOUT THIS BOOK

This book is the first of two volumes that guide you through the Queensland Curriculum & Assessment Authority's *Design General Senior Syllabus 2025*.
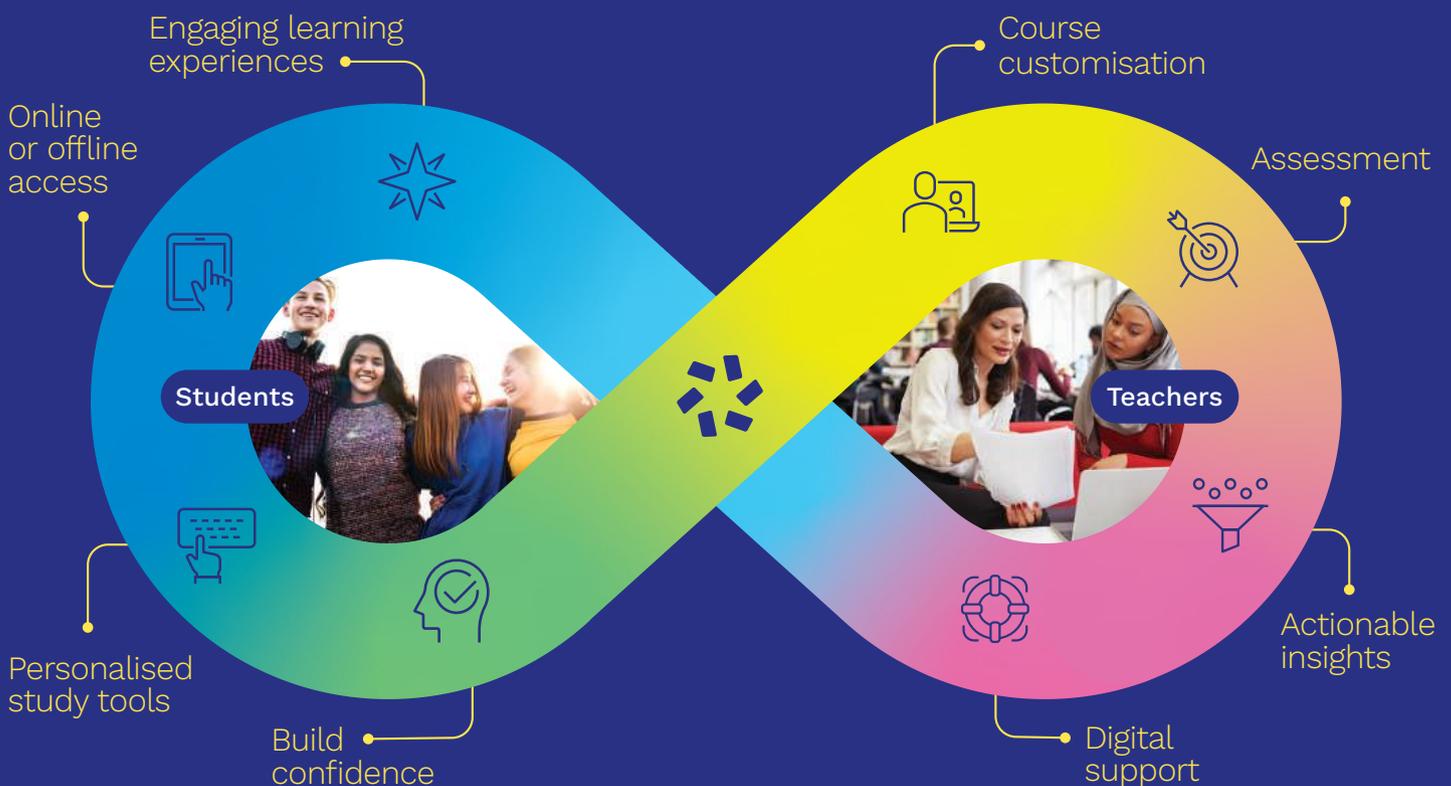
NELSON DESIGN FOR QCE UNITS 1 & 2

This volume is intended for Year 11 students undertaking Unit 1 Stakeholder-centred design and Unit 2 Commercial design influences.

We use the word 'design' as both a verb and a noun. Used as a verb it means the act or process of doing or planning something with a purpose. As a noun we use it, essentially, to mean the *outcome* of that process. It's important to study the theory of design, but the best way to learn how to design is by applying the design process to design problems: by *designing*. To help you do this, we've arranged this book into two parts and four sections, each intended to be used together. Use sections 1 and 2 as a kind of 'toolbox'; they will provide you with a practical guide to the designing aspect of the course. Then, the final two sections build your knowledge about design theory as you need it.

SECTION 1: DESIGNING

This section is your step-by-step guide[1] to the process of designing, from preparing for, conducting and concluding a design project. You'll find advice on how to think about designing, practical methods to try out in class, tips and tricks that can help you avoid common problems, and pointers to the other sections that contain in-depth discussions on design theory and visualisation techniques.

Chapter 1: What is design? discusses the nature of design, why it's useful and why you might study it.

Chapter 2: Design in the classroom shares some of the 'rules' you should know about studying design. Learning about design is a little bit different from many school subjects and this chapter should help you avoid some of the most common traps.

Chapter 3: Your design process will help prepare you to apply the design process. Here we discuss some of the things you'll need and how to effectively use your time.

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[1] Design projects and the design process that supports them are inherently non-linear (there's no rigid sequence that's the same every time), so when we say 'step-by-step', we mean only in the very general sense.

Chapter 4: Starting your design project shows you how to understand your design task and the needs of the people you're designing for, research and analyse information, and formulate the design brief.

Chapter 5: Generating and developing designs covers what many designers think is the most fun part of any design project: thinking of and refining interesting design ideas.

Chapter 6: Finishing your project will help you with the important task of communicating your design proposals, and offer some suggestions on how to get good marks.

SECTION 2: VISUALISING

Designers use the term 'visualising' to encompass a wide range of tools and techniques for 'seeing', communicating, evaluating and testing their designs. This section illustrates many of the most useful approaches in the following three chapters:

Chapter 7: Drawing
Chapter 8: Rendering
Chapter 9: Prototyping

SECTION 3: UNIT 1 STAKEHOLDER-CENTRED DESIGN

Chapter 10: The design profession explores a range of design disciplines, the skills and resources used within them, and some of the typical challenges faced in the real-world industry.

Chapter 11: Design process models looks at different design models within the syllabus, and closer at the Double Diamond design process.

Chapter 12: Design features focuses on the key areas that you need to consider when devising a design solution: aesthetic, cultural, economic, social and technical.

Chapter 13: Stakeholders unpacks the importance of identifying your client and stakeholders to determine the users' needs, wants and opportunities for design.

Chapter 14: Defining a design problem examines how to create a successful design brief.

Chapter 15: Good design presents a range of recognised and valued approaches to distilling the key aspects of good design by designers, including Dieter Rams' 10 Principles for Good Design.

Chapter 16: Design elements and principles unpacks the building blocks of design solutions – the components designers use to develop effective designs.

Chapter 17: Design styles provides a brief history of significant designers and design movements from the past, which can help us make better designs in the future.

*Chapter 18: Design trend*s explores timeless, classic designs and enduring design trends by reviewing a range of examples.

SECTION 4: UNIT 2 COMMERCIAL DESIGN INFLUENCES

Chapter 19: Demographics examines how vital information and data about trends, ethnic diversity, average age, education levels and socioeconomics of potential users shapes a designer's understanding of their user.

Chapter 20: Influences on design focuses on the influences of social, economic and cultural dimensions, and their profound significance in the success of designs within the commercial landscape.

Chapter 21: Ethical and legal considerations considers the legal and ethical issues that affect designers in their chosen field.

Chapter 22: Design teams explores the importance of working together as designers and makers to combine our unique insights and skills to generate innovative solutions.

HOW TO USE THIS BOOK

To assist you in using this book, icons are placed throughout to indicate the following:

FYI

Information to read that may expand your interest in the topic

Tip

Helpful information to assist in developing your skills

Tech tip

Helpful information to assist in developing your skills with digital media

Key word

Fundamental vocabulary

Case study

Case studies of contemporary Australian designers provide real-world context.

Weblink

Websites that contain information that may assist your learning

Video demo

Video demos of practical tutorials

Chapter recap

Practical exercises to help develop your skills

Signpost

Cross-references to relevant sections of the text and resources on Nelson MindTap

A NOTE ABOUT TERMINOLOGY

Design is a very broad field, and the term encompasses a wide range of types of design, design practices and design professions. Some design professions are very old (e.g. architecture), whereas others are very new (e.g. interaction design) and they work at different scales, with different materials, processes and technologies, leading to distinct traditions and vocabularies. Designers in different professions may use different words for the same things and the same words for different things. This can be quite confusing for the newcomer.

The Design Syllabus that guides your design studies in Queensland schools takes a pragmatic approach to terminology and tries to be very specific about terms and definitions – refer to the official 'Glossary of cognitive verbs' on the Queensland Curriculum and Assessment Authority's website. In this book we use the official terms whenever possible but also introduce terms from the design professions when it might be helpful to discuss useful design concepts or approaches, or to make it easier for you to find more information in online searches.

ABOUT THE AUTHORS

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NELSON DESIGN FOR QCE UNITS 3 & 4

Nelson Design for QCE Units 3 & 4 is intended for Year 12 students undertaking Unit 3 Human-centred designs and Unit 4 Sustainable design influences.

This resource builds upon the understanding of designing in the Units 1 and 2 edition, and explores the application of design methods through the lens of human-centred design and sustainable design.

Andrew Scott
Mike King
Kristen Guthrie

✴ Nelson MindTap

An online learning space that provides students with tailored learning experiences.

- Access tools and content that make learning simpler yet smarter.
- **Flexible formats:** choose how you navigate using either the online eText or offline PDFs.
- Margin links in the student book signpost multimedia student resources found on Nelson MindTap.

Worksheet
A3 Design brief

For students:

- **Navigate** your own path, accessing the content, templates and support as you need it.
- **Access** activity presentations in PowerPoint and Keynote to support the end of chapter activities designed to support students with the practical aspects of the QCAA Design course
- **Extend** your learning with tailored weblinks to videos, websites and other design resources and a Design Resources list compiled by expert design teachers
- **Watch** video tutorials featuring step by step advice on rendering, concept maps and setting up a grid.

For teachers:

- Use **teaching plans** to support easy program and assessment planning.
- **Access** editable activity presentations in PowerPoint and Keynote based on the end of chapter activities designed to support students with the practical aspects of the QCE Design course.

Complimentary access to these resources is only available to teachers who use this book as part of a class set, book hire or booklist. Contact your Cengage Education Consultant for information about access and conditions.

Security and privacy:

Nelson MindTap joined the Safer Technologies 4 Schools (ST4S) Product Badge Program in 2024. The annual ST4S assessment is part of our commitment to supporting the online security and safety of students and schools. Learn more at st4s.edu.au.

DESIGNING

WHAT IS A DESIGN?

CHAPTER

1

Design is the conscious effort to impose a meaningful order.

Victor Papanek

In this chapter:

Learn the language:

+ art
+ creativity
+ design
+ design thinking
+ designing

If you are reading this book, it's likely you're interested in design and know something about it, but it's worth discussing the fundamentals and the implications they have.

+ Fundamentally, design is about *solving problems* through the creation of physical or digital objects. To learn about design is to learn about the *design process*. An important objective of this book is helping you learn about this process.

+ The purpose of designed things is to fulfill, in some way, the needs of the people they are designed for. When we design things we want them to be *useful* or *beautiful* or *meaningful* to the people who will use them, and the best designs are all three of those things in some measure. An important part of the design process is discovering people's needs and how to meet them through the design, so we'll be looking into that, too.

+ Finally, the design of things is inextricably related to the *making* of those things. This is a very big topic, especially across the breadth of all the different things that are designed – from building construction to garment fabrication to app coding – so it's something we won't be able to address here. If you decide to become a professional designer, this is one of the things you will learn a great deal about at university.

> ::: To learn more about the design professions, see Chapter 10.

1.1 THE CREATIVE CONTINUUM

Design isn't the only way of creatively solving problems for people. While some people learn to cultivate it, creativity is part of being human, so naturally it appears in many aspects of life. You can express your creativity in many ways and for many purposes. Artists may use their creativity to be expressive, engineers may use their creativity to solve technical problems, designers do something in the middle.

You can think of creativity as existing on a continuum from the scientific to the artistic, with design in a position somewhere between engineering and fine art. People are creative in roles throughout this continuum, but their focus differs. Engineers are mostly concerned with creating technically effective, efficient solutions to problems. Artists are concerned with beautiful, thoughtful or provoking artistic experiences. Designers are interested in a balance of both, but primarily in satisfying the needs of the users of their designs.

For aspiring young designers, think of design as the ultimate creative playground where art meets problem-solving. It's not just about making things look good; it's about crafting solutions that make a real impact in the world. Design is your superpower to turn imaginative ideas into reality, like a bridge between creativity and logic.

> Make no little plans … Let your watchword be order and your beacon, beauty. Think big.
>
> Daniel Burnham, architect

ENGINEERING	**DESIGN**	FINE ART

Science   Art

▶   The creative continuum

1.2 WHAT'S THE DIFFERENCE BETWEEN DESIGN AND ART?

While art is like painting a beautiful picture just for the joy of it, design is more about making things not just pretty but also incredibly useful. It's your chance to show the world how creativity can be a game-changer.

Art is centred on the artist. It's a form of expression centred on what the *artist* feels and thinks, and what they want to say to others. Design is centred on the needs of *others*, not the needs of the designer, although these needs might overlap at times. The designer's 'creative urge' – a desire to make beautiful, useful, meaningful things – may be the impetus that drives the designer to design, but not what determines if the design is good for other people. Put very simply, it's not the designer's needs that count but the needs of the people they're designing for.

Art is about communication, sometimes between the artist and themselves, sometimes between the artist and their audience. Designers can't help but incorporate their values, priorities and ideas into their work, but the communication of these things to others is incidental. Design is about serving the needs of others.

This doesn't mean that art is bad and design is good, only that they serve different purposes. Perhaps the artist wants to provoke you to think by experiencing their work, whereas the best design might work so well that you don't even notice it. There's a saying – good design is 99 per cent invisible.

▶ Riverside Green, by Hassell, is a recent addition to Brisbane's South Bank Parklands, a reflection of the outdoor lifestyle of Queenslanders.

▶ The Queensland Art Gallery | Gallery of Modern Art (QAGOMA), Brisbane, designed by Kerry and Lindsay Clare, Architectus, references Brisbane architecture through its generous eaves.

▶ The ubiquitous PB/5 pedestrian crossing button designed by Australian industrial design firm Nielsen Design Associates in 1984

▶ Inge King's Grand Arch, on the Mornington Peninsula

▶ Part of a collection by Gail Sorronda, Brisbane

Read the article, 'Sublime design: the PB/5 pedestrian button' on *The Conversation* to learn about design.

Weblink
Sublime design: the PB/5 pedestrian button

Design is an expression of the purpose, and it may (if it is good enough) later be judged as art; design depends largely on constraints and it is a method of action (there are always constraints and these usually include ethic).

Charles Eames

1.3 WHAT SORTS OF PEOPLE MAKE GOOD DESIGNERS?

People are attracted to design for a variety of reasons. You might recognise yourself in some of these:

+ They like working with their hands and making things, perhaps to solve problems or just to scratch a creative itch.
+ They're curious about how things work. (Sometimes they take things apart and don't know how to put them back together!)
+ Like everyone, they enjoy beautiful things, spaces and experiences, but they're excited by the idea of making such things themselves.
+ They have an interest in other people and like the idea of making their lives better.
+ They like to speculate and ask themselves, 'What if …?'

You don't need to share all of these impulses to become a good designer. That said, as students learn more about design, they're sometimes surprised at how much work it takes to design something good. Good design takes a lot of effort. Design is one of those things that is quite easy to *do* but difficult to do *well*. It's constantly changing, always challenging and incredibly engrossing. There's not a designer alive who doesn't get an amazing sense of satisfaction when they see things they designed being used by people out in the world.

Monkey Business/Adobe Stock Photos

1.4 WHY STUDY DESIGN?

Studying design is like unlocking a secret door to a world where your ideas matter. You get to be the problem solver, the innovator, and the one who designs solutions that impact real lives. As a young designer, think of yourself as a positive force in the world. Your designs can tackle big issues and shape a better future for everyone. Design is your tool to make the world a cooler, smarter and more awesome place.

If you'd like to make a career of designing, then studying Design at high school is excellent preparation for university. At school you'll learn the fundamentals of design and begin developing useful design skills. It's also a wonderful place to explore different types of design to find out what interests you most. This can help you make an informed choice of the university degree where you'll master the knowledge and skills required for professional practice.

Studying Design at high school may make it easier for you to adapt to studying it at university. A recent study of university design students suggested that those who studied Design in Years 11 and 12 earned notably better design marks in their first year.

If becoming a professional designer isn't your goal, however, studying Design at school can still be worthwhile. This is because the design process offers a different way of solving problems that can produce innovative and positive outcomes in many non-design fields. This is reflected by the popularity of 'design thinking' in the business community. You might even say, 'designing' is the process designers use to solve *design problems*, and 'design thinking' is the application of the design process to *non-design problems*. Designing results in an object, a space or an interactive interface; design thinking results in schemes for all manner of different things – an organisational structure, a service, a strategy.

As with any subject selection, you should choose subjects you enjoy. If you enjoy a subject you are passionate about, you are more likely to achieve well in that subject, leading to a greater chance of finding the pathway that works for you. Design has many transferrable skills that can support a range of pathways, and for some it moves them into that highly sought space of loving what you do.

CHAPTER RECAP

+ Design is a form of problem-solving through the creation of physical or digital things.
+ Professional designers design for other people.
+ Studying design can be a pathway into studying design at university and becoming a professional designer, but it can be useful for solving non-design problems too.

CHAPTER REVIEW

1 Think about what you've read in this chapter and ask yourself the following questions:
   a What types of design interest you the most?
   b What are your favourite designs and how do they make you feel?
   c Do you know any famous designers and their work?
   d What motivates you to study design?
2 Transferrable skills are those that can be used in different industries or subjects. What skills do you think a designer develops that could be used in another context?
3 Below is a street light cover that has been sculptured from bronze. Where would you put this on the creative continuum: is this art or design?

Andrew Scott

▶ These street lights covers at Noosa Junction are designed to look like banksia cones, but are cast from bronze.

DESIGN IN THE CLASSROOM

An essential aspect of creativity is not being afraid to fail.

Edwin Land

In this chapter:

Learn the language:

+ colleague
+ consultation
+ formative assessment
+ group norm
+ non-linear process
+ peer evaluation
+ self-directed
+ social learning
+ summative assessment
+ teamwork

Professional designers sometimes work alone but often work in teams, either within design consultancies (design studios) or in design departments in larger companies (in-house designers). Designers typically work on *design projects*, which are design problems with a start and end, a design brief defining the task, a client who initiates the project, and end-users (and other stakeholders) who the design outcome must cater to. Digital media designers increasingly design apps and websites that are developed and improved on an ongoing basis rather than having a definite end.

▶ At a professional studio, designers often work together.

Design education is modelled on design practice and most university design courses follow the 'design studio' tradition: project-based design activities that encourage students to collaborate and learn together while engaging in hands-on, self-directed discovery and problem-solving. Not all university design projects have real stakeholders; sometimes lecturers act as client, and end users may be represented by role-play.

High school design classes follow a similar approach to university design education. You'll undertake design projects with a design brief and you'll design by investigating, sketching and making. Usually you'll have real stakeholders (a client and end users) and sometimes not. As much as is practical. you'll learn to *design* by *designing*.

To learn more about the design professions, see Chapter 10.

To learn more about design teams, see Chapter 22.

2.1 WHAT MAKES A DESIGN CLASS A DESIGN STUDIO?

Taken together, the characteristics of design studio learning make it a little different from many other high school classes. Essentially design studios are quite unstructured places, and activities vary from week to week. Students have lots of freedom to choose what and how they design, but also responsibility to use their time well. Social learning is important because they collaborate frequently, despite being individually assessed. Their teachers support and guide their learning more by 'consulting' with them during the project, asking questions and sharing suggestions, rather than by giving instructions. Let's explore these characteristics in more detail.

DIVERSE ACTIVITIES

Class activities will depend on the type of design activity you're working on and the stage of the design process. In the early stages you might be working in small groups, talking about the design problem, then visiting a site to study its characteristics or interviewing stakeholders to discover their needs. Other classes might revolve around sketching and low-fi prototyping to generate and test design ideas. Later you'll be rendering and communicating design proposals. At times you might engage in short exercises, unrelated to a larger project, to develop your design skills. This makes for varied and interesting class experiences.

Physically, design studio spaces need to provide room for these different kinds of activities and collaborations. Movable tables and chairs are helpful for small group discussions. Wall space to pin up sketches and design proposals is useful for class discussions and design concept feedback. Such facilities are not always possible when rooms are used for many different subjects, so design students and teachers need to be flexible.

PROJECT CHOICE

Diversity in design learning also applies to the type of design 'projects' you work on. Not every design activity is a full design project that goes through all stages of the Double Diamond. In Units 1 and 2 you might undertake activities that focus on just parts of the design process to help refine your skills. Even complete 'start-to-finish' design projects can be quite varied, too.

Sometimes your teacher will provide you with a project brief that specifies the type of design you'll need to do: a fashion garment, a graphic design, a product, a building, an interior, and so on. At other times, you'll be free to write your own design brief that specifies the type of design solution you'll explore within the context of a class project.

For example, your class might be given a site location as context for the design project but you might choose to address stakeholder needs through a design brief that specifies *one* of the following:

+ landscape architecture: the external spaces between buildings and other structures on the site
+ interior design: a room within one of the buildings on the site
+ industrial design: exterior street furniture (park benches, rubbish bins, drinking fountains etc.)
+ graphic design: a logo and signage system that helps people navigate the site
+ interaction design: an interactive signage kiosk for visitor information.
+ fashion: a corporate livery or workers' uniforms.

WRITING YOUR DESIGN BRIEF

When writing your design brief, it's essential to commit to the type of design response you'd like to make. If your design brief is too vague, you'll spend too much time deciding what to design instead of getting on with designing it. Likewise, once you start, it's quite destructive to fundamentally change the design brief, and your teacher would have your best interests at heart if they didn't let you!

SELF-DIRECTED, NON-LINEAR PROCESS

Because students often have a lot of project choice and many design problems are unpredictable, the design process features many loops rather than a linear sequence. You need the freedom to go where an exploratory design process takes you, but at the same time, you're responsible for making good use of your resources and time.

Junior school design classes may follow a quite linear design process. This allows students to practise skills and come to grips with the basics without the burden of making constant decisions.

Students in senior design classes are expected to be more mature so they can take on more freedom, more responsibility, and more complex design problems. One way this maturity should manifest is taking responsibility for planning and managing your time. Plan out your goals for the duration of the project and consult this plan prior to every class. Ask yourself, 'What should I try to achieve in class today?' Drawing up a list of actions, questions and decisions can help you make the most of the valuable time you have with your teacher and colleagues. If you have some unstructured time in class, take the initiative and follow your plan to make progress on your project. Future you will be grateful!

CONSULTATIVE TEACHING

Part of giving you the room to be responsible for your design learning is the need for teachers to guide and support you without making decisions for you. This is done by 'consulting' with you about your design work on a regular basis. (This is the way design studios work at university. Most weekly design studio classes revolve around one-to-one discussions between design students and lecturers or tutors.) Ideally this consultation would happen in every class, but time constraints and class size often make this difficult, which is where the social learning aspect of design studios really helps.

design discussion

student   teacher

design sketchbook and low-fi prototypes

Andrew Scott
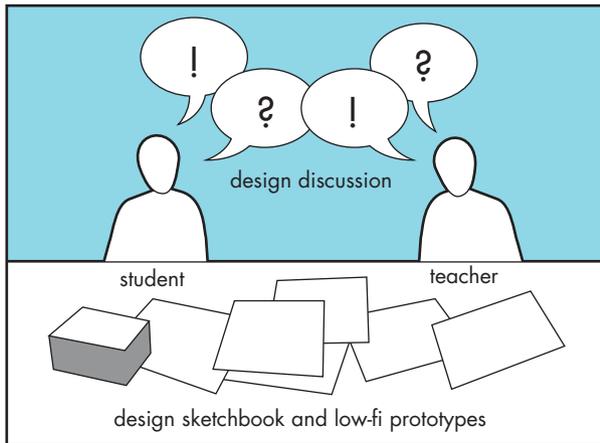
▶ Regular design consultations with your teacher will keep you on track.

YOUR TEACHER'S ROLE

Your design teacher's role is to guide you through the design process but not to do the design for you (that would be no fun). Part of the reason for this is that design projects can get out of control if you're not sure what you're doing. Your teacher can help, but only if you show them your work often. They can manage the amount of complexity you're dealing with so that you can achieve your goals in the time you have available. Sometimes this means advising you to narrow your focus to simplify the problem or, conversely, broaden it so that you have better scope to create interesting design solutions.

Your design teacher:

+ guides you through the design process, controlling complexity and maintaining achievable goals
+ learns about the problem alongside you
+ prompts your design process by asking questions and making suggestions.

It's important to keep in mind what your teacher *isn't* there for:

+ They don't have all the answers to your design problem because each design problem is new in regards to the specific project objectives and constraints.

+ They aren't an expert on your problem. No one can know everything about all kinds and types of designs, architecture, fashion, interaction design, industrial design etc.
+ They aren't the designer making the design decisions – that's *your* job.

SOCIAL LEARNING

People sometimes imagine designers working alone, conceiving fully-formed ideas in a flash of inspiration. This isn't true at all. Designers almost always work in teams, and even when working solo they are often 'bouncing ideas' off other people (other designers, clients, users). Moreover, while it can be difficult to say *where* ideas come from and inspiration can indeed come suddenly, there is always a tremendous amount of work that goes into turning an idea into a refined idea (or 'concept') and developing that into a design proposal (a finished 'design'). The design studio (classroom) is an environment tailor-made to help with this process.

Urbanscape/Shutterstock.com

▶ A classroom design studio

You'll learn as much from your classmates as you do from your teacher. This happens by constantly discussing work with each other, offering feedback, giving ideas freely, and gaining inspiration about ways of solving design problems. The more active design students are in social learning, the more they improve as designers.

COLLEAGUES

FYI

It's constructive to see your classmates as colleagues – people you work *with* rather than just alongside. While you may be designing different things, you should rely on each other for feedback and suggestions.

Art Kovalenco/Shutterstock.com

▶ Collaboration is a valuable part of the design process.

SHARING IDEAS

Students sometimes struggle with the suggestions and ideas their teacher and colleagues offer them. They may respond to design suggestions in one of two unhelpful ways. They either adopt the suggestion as an *instruction*, which is especially likely if made by their teacher, or they reject it because they didn't think of it and that would somehow be wrong or stealing.

Your teacher, colleague or friend may give you design suggestions but they're not in the position to know if those ideas will work because they're not the designer; you are. It's not their responsibility to work through that idea, considering all the strengths and weaknesses, balancing trade-offs between competing demands, and so on. They can't know these things unless they become the designer. If you take suggestions as instructions, you can easily find yourself painted into a corner, trying to make an idea work despite all the flaws that later become evident.

Concerns about originality and ownership are partly due to placing too much importance on ideas. That is to say, novice designers may mistakenly believe that design is all about coming up with a 'good idea', and when this is

done the process is mostly over. In reality, designers need to consider many 'good ideas' to have any confidence that the final design proposal is the best choice from all the possibilities. A good idea is just part of the process. (See Chapter 5 for a discussion of the difference between 'ideas' and 'designs'.)

ORIGINALITY

FYI

The most innovative and original ideas result from combining ideas that most people would assume are unconnected. To be truly original, designers need an unusually wide range of experience, often in very different fields, plus the ability to see connections between apparently unrelated ideas. Acquiring this experience and ability takes years so you, as a design student, can't be expected to be very original yet. That's OK. Instead, concentrate on developing habits and attitudes that will make originality possible later – soak up ideas and inspiration from everywhere and keep designing.

GoodStudio/Shutterstock.com

You should *consider* design suggestions and ideas when you receive them. If an idea seems promising, investigate it, stretch it, twist it, try it on for size. If it turns out to be useful, adopt it and, in the process of working through the details, refining and improving it, you'll make it your own. Remember: ideas are cheap, but turning ideas into design solutions takes time and effort, and that's what designers do.

2.2 BEING PREPARED

In the next chapter we'll discuss using a design sketchbook, but first we should consider how you prepare for the subject. Studying Design will take time and commitment if you're to give yourself the best chance of success, so be prepared with a proactive attitude and the willingness to source the tools and media you'll need. Essential equipment and media are generally quite affordable, but your sketching and prototyping needs will change as you progress, and may mean collecting provisions from home or doing further research outside class time. You might have great ideas, but a lack of preparation, time and materials will make it hard for you to turn them into great designs.

▶ Avoid a rough start to your Design journey by being prepared with the correct tools.

2.3 TEAMWORK

You may work in small groups for some or all of a design activity or project. For example, working in a team of three or four is an effective way of gathering and analysing research in the Discover and Define phases. Teamwork might end with a shared design brief, followed by individual designers pursuing their own design directions.

Teamwork can be challenging because it requires coordination and communication that isn't part of individual design work. It takes effort to establish shared understanding, trust and agreement with other people (in school and in the workplace). People may have quite different underlying values and thus differing priorities within the project. If these aren't clearly articulated and discussed, it can lead to individuals working at cross-purposes and a less effective team.

> ••• To learn more about teamwork, see Chapter 22.

TURNING GROUP WORK INTO TEAMWORK

To make your design teams cohesive (working as one) it's important to discuss what you think is important and to agree on shared goals for the project.

Next, discuss how your team will operate, when it will meet, how it will make decisions, and so on. Discussing and agreeing on these 'group norms' helps reduce misunderstanding and friction. Ultimately you want to be part of a team made up of people committed to the project and each other, sharing inspiration, encouraging each other and, collectively, excelling. A cohesive and supportive team allows its individual members to learn and achieve more than they could in isolation.

FORMING, STORMING, NORMING, PERFORMING   **FYI**

Group development is recognised as an important aspect to working collaboratively. In 1965 Bruce Tuckman proposed four necessary stages for groups to work together:

1 *Forming*: group formation and acclimatisation
2 *Storming*: personality clashes, conflicts, building trust
3 *Norming*: shared responsibility, common goals, cooperative spirit
4 *Performing*: motivated and effective teamwork.

Groups that can't resolve their differences won't move past the second stage.

BUILDING TRUST

It's difficult to achieve much in a team unless the members trust each other, and trust takes time to develop if people haven't worked together before. You establish trust by keeping your promises to the team, and weaken it by breaking them. If you promise to have a task done in time for the next studio and all you have is excuses, how likely is it that your colleagues will rely on your next promise? This is why it's very important to think carefully and make sure you can deliver on any promises you make.

Communication is important for trust, too. Keep your colleagues abreast of your progress so they don't accidentally duplicate each other's efforts. If you're having difficulty with a task, let people know. If you promise to do something by a specific date and are unable to do so, let your team know *before* that date. In both situations, they may be able to help or it may affect their part of the teamwork.

▶ Teamwork is a skill that can be learnt and developed.

ACCOUNTABILITY

Trust also relies on accountability. Individuals accept responsibility for, and the consequences of, their actions. After all, one of the most common reasons for disliking group work is the sense that some people 'don't pull their weight'. Social psychologists call this 'social loafing' and it leads to resentment and lower team performance. It's one thing to trust your teammates but it's quite another to expect them to do all the work for you!

Accountability may be especially important in the classroom if it's necessary to allocate marks for teamwork. This can be challenging for your teacher because it's often impossible to know everything that takes place in a team. One way of doing this is by requiring everyone to evaluate each other's performance, a task known as 'peer assessment' or 'peer evaluation' and may take the form of a paper or online survey rating team members against criteria such as effective communication, good time management, and quality of work. Peer evaluations may include self-reflection, meaning you rate your own performance as well as the performance of your peers.

Peer evaluations conducted at the conclusion of the teamwork are a form of *summative* assessment – evaluation for marks as well as feedback. Your teacher may also require you to complete peer evaluation surveys quite early – a form of *formative* assessment – evaluation only for feedback and learning purposes. Formative peer evaluation serves as a diagnostic tool to identify and address team issues when there is still time to improve them.

⋯ See Activity: Peer evaluation on page 15.

MANAGING CONFLICT

Team cohesion does not necessarily mean constant agreement; people have different points of view, values and working styles. Committed teams can sometimes engage in quite heated discussions when members disagree. Don't panic: this is not in itself a bad thing. The passion that underlies disagreement is a sign that team members are committed to the work, which is a good thing. Remember the commitment you share and work through your differences. As long as people trust each other, there can be a much better shared understanding of the design problem and better outcomes. Also remember that different points of view are more likely to produce different ways of looking at the design problem, leading to a greater variety of design ideas and options.

GO FOR ICE CREAM **FYI**

If your team is struggling to agree on a topic and people are getting frustrated, take a break – not apart but *together*. 'Going for ice cream' involves the team doing something fun together and enjoying each other's company, leaving the argument behind for a little while, physically, mentally and emotionally. This reinforces team cohesion and commitment, allowing the members to remember that the disagreement is temporary and the team is 'in this together'. After the break, return to the discussion and you may find it easier to reach agreement.

If you feel that another team member's work is going in the wrong direction, then let them know by discussing it with them and listening to their point of view. Hurting people's feelings is counterproductive, but saying nothing robs them of a chance to improve and may harm the team. If you're not sure how to be diplomatic, discuss it with your teacher first. In some cases, your teacher may mediate a discussion to help it go smoothly.

DESIGNING TOGETHER

Design teams can explore a wider range and variety of design ideas than individuals could alone, but making design decisions may take a little more effort. How does the team decide between multiple options? The decision matrix activity in Chapter 6 may help with this process. By rating

the choices against the decision criteria, your team may find it easier to identify the most promising options.

● ● ●   See Activity: Decision matrix on page 77.

This won't, however, address the issue of ego. Every designer wants to see their work respected and their ideas valued. It may hurt your feelings to see other people's ideas gaining greater support in the team than yours. As a team, you will want to make everyone feel valued and you may be tempted to do this by forming designs made up of elements from each person's concepts. Beware of this because it can distort the decision-making process and turn the design into a patchwork solution lacking harmony and cohesion – a sort of Frankenstein's monster of a design proposal. It's important to let go of even good ideas if doing so produces a better design.

Instead, try to replace individual pride with team pride. Remember that a team achieves more together than its individuals can alone, and the design that emerges is only made possible by all of the ideas and discussions that took place along the journey. In the most effective teams, people find it difficult to remember who came up with specific ideas because they work in a very fluid back-and-forth way, and also it doesn't seem at all important.

CHAPTER RECAP

+ Listen to your teacher's advice but, remember, you are the designer of your design work. It's both your responsibility and your right to make good design decisions.
+ Show your design work to your teacher and other people in your class as often as possible. Regular feedback on your work will keep you on track.
+ Treat your classmates as colleagues – discuss your ideas with them constantly. Their feedback will make your design work better. Likewise, give your feedback and ideas freely to them for their work, which will also make you a better designer.

CHAPTER REVIEW

1 You might be fortunate enough to have a Design teacher with architectural experience. Does this mean you should only work on buildings? If you get more support designing spaces, is this the area you should work on?
2 If a class is lacking in maturity and struggles to share ideas and constructive feedback, do you think the teacher will be able to offer them as much freedom as a more collaborative class?
3 What are your priorities in a design project? Is it learning about design, helping people, creating cool designs, getting a good mark or something else? How does this inform your approach to teamwork with other design students?
4 What sorts of habits can you cultivate to become more 'self-directed' in your approach to your design work?

ACTIVITY: PEER EVALUATION

If you have a significant amount of teamwork in a design project, your teacher may require that you undertake peer evaluations to encourage accountability.

WHEN

This method is useful at any time in design projects that employ substantial amounts of teamwork.

WHAT

You'll need a team survey allowing you to rate each member of your team. You may be required to reflect on your own contribution and rate yourself in the survey as well.

RULES

1   Be sincere in your evaluation and if the survey permits you to give written feedback, do so honestly.
2   Be constructive. Imagine that your colleague will be reading your comments. How can you phrase your opinions of their work so that they'll understand your point of view without being upset?
3   Survey comments may be confidential. Your teacher may decide that it's constructive to share just the overall survey grade.

METHOD

Your teacher might instruct you to complete the evaluation on paper or using an online survey tool. For each person in your team, rate them against the criteria:

1   *Communication:* effective communication with everyone on the team throughout the project
2   *Time management:* steady progress, sharing work promptly and with enough time for others to build on it
3   *Value:* contributes a high quality of work that meets or exceeds team goals and expectations, shares work and decision-making and avoids shirking responsibility or taking on too much

FAQS

Q: I don't like working in teams because other people are lazy and I end up doing all of the work! Can't I just work on my own?

A: Teamwork is a skill that needs practice like any other. Working in teams is often essential in the adult world, so learning to be a good colleague is important. Having high standards, by itself, doesn't make you an effective team member, so working in teams can help you as well as less motivated students.

Q: I've had health/family issues that have made it difficult to do my share of the team's work and I'm worried my colleagues will give me a low peer evaluation score. What should I do?

A: Communication will help. It may be difficult to admit you're having problems, but be frank, sharing as much as you are comfortable with. You may be surprised how supportive and encouraging your colleagues are if you give them a chance. Let your team know as soon as you anticipate problems so that they can redistribute work across the team. Let your teacher know too so that they can help.

YOUR DESIGN PROCESS
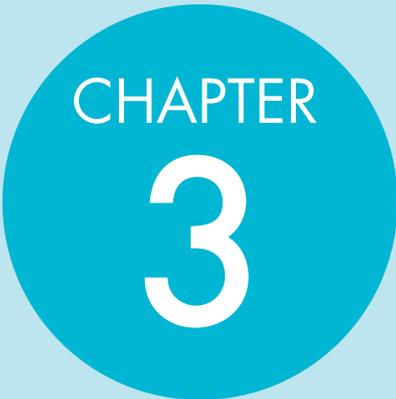
The alternative to good design is always bad design. There is no such thing as no design.

Adam Judge

In this chapter:

Learn the language:

+ analogue sketch
+ CAD
+ design challenge
+ digital sketch
+ iterative development
+ parallel ideation
+ sketchbook
+ tame problem
+ visualisation
+ wicked problem

This chapter will help you prepare for designing by considering the philosophy underpinning the design process, the steps you'll follow, the things you'll need and how to manage the time you have.

3.1 THINKING ABOUT THE DESIGN PROCESS

Take a few minutes to read through Chapter 11 on design process models. You'll see the Double Diamond design model, adopted by the QCE Design Syllabus, as well as several other models.

Designers break down the design process in different ways, using different words or placing emphasis on different aspects, but they all have much in common. As you learn about design, you might like to try out these different ways of thinking about design to see what feels right to you.

In the previous chapter we discussed the nature of design – how it's a problem-solving process for producing physical or digital things that serve the needs of particular people. Let's look at a definition of the process that draws out important characteristics and their implications for how designers work:

Design is a non-linear process that uses parallel ideation and iterative development to create designs that solve problems.

That's quite a mouthful so let's break it down. We'll start from the end first because everything follows from this. We often talk about 'design challenges' as problems in search of solutions (though there are other ways of thinking about design; for example, a process that manages a change from one state or condition to a more desirable state). Some design problems are quite straightforward and well understood ('tame' problem), while others are complex ('wicked' problems). Regardless of complexity, there's frequently many ways of solving a design problem and no single 'right' answer; instead there are many competing demands and design criteria, which means that any approach involves lots of judgement and trade-offs. It's likely that you'll never have complete knowledge of everything at play in a design project, partly because everything is so interconnected, but also because many factors are changing during the project. The design process is a machine for producing results despite these uncertainties.

To read more about the Double Diamond design process, visit the Double Diamond page on the Design Council UK website.

Weblink
The Double Diamond
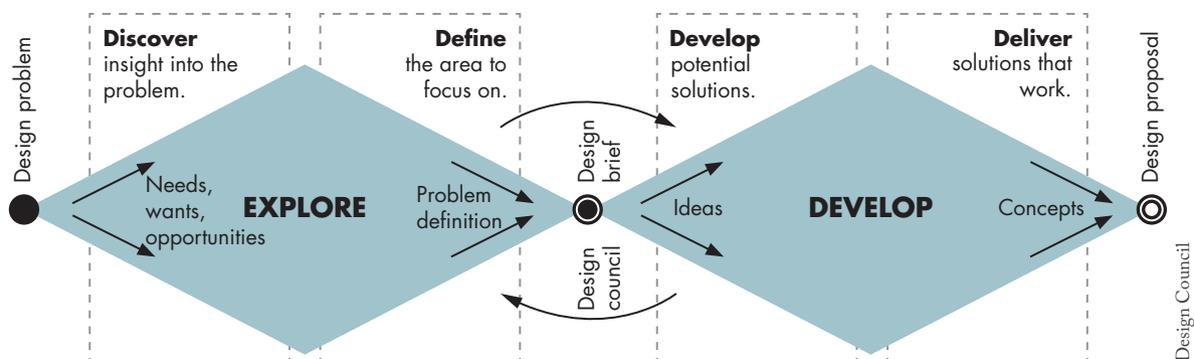
▶ The Double Diamond design process

These complex problems mean that there is no rigid sequence of steps you can follow to come up with a solution. Instead, designers adopt a non-linear process that involves lots of experimentation. From the outside this can look like a lot of chaotic back-and-forth, but it's always for a purpose. (This is represented by arrows within and between the diamonds in the Double Diamond diagram.)

Parallel ideation is a fancy way of saying that designers don't stop at the first idea that comes to them. They know that there are no perfect 'answers' and each design is a result of trade-offs between competing project criteria. Instead, designers try to think of multiple good ideas, and examine them all to see which is the optimal solution in the given circumstances.

▶ Parallel ideation is featured more in some disciplines, such as graphic design and industrial design where it's common to present multiple design concepts to the client, and not so much in others such as architecture.

Iterative development follows on from parallel ideation: a good idea isn't the end of the process, it's only the start. Promising ideas are 'tested' against the project criteria to see how they perform, and are then improved in a subsequent iteration. Each iteration reveals more about the nature of the design problem, often raising new questions (more research!) and suggesting new ideas to explore. You might think of this as a sort of evolutionary process where each generation of ideas is improved and refined. Combine this with parallel ideation, and the design process often involves the refinement of multiple ideas at the same time, before one finally emerges as the final design proposal.

Does this sound complicated and confusing? It can be at first, but it's also a lot of fun and it gets results. As you complete more design projects, it will start to make more sense to you. Remember: have faith in yourself, and your teacher will be there to guide you each step of the way.

TAME AND WICKED PROBLEMS

In the 1970s, the terms 'tame' and 'wicked' problems were used to describe challenges related to urban planning. Over time, the terms have been applied to define problems in a range of areas, including design.

A tame problem is one that can be clearly defined in a design brief, understood by the key stakeholders, and addressed in isolation from other issues and factors. The designer can methodically analyse the components of the problem and formulate a design direction to explore. For example, a local plumber requiring an identity design for use on a website, van and stationery might start a series of helpful investigations:

+ Who is the audience (people who need plumbing services)?
+ Where will the logo be used (e.g. website, van, business cards, letterheads, fridge magnets)?
+ What do other plumbers' logos look like?
+ What values and impressions would the client like to convey (e.g. reliability, quality, fast service)?
+ What is the budget?
+ What must the design achieve?

One aspect of tame problems is that you generally know when you've got a solution. This is often not the case with wicked problems. A wicked problem is far more complex and may be influenced and connected to other factors external to the design solution. Examples of wicked problems in society are climate change, homelessness and poverty, and sustainability. These are problems that defy straightforward solutions and for which there is no 'right', and seldom no 'optimal', solution. Wicked problems are influenced by myriad factors and may be based on entrenched behavioural, political and cultural systems. A wicked problem needs a research focus that investigates and understands the systems that create and maintain it, and the understanding that useful design solutions are unlikely to 'fix' the whole problem.

For example, designers working for a local government authority on the problem of homelessness would be confronted by many questions and competing constraints and many proposed solutions would lead to other problems and challenges.

+ What causes homelessness? We may find out that there are many causes, including financial, emotional, mental health, and lifestyle choices, and that homeless people are a diverse group in need of different responses.
+ What form might solutions to homelessness take? We might imagine such approaches as more affordable housing, tents designed for city parks,

warm coats to sleep in during colder moths, financial support, and mental health services. Many of these are not *design* solutions but may be needed if a physical design solution is to succeed. Also, many solutions would lead to other problems; for example, very few people want tent cities popping up in parks near their houses.

Takatoshi Kurikawa/Alamy Stock Photo

▶ A homeless encampment on a street in Sydney

3.2 YOUR DESIGN PROCESS

Right from the outset, accept your personal design process, your way of designing, as *yours*. It will change and improve as you acquire knowledge and design experience, informed by your skills and the way you think. It will also be affected by the kinds of things you design.

PERSONAL PREFERENCES

The best designers take a highly flexible approach to the way they work, constantly reflecting and looking for ways to improve. When new tools and technologies come along (e.g. virtual reality, discussed in Chapter 9), they experiment with them to see if it resonates with their way of working. This is no different from where you are in the early stages of your design journey – constantly learning and improving – only that right now almost all of it is new to you.

This quote is surprisingly apt for students of design:

Some consider it noble to have a method; others consider it noble not to have a method. Not to have a method is bad; to stop entirely at method is worse still. One should at first observe rules severely, then change them in an intelligent way. The aim of possessing method is to seem finally as if one had no method.

The Mustard Seed Garden Manual of Painting

Having 'no method' will leave you adrift and unfocused as you try to design. Clinging too tightly to a method will make you unable to adapt to the demands of the problem. Master designers sometimes appear to have no method because they have internalised so much knowledge that their process happens invisibly in their heads. Meanwhile for the novice, everything can feel confusing and the challenge insurmountable … but everyone starts out this way.

In class, your teacher may require you to follow a specific method and series of steps in your design problem, some of which may seem strange or unhelpful at first. Follow their advice and learn by doing. Later, reflect on how this method worked for you, and refine or discard it as you see fit. As you get more design projects under your belt, you may have more freedom in how you approach your design projects. (This is characteristic of university design education: first-year classes tend to require specific tools and processes, while final-year classes may give the student almost complete freedom.)

TYPES OF DESIGN PROBLEMS

A well as personal preference, the way designers work is deeply influenced by the field they work in, its traditions and tools. This is because the object being designed has a big impact on the steps designers follow to design that object and, in turn, this influences the practices and traditions of that design profession. This is why there are quite distinct design professions (known as 'design disciplines') because deep 'domain knowledge' of particular types of problems is necessary.

For example, designing a building means having a great deal of knowledge about sites, building techniques, the building industry, how people use spaces, and so on. Conversely, designing fashion garments requires deep knowledge of fabrics, sewing, body shapes and sizes, the garment industry, fashion trends etc. When seen at a high level, the design processes employed in the design of buildings and garments may be recognisably similar, but day-to-day activities are very different. That's not to say you should be stuck designing one type of thing; many designers' careers cross disciplines.

▶ Fashion designers discuss methods and materials.

No one can reasonably expect you, as a high school design student, to learn a great deal about a variety or even one design discipline (though you may find it interesting). The Double Diamond model, and the others discussed in Chapter 11, should be your focus. If you decide to pursue design as a profession, you'll learn about specific design discipline practices at university and in the workforce.

3.3 YOUR SKETCHBOOK

In this book we often use the term 'project sketchbook' or 'design sketchbook' to mean a collection of all the 2D work you're doing in your design classes, usually for a design project but sometimes also non-project design activities such as classwork homework and other activities. Keeping all your work together helps your teacher guide your learning. By quickly flicking through your sketchbook they can quickly see where and how to help you improve. Keep your work together and bring it all to each class.

In Units 1 and 2 you might do design projects but also design exercises that aren't part of a full 'project'. These help you develop your skills in the different phases of the design process without needing to run through the whole process each time. Your teacher might ask you to keep all of that work in a sort of 'unit sketchbook' to help them guide your overall learning.

When it comes to Units 3 and 4, however, your work will revolve around design projects for assessment so start a new sketchbook for each one. At the end of the project you'll be choosing specific pages from your sketchbook to demonstrate your design process. (Naturally you'd exclude any non-project pages from this.)

Sketchbooks have several important purposes:
+ *Thinking tool:* It's a problem-solving tool to help you think visually and work through your designs by sketching.
+ *Process record:* It becomes a comprehensive record of your design work, which helps you communicate with your colleagues and teacher so they can understand your design process and give you feedback about your design ideas.
+ *Assessment:* It helps in the assessment of your work. You'll choose pages from your sketchbook to demonstrate the rigour of your design process when you submit your 'response' for assessment.

⦿ We share some advice on assessment in Chapter 6 on page 73.

ASSESSMENT RESPONSE

An assessment response requirement may read 'up to 10 A3 pages' representing the design process. Some students become confused by this and produce a sketchbook that is only 10 very dense pages in total. This is not an authentic or helpful way of producing good design work.

SKETCHBOOK FORMATS

There is no perfect format for a design sketchbook; experiment and find what works best for you. Your choices include bound books of various sizes, or unbound collections of separate pages clipped together or collected in a folder.

+ *Small notebooks* are popular with some designers because they can be easily carried around so that when an idea pops up it can be recorded no matter where they are. The disadvantage of small page sizes is that they're too small to see much detail at once, making them hard to use for serious design sessions.
+ *A4 sketchbooks* are portable and, when spread open, provide a reasonable amount of space to sketch multiple ideas.
+ *A3 sketchbooks* provide ample space to record and explore design ideas but are less convenient to carry and difficult to use on the go when an idea appears.
+ *Bound sketchbooks* excel at keeping design notes together and it's easy to preserve the chronological order of the design process. Things become less satisfactory if you feel the need to insert material (research, photocopies, photos, printouts etc.) into a bound book. Avoid trying to insert large volumes of research into a sketchbook – it becomes unwieldy – but the occasional important reference page is fine.
+ *Unbound sketchbooks* are a flexible alternative to bound books. This allows you to use separate sheets of paper, adding pages as needed. This makes including printouts from research, photos of models and different types of paper (photocopy paper, tracing paper, graph paper etc.), and reordering them, easy if required. Keep the pages together in a folder or use a large clip.
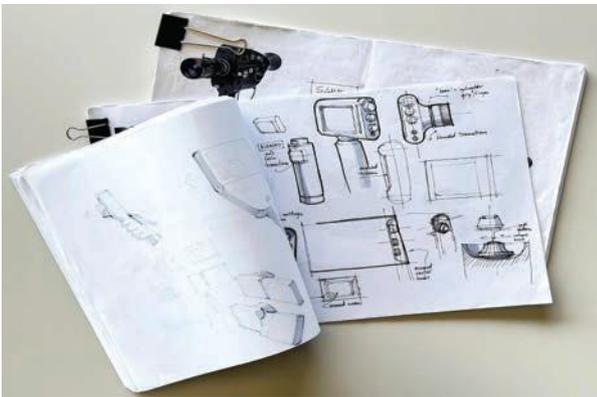
▶ A3 unbound design sketchbooks

The most popular format for many designers is A3 photocopy paper clipped together with a bulldog clip. A sketchbook like this can easily grow to be 30–50 sheets of paper for a long project. To make it easier to carry in your school bag, simply fold the A3 sketchbook in half without creasing it. The pages will get a little dog-eared over time but that's OK – a design sketchbook is a tool not a work of art.

A3 paper is also the required format for official Design Syllabus submissions, so working on A3 will simplify your assessment submissions.

SKETCHBOOK CONTENTS

What should you put into your sketchbook? In a word, everything. Remember: it's a thinking tool and a process record so if you've written, drawn or made something while designing, it has a place in your sketchbook. You can't put three-dimensional models in, of course, but photographs of your prototypes make useful additions to keep track of what you've done and help build on your ideas. (Sketching directly over a photo of a model is a very effective development technique.)

Things to put in your sketchbook:
+ written project notes
+ brainstorming notes
+ annotated research photos and notes
+ images of designs that inspire you (inspiration boards)
+ research images that help you understand stakeholder tastes (mood boards)
+ design sketches
+ prints of useful 'image2image' AI renders of your sketches
+ design detail sketches
+ photos of prototypes and models
+ print of key digital models, CAD or renders
+ presentation planning sketches.

Many beginner designers worry about sketching because they feel their sketches don't look attractive. Don't think this way – no matter how crude a sketch may be, if it's useful, it belongs in your sketchbook. Conversely a 'pretty' sketch may impress people, but if it has distracted or slowed you down, it's not very useful. Your sketching is to help you think and design, not to produce attractive art, and, like all skills, will improve in speed and quality the more you do it.

In the same vein, don't worry about how neat and tidy your sketchbook looks. Avoid embellishing it with decorations, elaborate headings and premature detail. (Embellishing your sketchbook can be enjoyable, but don't let it distract and slow you down.)

Organise your pages chronologically – older pages at the front, newer pages at the back – and make a habit of recording the date in the corner of each new page. This is useful because if you take a page out of your sketchbook for some reason, it's easy to return it to the right spot, plus it can help you reflect on your design process when you've completed the project (what you did and when). It's not necessary to change the date when you go back to add something to an older page.

Andrew Scott

Andrew Scott
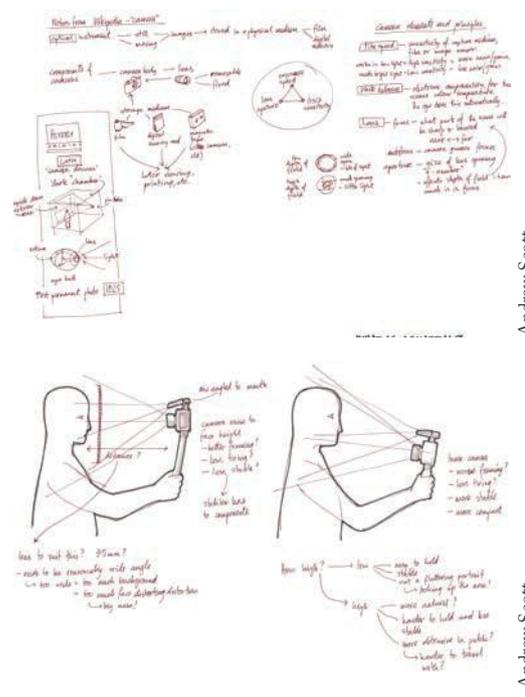
Andrew Scott

Andrew Scott

▶ These A3 sketchbook pages are sketches showing the first pages from an industrial design camera project and contain lots of written notes and some research photos. These and other early pages helped the designer decide to design a camera for bloggers.

3.4 VISUALISATION

With all of this talk about sketchbooks, you're probably thinking you'll need to do a lot of drawing during your design project. While you'd be right, experienced designers use many tools and techniques to explore and develop their design ideas. We'll discuss this in Section 2, but for now let's discuss the kinds of visual representations that you may find useful.

Designers often use the term 'visualisation' to include a wide variety of visual representation tools they use to 'see' their design ideas. This is useful to remember because it's more than just pen and paper. Designers embrace all tools and media they find useful to help them think about and test their designs, which may include, but is not limited to:

+ sketching on paper (analogue sketching)
+ sketching digitally on a tablet (digital sketching)
+ making a fast low-fi prototype (physical model in cardboard, foam, fabric, whatever works)
+ making a fast low-fi digital prototype (wireframing an app or website idea, low-detail CAD model)
+ using virtual reality conceptual software (e.g. Gravity Sketch).

Many types of visualisation tools and techniques are discussed in Section 2 of this book. All of them have value for two reasons:

1 They help the designer to generate, simulate and test design ideas.
2 They help the designer to communicate and discuss design ideas with other people.

It's necessary to do the first before you can do the second: the communicating part isn't as important as the thinking part. Keep this priority in mind when you're drawing in your sketchbook. The purpose is to generate and develop design concepts, not to impress people with beautiful drawings. The visual quality of the visualisation is irrelevant. In fact, quantity (and speed) is much more important than quality.

This is good news. You don't need to be a great sketcher to be a designer (famous designers are not famous for their sketches), although there's a definite benefit to cultivating your sketching ability. There is some relationship between ability to sketch and ability to rapidly explore design ideas.

The best way to have a good idea is to have a lot of ideas.

Linus Pauling

SPEED FIRST

As you develop your ideation sketching, focus first on speed and only later on quality. Speed gives you the power to explore many ideas quickly, which makes it more likely some of them will be good ideas.

Designers have always found drawing on paper to be useful for coming up with, developing, testing and communicating design ideas. There's nothing as immediate as grabbing a pen and some paper and quickly capturing an idea. However, there are many other useful tools in use today, along with much confusion in the minds of design students on when and how to use them. We'll discuss this later, but it's worth mentioning here that some tools are more effective when used late in the design process. For example, computer-aided design ('CAD', sometimes known as computer-aided drafting and design, 'CADD') is an essential tool in most design professions, but a trap for novice designers who prematurely invest time building CAD models of immature, unproven ideas. CAD, and more recently AI image generation, allows for the creation of superficially polished renderings of *underdeveloped* design ideas. This can lead to 'design fixation' – converging on a solution too early.

DON'T BE PRECIOUS WITH YOUR SKETCHBOOK

Your sketchbook is a tool for designing, not a work of art. Designers use sketches to discuss ideas, and many find it difficult to think without a pen in their hand. When discussing your work with a colleague or your teacher, it's natural for both of you to sketch in your sketchbook, sometimes directly over sketches you've already done. These will be loose 'back-of-the-napkin' sketches to aid the discussion of ideas, not

attractive, nicely rendered illustrations, but they can often be the most useful, pivotal drawings in your sketchbook. Don't shy away from letting other people add to your sketchbook like this.

For some useful advice for your sketching watch the following videos on YouTube:

- Sketching Basics 1: All about lines
- Sketching Basics 3: Line weight
- Bubble diagrams for spatial planning

Weblinks
Sketching Basics 1: All about lines

Sketching Basics 3: Line weight

Bubble diagrams for spatial planning

SKETCHBOOK ANNOTATION

Let's take a moment to look at why you write as well as sketch in your sketchbook.

The audience for written notes in your sketchbook is you, the designer, and the reason you make them is as notes to and for yourself so that you won't forget ideas and insights as they come to you. These notes include lists of things to do, ideas that pop into your head, what's next, and so on. These notes are aids to your thinking and memory with the goal of supporting your design process. If your notes slow you down, your design process becomes less efficient and less effective.

Alongside these personal notes, it's also useful to add a very limited amount of bullet-point text to show how you're evaluating design ideas against your design criteria. This helps your teacher and other assessors get a better idea

of how you're making design decisions. Just take care that your pages are overwhelmingly visual, not written – lots of sketches with brief, little bits of text. Any time you find yourself writing full sentences or paragraphs, check that you haven't lost your designing focus. After all, this is Design, a subject centred on doing and making, not on writing.

Andrew Scott

▶ An A3 sketchbook page for a blogging camera. Note how loose most sketches are and the limited number of annotations. There's also room for assessment annotations to be added later if needed.

Andrew Scott

▶ Annotations over photos of handgrip models. This is an effective way of recording thoughts and discoveries from low-fi prototyping experiments.

ADD A TITLE TO EACH PAGE

Make a habit of adding a title to each page of your sketchbook that loosely describes what the page is for. This helps you find things quickly and is especially helpful for your teacher as they skim through your sketchbook during your regular studio consultations. They don't need to understand every sketch on every page, but they'll be able to grasp the flow of your process and make suggestions for things to improve.

You'll find some suggestions for annotating your work for assessment in Chapter 6.

3.5 MANAGING YOUR TIME

As we discussed, the design process is non-linear. If you charted your progress through the Double Diamond with a line, you'd find it to be rather messy and convoluted. Designer Damien Newman created his famous 'Process of design squiggle' to help convey this to his clients.

Weblink
The Design Squiggle

The Process of Design Squiggle by Damien Newman, https://thedesignsquiggle.com

▶ The 'Process of design squiggle' by Damien Newman

The squiggle might give you the impression that managing your time in design projects is impossible. In practice it's both possible and necessary, otherwise

you spend too much time on some tasks and not enough on others. Looking at the Double Diamond, you would be forgiven for thinking you should spend about half of your time in the Explore phase and the other half in the Develop phase. This is very rarely the case though; in general you want to spend more time in the Develop phase, *devising and developing*. Another way of thinking of this is that the Explore phase overlaps the Develop phase because while *devising and developing,* you'll frequently need to *discover* (research) answers to questions that arise and occasionally this will alter your view of the design problem (*defining*).

Aim to complete your design brief as early as you can and move on to generating design ideas. As you learn more about the design problem through the process of developing design concepts, you may need to make small adjustments to the brief. In professional design projects, this would need the approval of the client. The brief is an agreement between designer and client, so it's not something the designer can change without discussion. In the classroom, always discuss changes to the design brief with your teacher. Substantial or frequent changes to the brief can add a great deal of extra work or complexity to a student design project and it's your teacher's role to help the project challenge you without overloading you.

MAKING A PROJECT PLAN

At the start of your project, draw up a list of the things you'll need to do and set goals for when you'll complete them. Track your progress, week to week, against your plan, adding notes to record when you actually did things. (Dating your sketchbook pages helps, too.) This will help you stay on track and learn how long different parts of the design process take. Each week, check your plan to see what you should be working on. The approach of an important milestone may help you decide to finish work on tasks that are dragging so that you won't fall behind. Deadlines are an inevitable and necessary part of getting things done and everyone who's invested in their work finds them stressful in some measure. The more you practise managing your time, the less stressful deadlines become.
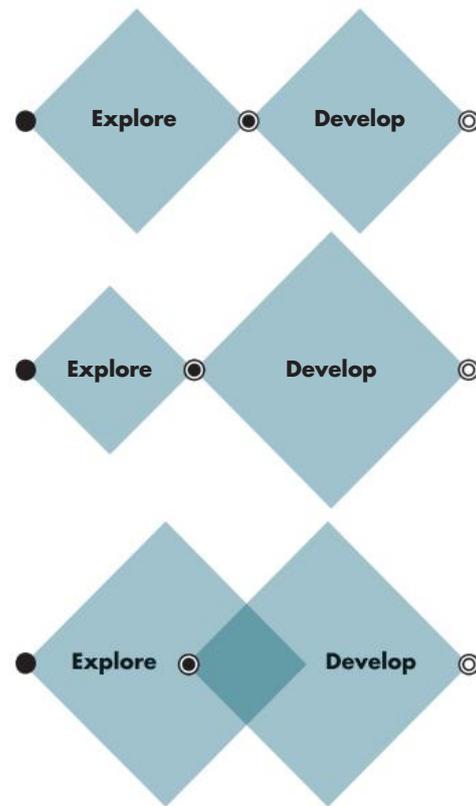
▶ The Double Diamond design process may seem to imply that each phase is equal in duration and sequential (top version), but this is rarely true.

You may find project and time management challenging at first but experience will improve your ability to anticipate how much time you need to do things. Start with simple project plans and add more detail as you gain experience. Ultimately the goal is to keep some measure of control, and peace of mind, while navigating the unpredictability of the design process.

Going forward, we'll mostly be discussing full design projects, the sorts of design activities you'll sometimes do in Units 1 and 2 but always be working on in Units 3 and 4.

FYI
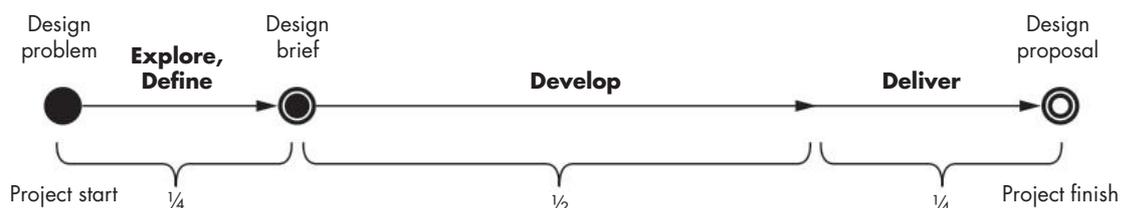
▶ In most projects, try to allow at least half of your time for the Develop phase.

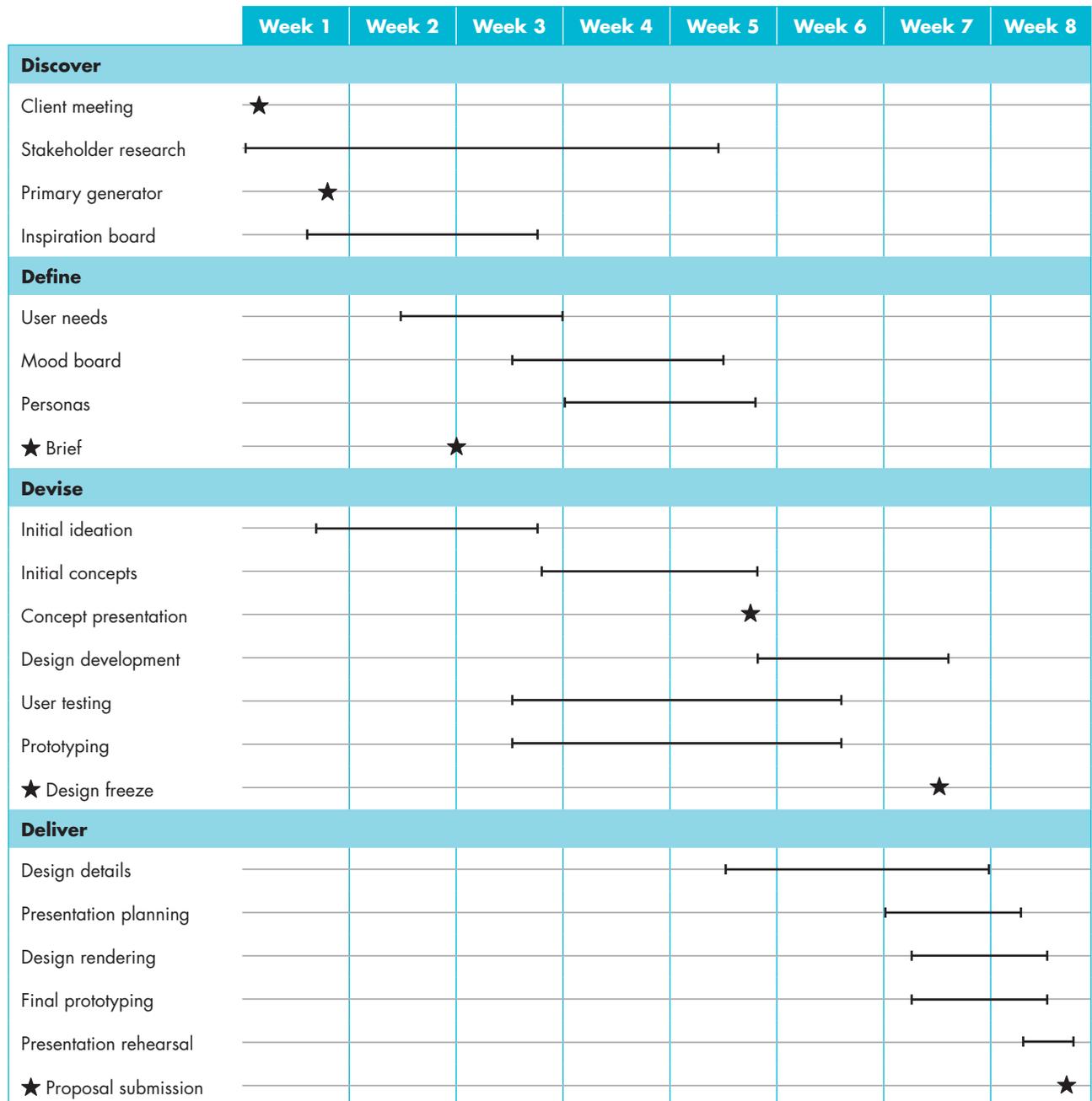One way of making a project plan is to create a bar chart showing a list of activities vertically, the time horizontally, and starting and end times for each activity. This is known as a Gantt chart and is easy to make using some grid paper or spreadsheet software. (You might also use dedicated project management software but most have an overwhelming number of features that you don't need for this purpose.)

Below is an example illustrating the approach and some of the features you might find useful:

+ *Columns for each week of the project* (eight weeks in this case). Include any weeks without classes so you can get a true sense of the time.

+ *Rows for the design activities you think will be needed.* Categorising them under the four Double Diamond phases may help.

+ *Stars indicating important milestones and deadlines.* You may have no control over some of these (e.g. proposal submission deadline) while others may be self-imposed.

+ *Activities that your teacher recommends and others that you expect to be useful.* Allow room to add more as needed.

+ *Bars showing your estimations of how long you should spend on activities.* You may find it helpful to work backwards from the final deadline and other milestones.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Discover								
Client meeting	★							
Stakeholder research	●────────────────────●							
Primary generator	●──────★							
Inspiration board	●────────────●							
Define								
User needs		●────────●						
Mood board			●────────●					
Personas				●────────●				
★ Brief		★						
Devise								
Initial ideation	●────────────────●							
Initial concepts				●────────●				
Concept presentation					★			
Design development					●────────────●			
User testing			●────────────────●					
Prototyping			●────────────────●					
★ Design freeze							★	
Deliver								
Design details					●────────────●			
Presentation planning							●────●	
Design rendering							●────●	
Final prototyping							●────────●	
Presentation rehearsal								●──●
★ Proposal submission								★

▶ This example of a project plan Gantt chart shows the activities and time required for the project.

Note that many activities will overlap and some may require intense work for a short period followed by a long tail where you revisit or revise your understanding. For example, you may plan to define stakeholder and user needs in the first few weeks but find it necessary to adjust this work during the Develop phase.

Resources
Template: Project planner

You can download and print a project planner template from Nelson MindTap.

Keep your project plan in the front of your sketchbook and refer to it often.

3.6 MANAGING YOUR EMOTIONS

It may help you to acknowledge that there is an emotional aspect to the designing journey. You will experience highs and lows, excitement and disappointment, confusion and insight, concern and satisfaction. At times the design problem may seem insurmountable, and you'll doubt your abilities. At other times you'll be excited to share your design ideas. These are usually passing states but it can feel like an emotional roller coaster. Accept that while designers seek perfection, we understand that it's always just out of reach. Be kind to yourself.

If you're dedicated to doing a good job, you'll become emotionally invested in your work. This is wonderful, and even necessary, but you may feel very vulnerable when you show your work to others and hurt when they criticise it. There are a few things to remember when you feel this way, though they may not make the experience painless:

+ *Feedback is a gift.* However unwelcome it may feel at the time, constructive feedback has the potential to make your designs better. (This is why one of the best things you can do for your fellow designers is give them honest, constructive feedback as often as you can, and hope they do the same for you.)
+ *You are not your designs.* Constructive criticism of your design work isn't criticism of you as a person. Be passionate about your work but cultivate a little emotional distance, too.

+ *Feedback isn't always right.* Sometimes people misunderstand your design ideas or simply don't fully appreciate their value. Even this is valuable feedback because it may help you communicate your design intent more clearly next time.
+ *You're not alone.* Your teacher, colleagues and others can help you. Listen to them, rely on them, learn from them.
+ *Trust the design process.* It's a machine for solving design problems. Don't worry if you can't see a solution at the start of the process (it's probably not a very interesting project if you can!). Work the problem and you'll succeed. (Grasping tightly to a very early design solution can sometimes be a mental block to seeing innovative approaches. See the Idea Dump activity in the next chapter.)
+ *Trust yourself.* If you work hard on your designs and make decisions informed by research and evaluation, your design ideas are likely to be useful. The trick is to find a balance between trusting yourself with confidence and listening to feedback with humility.

Above all, remember: you can do this!

IF YOU'RE NOT HAVING FUN, YOU'RE DOING IT WRONG.

FYI

Let's face it, designing things is cool, so enjoy your design work. There's some evidence that designers are at their most creative when they *play* with ideas, revelling in exploring and experimenting with design solutions. While this kind of play is purposeful, it's also fun. You might even say that having fun is necessary to design well.

Sometimes you'll be required to work on a design project for something that doesn't necessarily interest you at first and this may sap your motivation. (In the next chapter we discuss motivation.) When this happens, try to find something in the project that is fun, some aspect that allows you to play. It may be a little thing, an interesting idea that excites you, but it may be all you need to spur you on. After a while, you may suddenly discover the project is more interesting than you thought.

CHAPTER RECAP

+ Take ownership of your design process. Always be willing to try new things, follow the advice of your teachers to try new approaches, then reflect on what works best for you and build on those things. Review Chapter 11 on design process models. What methods make sense to you?
+ Start a new sketchbook for every design project and make it a comprehensive record of your design process. Loose A3 photocopy paper held together with a large clip is an affordable, flexible format.
+ Draw up a project plan and keep it in the front of your sketchbook. Refer to it often and add notes and adjustments as you go.
+ Focus on speed and quantity of sketching, not beauty.
+ Take photos of your prototypes and add them to your sketchbook as you make them.
+ Keep your sketchbook pages in chronological order, oldest first, newest last, and add the date to each new page as you work.
+ Remember to have fun. If you're not enjoying designing, see what you can change to bring the fun back.

CHAPTER REVIEW

1 How are you feeling about the project at this moment?
2 Using an iterative development design process, draw a hat that makes someone feel better. You should try and create as many designs as you can in five minutes with each one making small changes to the previous.
3 With parallel ideation in mind, can you create a portable tent for someone experiencing homelessness? Create at least three very different concepts. Then you can choose the best concept, perhaps combining different attributes from each if that gives you a better outcome.
4 Sketch the Double Diamond; write around it words that describe how you feel about how each works. Add some smiley faces at the top, with the happier faces aligned to part of the process you think you will enjoy the most.
5 Categorise the following problems as 'wicked' or 'tame'.
    a   the rates of homelessness in cities
    b   a commuter vehicle that uses biofuel or solar power
    c   a life jacket with in-built emergency medical supplies
    d   the impact of climate change on polar regions
    e   a community-based plastics recycling depot
    f   rubbish build-up in the Pacific Ocean
    g   refugees fleeing war zones
    h   a sustainable, inexpensive housing solution

STARTING YOUR DESIGN PROJECT

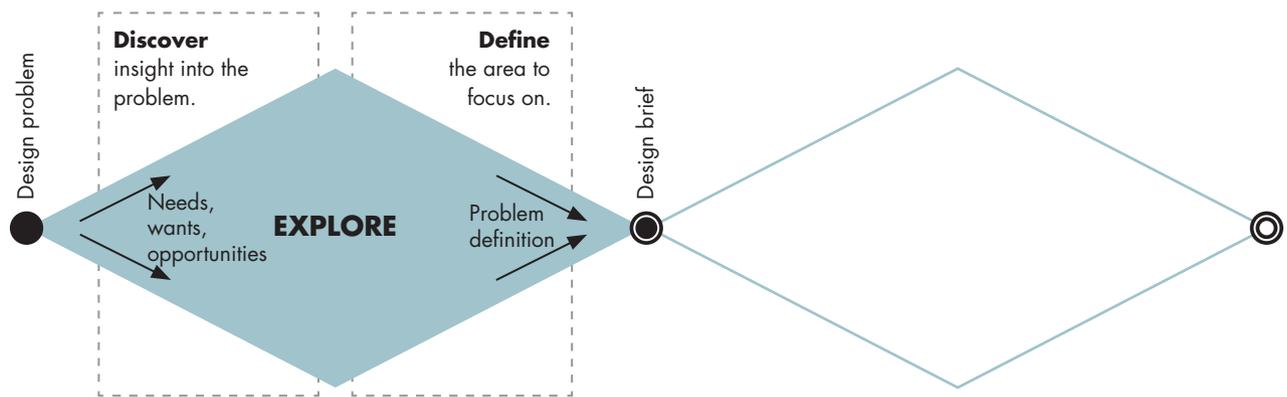I love doing research. It's like cheating, but with permission.

Greg Rucka

In this chapter:

Learn the language:

+ brainstorm
+ client
+ convergent thinking
+ design brief

+ divergent thinking
+ framing
+ primary research
+ secondary research

+ stakeholder
+ state-of-the-art
+ user

This chapter will look at beginning your design project, including understanding the needs of your stakeholders, researching the problem and formulating the design brief. This stage of the project is described by the Discover and Define phases of the Double Diamond, collectively labelled the Explore phase.

4.1 MEETING THE PROBLEM

Most professional design projects begin with a client meeting, sometimes known as the 'client briefing', to discuss the project and their goals. The client briefing is the beginning of the Discover and Define process that culminates in the design brief. For designers it's important to make a positive first impression and establish a good rapport that will be the foundation for this and future work. Your school projects may begin in a similar way, although often your teacher will play the role of client because it's not always possible to have real-world clients that fit in with the educational needs and timing of a school project. (Even if you have a real client, it's likely that your teacher will stand in for them in many of your classes.)

Your goal for this client briefing is to make a good start at understanding the client's goals and needs. Any preparation you can do before the meeting will help you ask insightful questions that provide useful information, while convincing the client they're in good hands. This preliminary research may include:

+ learning about the client: what do they do, what is their business/organisation about?

+ researching the project context: if the project is about a place, then where is it, what surrounds it? If it's an object, then where will it be used?

+ finding out who may use the design and what their needs might be. (See Chapter 13 and Chapter 19.)

During the client briefing, stay focused, be polite and take good notes. Don't be too shy to ask questions – it helps everyone and your point of view is valuable. Keep all of your preliminary research and client briefing notes in your project sketchbook.

NO STUPID QUESTIONS

Don't be embarrassed about asking the client basic questions. You can't know everything at the start of the project; the designer's 'outsider' perspective, and relative ignorance, is a strength, not a weakness.

Depending on the circumstances of your project, you may visit a site or look at existing designs. These are great opportunities to take pictures and make observations of all things happening upfront and behind the scenes.

So begins the Discover phase of the Explore diamond: identifying needs, wants and opportunities.

UNPACKING THE PROBLEM

After the client briefing, perhaps in the same or next design class, you begin the process of analysing and understanding the design problem (as well as how it relates to your assessment requirements). This is sometimes referred to as 'unpacking the task'. Any preliminary research you've done will help with this.

Your teacher may conduct this discussion in several ways and there are many useful methods that can assist. Fundamentally they seek to benefit from the 'social learning' we discussed in Chapter 2. Harnessing the diverse sets of experiences and viewpoints of people in the class benefits everyone. In fact, the more atypical a person's viewpoint on the problem, the more it widens the class's understanding. If you have colleagues in the class who are from another city, state or country, their perspective may be very valuable.

Class activities might take place with the whole class or in small groups. Small group discussions make it easier for everyone to share diverse thoughts. Class discussions allow everyone to benefit from questions and observations. To get the best from both approaches, your teacher may start with a class discussion, then conduct small group discussions before concluding with another class discussion to share ideas and address questions uncovered in the groups.

See Activity: 5Ws on page 38.

See Activity: Mind maps and concept maps on page 39.

Another popular technique to use early in the Discover phase is brainstorming. Brainstorming is useful to help with divergent thinking because it harnesses the different viewpoints and experiences people bring to a problem. This is why brainstorming is not something you can do on your own (the word for that is 'thinking'). Brainstorm in a group of four or five people to think of as many aspects and facets of the design problem as you can. For example, who are all the different types of stakeholders? Brainstorming is also useful at the start of the Devise phase.

See Activity: Brainstorming on page 40.

STUDIO ACTIVITIES

We'll suggest a variety of activities and methods, in this and following chapters, that may help you work on your design project. Note:

+ You don't need (and probably shouldn't) use every method in every project. Some methods may resonate with you more than others.
+ We mention activities at the stage of the design process when they are most commonly used, but many may be used at multiple stages.
+ Some methods are more advanced than others and may be more suitable for use in Units 3 and 4 rather than Units 1 and 2. Rely on your teacher's advice.
+ There are many other methods and variations on these activities to be found in design books and websites.

4.2 COMMITTING TO THE PROJECT

At the start of your project, take a moment to ask yourself about the value of the project and your commitment to doing it. Who will it help and to what degree? Does the planet need this thing? Is it a worthwhile use of the finite resources of the world? (Sustainability's a challenging topic. Few school projects are actually built, so the question of sustainability is not pressing, but sustainability should always be in your list of considerations.)

Such questions don't mean that every design project needs to achieve something profoundly serious and important – after all, people need beauty and fun in their lives as much as practicality – but the costs of a design (socially, financially, environmentally) should be proportional to its benefits.

To learn more about design considerations, see Chapter 12.

To learn more about ethical and legal considerations, see Chapter 21.

If you decide the project is worthwhile, ask yourself if you're ready to commit to it. Do you commit to doing your best? There are both ethical and emotional elements to this. You always have a choice but that doesn't necessarily mean it's always an easy one, especially if the choice is between passing your subject or not (or getting paid or not, in the case of professionals); nevertheless you have the right to make a choice and a responsibility to make a wise one.

> We don't get a chance to do that many things, and every one should be really excellent. Because this is our life. Life is brief, and then you die, you know? So this is what we've chosen to do with our life … So it better be damn good. It better be worth it.
>
> Steve Jobs

4.3 ENGAGING WITH STAKEHOLDERS

In talking to the client, you've already begun engaging with the project's stakeholders, the people who have a 'stake' in the design outcome. The client is perhaps the most obvious stakeholder, but no less important are the people who will use the design solution. Sometimes the client and user are the same person (e.g. someone wanting you to design a home for them to live in), but often they are quite different people whose needs are different.

In commercial contexts, for example, the client's goal may be to have a thing they can produce and sell for a profit, be it a house, a garment, a logo or an appliance. For the design to be successful for the client, it therefore needs to be useful and attractive to the people who may purchase and use it, but this doesn't necessarily mean the client's needs are the same as the users. Perhaps the client would like the product to have a limited life span, for example, so that people need to buy it many times, although this may conflict with user preferences. There are also different groups of users, possibly with conflicting needs – see Chapter 13 for more on this.

Identifying these possibly conflicting needs is a large part of the Explore phase of the design process. In a sense, the designer may have the difficult job of serving two masters!

CLIENT NEEDS

Talking to the client would seem like a fairly straightforward process: ask them what they want and write it down, right? However, real life can be more interesting and more complicated. These two questions can have different answers:
1   What does the client *want*?
2   What does the client *need*?
The client's assumptions of what they need to best serve their goals may not be the best solution for them. One of the best reasons to employ a designer is to question those very assumptions. The outside perspective the designer brings to the problem is valuable because it's not conditioned by conventional ways of looking at the situation. Challenging the client's assumptions is a vital part of the process.

> If I had asked people what they wanted, they would have said faster horses.
>
> Henry Ford

USER NEEDS

The other essential stakeholder group is the users.

Just like clients, talking to users is very valuable if we keep in mind that they may not always have a complete idea of what best serves their needs. This is because people become habituated and conditioned to familiar objects and places. Just like the client, the user may be too close to the problem to see unconventional solutions.

This doesn't mean we don't stop talking to users, just that we can't expect them to do our designing for us. We question, listen and, most importantly, observe. Observation allows us to see things about the problem that stakeholders can't and is quite different from asking people for their opinions.

Directly observing people use designs can open your eyes to the different ways people do things. The key is to avoid giving your volunteers any indication of your assumptions of how to do the task you ask them to perform. The point of user observations is to discover new knowledge, not to validate your assumptions.

This activity works well for industrial design, interaction design and graphic design projects, but can also be used in built environment projects, too. Examples of types of user observation include:

+ asking people to perform a task on a website or within an app
+ studying how people hold or use an appliance
+ observing how people move through or inhabit a space.

In the same way that you may not have a 'real' client, you may not have access to authentic 'users' either. Perhaps they aren't able to visit your school and you can't visit them. Perhaps you're designing for a global audience or a very specific group of people (perhaps with a rare illness or disability). Perhaps your design project is simply too short in duration to make outside stakeholders a viable part of the process.

One partial solution to this problem is to have people role-play as users. It's not ideal but it's better than trying to imagine everything, which can lead to entrenching instead of questioning the designer's assumptions. There are limits to this, of course. Spending an hour in a wheelchair will not make you an expert on the needs of a person with a spinal injury, nor will wearing a blindfold for a while tell you everything about living with vision impairment (although both activities might be informative).

YOU ARE NOT THE USER

For most of your life, before you started studying design, you've been designing for *yourself*. That is, your choices have been informed by your personal tastes, preferences, physical abilities and needs, and so on. When you start designing for *others*, however, you need to start cultivating a different way of thinking – you need to go outside of yourself to uncover the tastes, preferences, physical abilities and needs of the people you're designing for.

Most people find this quite challenging to do well – we're so used to our own experiences of the world. Also, as a person in high school, it's likely that you're very busy working out who you are, and what you want to do with your life! It's quite tricky to also start thinking about *other* people's needs and wants, something that even professional designers have to work at. However difficult it can be, it's very rewarding when you get it right because it has such a profound and positive impact on all of the decisions you'll make during your design project, and the quality of the design proposal.

4.4 RESEARCH

Talking with and observing stakeholders is the research part of the Explore phase. Research is an essential activity in the design process. (Some people see design itself as a type of practical, applied research.) It happens most intensively at the start but continues throughout the project. Research involves gathering and learning information from the world. Even experts in a given field of design need to do this.

There are two broad categories of research: primary research and secondary research.

PRIMARY RESEARCH

Primary research, also known as original research, is research you conduct yourself, to learn new information. Perhaps you're picturing lab-coat wearing, clipboard-holding scientists when you think of original research but this is important for designers too and includes some of the activities we've mentioned. For example, visiting a project site and observing users are both primary research activities. The information that you gather using primary research is called *primary data*.

SECONDARY RESEARCH

Secondary research involves finding existing knowledge. You'll find existing knowledge in books, journals and websites, and it is probably the most familiar kind of research. One of the most important secondary research activities you can do as a designer is looking at existing design solutions and considering their strengths and weaknesses, sometimes known as the 'state-of-the-art'. The information that you gather using secondary research is called *secondary data*.

▶ Examples of primary and secondary design research activities

Primary research	Secondary research
Visiting the design project site, taking photos and making measurements	Searching for information on a topic online
Observing users inhabiting a space or using a product	Reading a book about technology
Interviewing people about their habit and needs	Searching for examples of existing designs to learn from
Experimenting with design test rigs	Compiling images of similar designs in your project sketchbook

Besides stakeholder, you'll need to discover information about other aspects that contribute to devising a design solution. Two important aspects to investigate are the sorts of designs that already exist and the materials, processes and technologies that might be used in your design solutions. Both might be described as research into the state-of-the-art. Some of this research can be done online, in libraries or out in the world, observing and experiencing existing designs.

Your research observations and notes should be recorded in your project sketchbook. Avoid inserting large quantities of printouts, however. These add unnecessary bulk. Insert only selected reference material that seems the most useful to your design work.

IDEA DUMP

Sometimes you'll start your project and a design solution will occur to you before you've had a chance to do much research. This can be comforting and you may be tempted to go through the motions of the Explore and Develop phases, and then write your brief with this solution in mind. But this is dangerous because you're allowing your initial assumptions to restrict how you view the problem (limiting your view of the *solution space*). The remedy is to *dump* these first ideas out of your head and into your project sketchbook, safely recorded for later consideration and freeing up space in your head for more ideas.

It may feel premature to start sketching design solutions when you haven't yet defined the design problem, but this is a valid technique to drive your Explore phase activities. These first ideas will help you discover questions for which you don't yet have answers. This technique is known as a 'primary generator' – design ideas that help drive the exploration of the problem.

⦿⦿⦿   See Activity: Idea dump on page 43.

EXPLORE ⇌ DEVELOP

Design research can be very satisfying and absorbing. It's fascinating to learn about people and new technologies. The deeper you delve into these subjects, the more you discover and it can be difficult to know when to stop. This means that sometimes you may want to keep researching for as long as possible. Before you know it, your design proposal is due in a few weeks and you've left too little time to actually design something!

The antidote to this to remember that research takes place *throughout* the design project – new design ideas will prompt new questions to investigate – and that you mustn't wait until you feel that you know everything before you start designing. You can't know everything about a complex design problem and you'll learn more about it by developing solutions than just by researching information. This is illustrated in the Double Diamond by arrows that flow back and forth between the Explore and Develop phases.
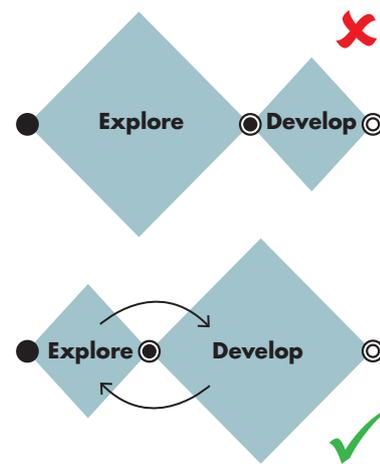

▶   Spend most of your project in the Develop half of the Double Diamond.

DIVERGENT AND CONVERGENT THINKING

One aspect of the Double Diamond we haven't referred to yet is divergent and convergent thinking (see Chapter 11). This is so important that it's the reason that the twin stages of the design process are diamonds instead of rectangles – the widening and narrowing of these boundaries reminds us of these twin modes of thought.

Divergent thinking is the ability to see lots of possible answers to a question, lots of possible ways to interpret a question, to think laterally, to think not just in linear or convergent ways, to see multiple answers, not one.

Sir Ken Robinson
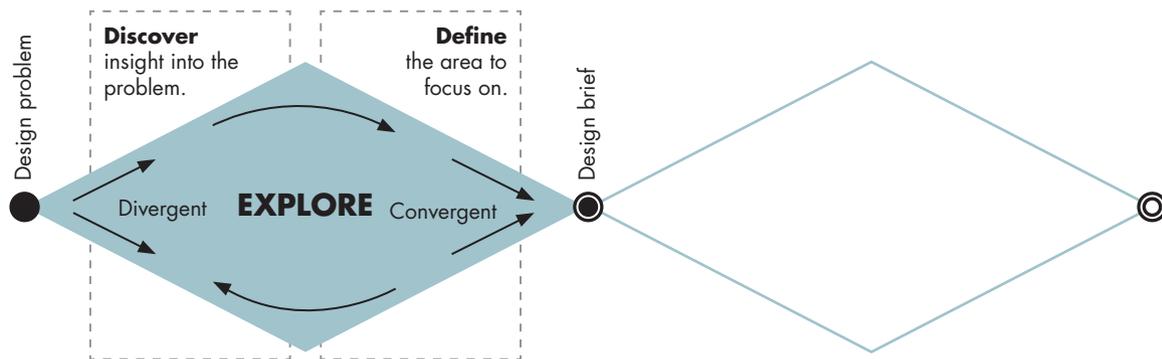
ANALYSIS

The Discover phase leads to the Define phase. After you've gathered information about the design problem, you need to analyse it to understand it with the goal of producing a concise definition of the design problem that we call the 'design brief'.

There are many ways of analysing all of this information. Something as simple as underlining keywords in notes can help. Looking up the meanings of words and phrases is useful, too. Some students use colour coding to help spot patterns in their research.

See Activity: Keyword distillery on page 44.

There are several popular techniques for summarising stakeholder data. Compiling a *mood board* is an effective way of understanding the preferences of your users. It's as simple as finding examples of things that appeal to them and identifying key aesthetic qualities. You'll draw on this to guide your aesthetic choices during the Develop phase.

See Activity: Mood board on page 46.

Designers are often designing for people they'll never meet, which can make users seem faceless and distant. *Personas* are a technique designers use to build empathy by literally putting a face to hypothetical users. The goal is to encapsulate and humanise the variety of people

▶ Mood boards by students

you are designing for by creating one or more fictional representatives. Don't confuse personas with real people – they are hypothetical people that summarise groups of users and their needs.

Between one and three personas is often sufficient, depending on the design brief. If everyone in the class is working on the same project, your teacher might organise you into small groups of students with similar design briefs, to create personas that everyone can share.

Mood boards and personas help you understand the needs and tastes of your stakeholders but another tool might help you create designs that excite you – *inspiration boards*. These are simply collections of design images that appeal to *you*. These can be anything, even unrelated to the current project or users. The point is to nourish your personal creativity.

USE WHAT WORKS FOR YOU

You might not need all of these techniques for every project. Experiment and see what works for you.

4.5 THE DESIGN BRIEF

Bringing all this information together is the purpose of the design brief, which concisely states what needs to be designed and for whom.

When we think about all of the things we need to consider in a design project – stakeholder needs, design principles, the elements and materials available for the design, and all the limitations constraining possible solutions – we can see that many factors contribute to what defines a viable and credible solution to a design problem. Moreover, circumstances change, so these factors are specific to a particular time and place. Conducting the design project at a different place and time may result in a subtly different brief calling for a different design solution.

There are many things to consider when writing the design brief, such as stakeholder needs and wants, design elements and principles, technology limits, construction/manufacturing/coding limits, costs, and so on, but some of them won't be discovered until you start testing design concepts in the Develop phase. This means that it's possible that there may be so many constraints on the problem that no viable, credible solutions exist. In other words, it's impossible to meet the design brief.

When this happens, one of two things takes place: we give up, or, more often, we decide to adjust ('relax') some of the constraints that can be changed. For example, on an architectural project we may not be able to increase the size of the site but it might be possible to increase the budget to add more floors to accommodate more rooms.

1. original design brief and criteria / other contraints / **no** credible design solutions

2. relaxed design brief and criteria / other contraints / **credible** design solutions
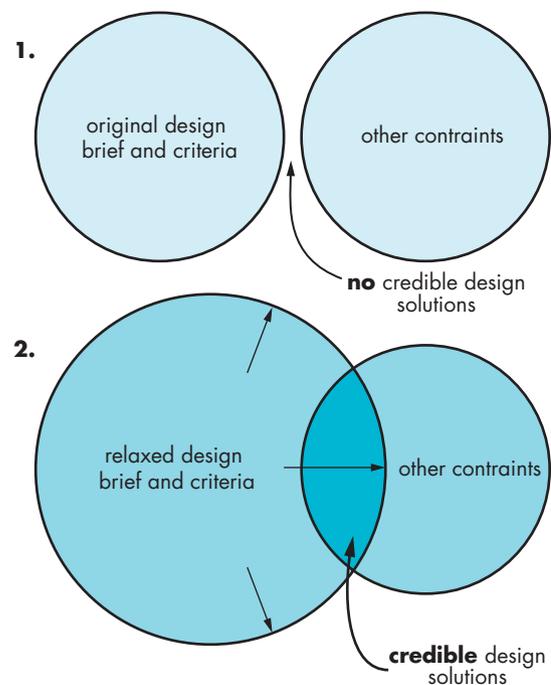
▶ If the design problem is so constrained that no credible solutions are possible (1), it is necessary to relax the design criteria (2).

Have you ever seen an episode of *Grand Designs* on TV? Most of the home owners go over their budget and take longer to finish their home than planned. In design brief terms, this means they've relaxed some of their original design criteria.

FRAMING

How you frame your design brief dictates how you look at the design problem, the perspective you adopt. Is your focus zoomed in with many constraints and assumptions but few possibilities, or zoomed out with many design possibilities but also lots of things to consider?

The language you use can have a profound effect on framing. If your brief frames the design problem as 'Design a toaster', you're going to be thinking about very conventional kitchen toasters. If the problem is framed as 'Design a device for lightly heating and toasting bread products', your exploration might be a little wider. Which is the 'correct' framing depends on the objectives of the project – does the client want a conventional or an innovative solution?

The important thing is, while writing your brief try to examine your assumptions and biases. Don't write your design brief with a solution in mind. If you've done the idea dump activity, you may have helped get any half-formed ideas out into the open where they can be subjected to scrutiny. Your brief should be framed in such a way that it permits ideas that you *haven't yet thought of*. The idea dump activity, introduced earlier, is designed to help you avoid unconsciously limiting yourself to any early ideas.

SPECIFY THE TYPE OF ITEM BEING DESIGNED

Resource
A3 design brief template

The way you structure your design brief and the headings you use will depend on the type of item being designed.

Decide what type or form your design solution will take – a building, an interior, a landscape, a fashion garment, a graphic design, an interactive digital design or a product – identify this in the design brief, and then use this to guide the design criteria. If you're exploring an architectural solution, you will specify architectural design considerations, mention the site, the surrounding context, and so on. If you're exploring a digital interaction, then describe the relevant format (app, website, digital kiosk) and media that apply. These design criteria define the qualities that the successful design proposal will demonstrate.

Your teacher may specify the type of design response required or you may be given the freedom to decide for yourself. Regardless, the design brief *must* specify the type of item to be designed. Leaving it undefined makes the brief much broader and is likely to mean you'll waste valuable time trying to decide this during the Develop phase.

ONE BRIEF, MANY SOLUTIONS

You might worry that dictating the type of design response and all of these design criteria will result in a design brief that restricts you to a single solution. On the contrary, a good design brief allows you to explore all of the options in the space defined by your design brief, and there are likely to be many. The fact that you haven't thought of them yet is because you have yet to enter the Develop phase, which comes next.

CHAPTER RECAP

+ Familarise yourself with the design project by asking questions of your client (or teacher) right at the start. Look at different points of view by discussing the nature of the design problem with your colleagues.
+ It's important to consciously commit to the project and accept responsibility to the stakeholders so that you can do good work.
+ Your project stakeholders – the client and end users – may have very different needs, abilities and tastes from you. Learn about them and design for them.
+ Research is about going beyond what you already know to learn more about the design problem and the stakeholders. Find existing information (secondary research) through books, online searches and talking to people. Uncover new knowledge (primary research) by observing and interviewing people and experimenting with prototypes.
+ Analysis follows research – it's how you turn facts into knowledge and wisdom.
+ The culmination of the Explore diamond, the design brief is a concise statement of the design problem and guides you through the Develop phase of the design project. It must specify the type of design solution you will develop (e.g., is it a building, a product, a garment, an app?) and be broad enough to allow you to explore many different design ideas and concepts.

CHAPTER REVIEW

1   Do you commit to doing your very best in your current design project? If not, what barriers do you need to overcome to do your best work? Identify what this project can give you, such as experience, marks, knowledge and satisfaction.
2   How are your needs, wants and tastes similar to your stakeholders'? How are they different?
3   How tightly should you frame your design brief? If it's too tight, it may only be possible to explore conventional, narrow design directions. If it's too broad, it may give you too many options to explore.

ACTIVITY: 5WS

The 5Ws (also known as the 5Ws and 1H, or the 6Ws) are questions whose answers are are terms for useful sets of information-gathering questions. They include 'Who', 'What', 'When', 'Where' and 'Why'. 'How' is sometimes useful too if it's not already covered by the other questions. None of these questions can be answered with a simple 'Yes' or 'No'. Instead, they require the factual answers necessary for your design research to be thorough.

Resource
5Ws activity

WHEN

The 5Ws are most useful at the start of the Discover phase to help you come to terms with the overall breadth and shape of the design problem. They can be especially useful during first meetings with your client or other stakeholders. You'll rapidly move beyond these very broad questions as your design research goes deeper but the information you uncover will help you write your design brief.

WHAT

You'll need:
+   pen and paper to record your findings, typically in your design sketchbook
+   your client, teacher and colleagues to discuss the questions with.

METHOD

Methodically address each of these questions in your design sketchbook. Vary the order of these steps if it seems more useful to you.

1   *Who* is involved in the design project? This includes the obvious stakeholders such as the client, but should also include people you'll be working with, and possibly those who may be able help you in the project, either directly or as sources of information.

2   *What* is required for the design and what are the design constraints? Don't worry if the answers to this question are quite vague at first. You're asking these questions to put these things 'on your radar'.
3   *Where* will the design solution be used? In some design projects, this will be in a particular location such as the site for a park, building or interior. In other projects, this might be more general, a broad context or setting where the app, garment, visual design or product may be used. Asking this question can help you consider the conditions (lighting, temperature, weather etc.) under which the design solution will be used.
4   *When* is the design needed and/or when will it be used?
5   *Why* is the design needed? This will prompt you to investigate stakeholder needs as well as consider why existing designs aren't sufficient.
6   *How* should the design solution be inhabited, worn, used or made? Pose this question if the previous 5W questions haven't covered everything important.

FAQ

Q: What if I can't answer all of these questions yet?
A: Don't panic: it may take weeks to find all of the answers you need but that's OK. The 5Ws act as a checklist to make sure you don't forget to investigate important project concerns.
Q: It's taking a lot of time to find these answers and I need to start designing. What should I do?
A: Start designing! Remember, you never really know everything about a design problem until you've finished the project (if ever). The design process uses ideation and iteration to discover new knowledge so sketching design ideas can happen alongside investigating the 5Ws. See the Activity: Idea dump on page 43.

ACTIVITY: MIND MAPS AND CONCEPT MAPS

A mind map is a visual representation of ideas organised in a hierarchy. A concept map is a similar approach but is more free-form and allows connections between items regardless of hierarchy.

Resource
Mind maps and concepts maps activity

WHEN

Mind maps and concepts maps can be used at any stage of the design process to organise your thinking and stimulate ideas based on relationships, but they are especially useful to explore your first response to the design problem at the start of the design process.

Your teacher might organise you into small groups to start mind mapping research topics or possible design directions.
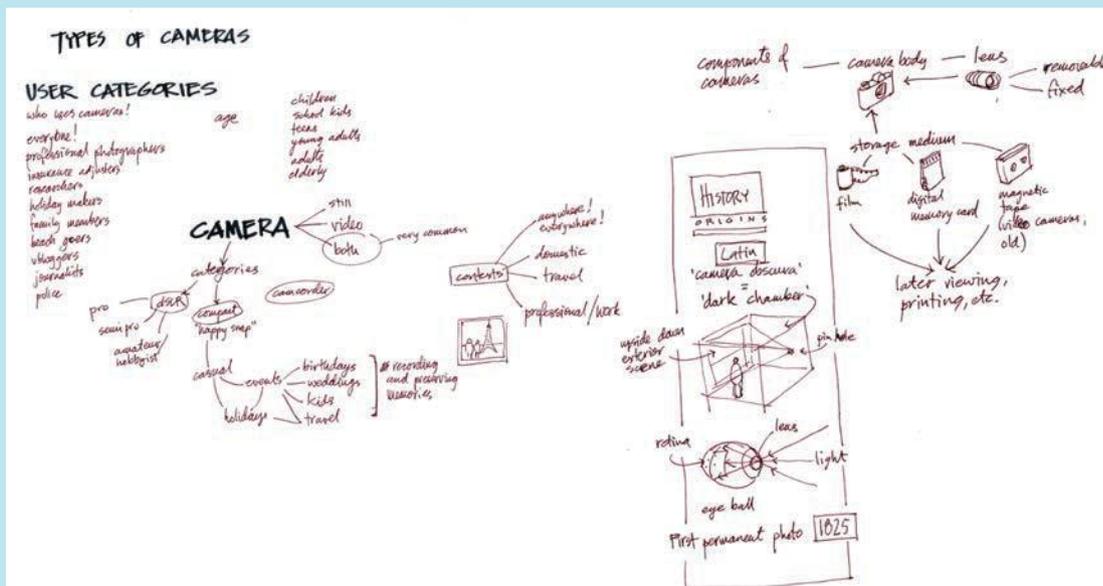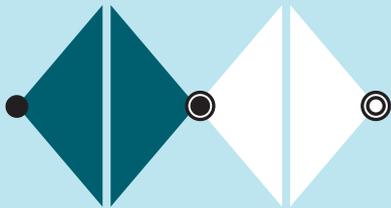
Andrew Scott

▶ Concept maps do not have to use words alone. These students used a combination of text and small images.

WHAT

You'll need pen and paper or mind-mapping software.

Items in a mind map or concept map are called 'nodes', which are sometimes referred to as parent, child and sibling nodes depending on their relationships. Mind mapping in small groups works well with a large sheet of butchers paper and pens. You can also use sticky notes, one per idea, on a wall, table or window, which allows you to easily organise nodes. Remember to take photos of large mind maps to print for your project sketchbook.

There are many mind-mapping software programs, which make it easy to reorganise nodes, either for working alone (Xmind, MindNode) or for collaborating online (Miro).

METHOD

Start a timer before you begin – working against the clock will prevent you from getting lost in details.

1 *Topics:* Write the main question or topic in the middle of the page.

2 *Nodes:* What does this topic make you think of? Write subordinate topics (nodes) around this central topic, connected by lines. You can also illustrate nodes with pictures or symbols, which may help stimulate your thinking.

3 *Expand:* Continue branching ideas off these nodes as you think of them. Each node will prompt you to think of others. Sometimes it's difficult to decide where a node should be placed because the elements in design problems are so interrelated; it's OK to draw lines joining nodes elsewhere in the hierarchy.

4 *Review:* After a while, take stock of your work and reorganise the branches as needed, either by redrawing the map on paper or by moving the nodes around in your software.

▶ **Video**
Concept maps
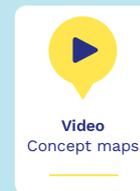
ACTIVITY: BRAINSTORMING

BalanceFormCreative/Shutterstock.com

▶ Brainstorming is a popular process for a group of people to generate lots of ideas for later analysis.
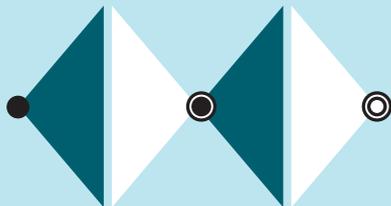
SOME THEORY

During a brainstorming session, several people come together to share their perceptions of the design problem and possible solutions. Because each person's point of view is informed by their unique life experiences, personality and thinking processes, the result is a broader view of the situation and possibilities. Brainstorming allows us to expand our understanding of the problem.

Resource
Brainstorming activity

WHEN

This method is very useful at many stages of the design process but especially in the Discover phase to expand ideas about the scope of the problem and areas to research, and in the Develop phase to generate ideas to explore.

WHAT

You'll need:

+ a quiet space that allows everyone to be heard
+ paper and pens for each person (you can use sticky notes)

+ a large sheet of paper to 'capture' ideas (or to put the sticky notes on)
+ a list of brainstorming topics
+ a group of four or five people (a minimum of two, a maximum of seven).
+ at least five minutes, no more than 20. End the session when ideas start to run out.

RULES

+ *Defer judgement:* absolutely no criticism of ideas during the process.
+ *Speed and quantity:* work hard and don't stop until the time limit is reached.
+ *Diversity:* this is all about divergent thinking so every idea is wanted no matter how odd or crazy.
+ *Build:* build on the ideas other people suggest.
+ *Respect:* respect other people's time to speak. Write down your ideas and wait your turn to share.

METHOD

Brainstorming is a structured and delicate process with definite rules you need to observe if it's going to work well for you.

1 *Agree* on the topics to be brainstormed before you begin. Between three and five is a good number.
2 *Announce* the first topic and allow one minute for each person to privately record their responses to the topic.
3 Each person reads out *one idea*; go around the circle taking turns. Only one person should speak at a time and when someone says something that triggers an idea in your head (and they will!) write it down.
4 After *five minutes* – or when ideas start to dry up – move on to the next topic.

By the end of the brainstorming session, you should have a large sheet of paper with lots of ideas on it. You can now begin discussing which ideas seem to have the most potential.

FAQ

Q: Who owns the ideas generated?
A: Everyone. Remember, ideas are cheap and plentiful and it takes lots of work and many decisions to transform an idea into a final design proposal. It's very unlikely two designers will end up with identical proposals even if they start with the same idea.

1 person's perception of the problem

3 people's perception of the problem after brainstorming
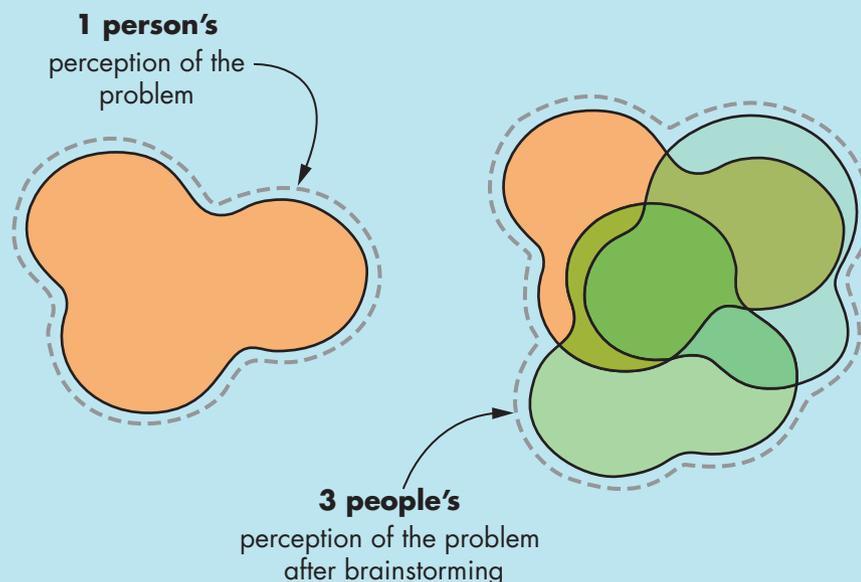
▶ When you brainstorm ideas with colleagues in class, you are expanding your perception of the problem space beyond what you could on your own.

ACTIVITY: ROLE-PLAY

Role-play is a method of seeing the design problem from different points of view. A group of designers role-play a situation together, each adopting a different stakeholder role.

Resource
Role-play activity

Role-play can also be used during design presentations by nominating audience members to play specific stakeholder roles. For example, in an architectural project, audience members might adopt roles of builder, owner, resident, maintenance person etc., and ask questions they imagine such people would ask the designer.

Role-play is dependent on participants being reasonably well informed about stakeholder needs.

WHEN

This method can be useful at any phase of the design process, including identifying user requirements during the Discover and Define phases, and evaluating design concepts during the Devise phase.

WHAT

You'll need:
+ pen and paper to take notes
+ scenarios to engage in
+ optional: props to aid the scenarios.

RULES

1 Role-play is not a replacement for engaging directly with stakeholders or user testing.
2 Role-play can be spontaneous and engaging for the participants but also tiring, so limit the duration.

METHOD

1 *Devise* a scenario that will require different stakeholders to interact and arrange classroom furniture to support it.
2 *Identify* useful roles and assign designers to them. At least one person needs to observe and take notes.
3 *Role-play* the scenario while the class observes.
4 *Discuss* what the role-play revealed about the scenario, the stakeholder role-players and their interactions.

ACTIVITY: USER OBSERVATIONS
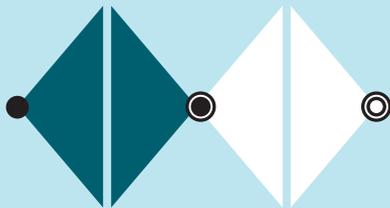
WHEN

User observations are useful at any time during the design project but especially in the Explore phase. Observations done with design prototypes during the Develop phase are known as 'user testing'.

Resource
User observations activity

WHAT

You'll need:
+ a place to conduct the observations that allows volunteers to avoid distraction
+ a well-defined task for volunteers to perform and any equipment they'll need

+ paper to take notes
+ optional: recording equipment
+ at least two people, you and a colleague, to conduct the observations. One person should concentrate on communicating with the volunteers and another person should focus on managing the setting and any equipment. Other colleagues can focus on just observing if you have a third person.

RULES

1 Respect the privacy of your volunteers. If you make recordings, don't share them outside the design team without permission.
2 Make sure volunteers know that they can stop the task and leave at any time and for any reason.

METHOD

1 *Identify* what, who and where, regarding your observations. A list of questions you're seeking answers to can help you focus.

2 *Test* the task with one volunteer before you do it with a number of people. This is known as a 'pilot study' and helps ensure the task makes sense, clarify how you'll communicate your requests and work out how long it will take. Improve your task and test again if necessary.

3 *Recruit* people to observe. Tell them what task they'll be doing, how long it will take and why you're doing this, but don't share your assumptions.

4 *Conduct* the observations and take careful notes. You may decide to video record the task, with your volunteers' permission, but note that this means spending time watching everything again later, which may not be necessary. (You can take notes as you go as well, and add to them later while watching the recordings if you wish.) Resist the urge to tell people what to do or answer questions about the task. When people are confused by a task, this can reveal interesting 'pain points' and design opportunities for improvement.

5 *Analyse* your notes and identify themes and patterns of behaviour. Did anything surprise you or challenge your understanding of the task? What might this mean for your design brief?

RELATED OBSERVATION TECHNIQUES

There are more advanced observation techniques you may find useful if you're undertaking a longer project and sharing research tasks across the class. Industrial designers and interaction designers refer to these as 'verbal protocols' because they involve people talking about what they do. Verbal protocols go well with observations, but they take more time and effort than you may have for most projects.

RETROSPECTIVE PROTOCOL

Observe your volunteer (known as a 'participant') performing a task and after they've finished ask them to recall what they did. Their recollections may help you identify aspects that they found important or difficult.

THINK-ALOUD PROTOCOL

Ask your participant to describe what they're thinking as they perform the task. This is remarkably difficult and some people are better at it than others. Think-aloud protocol may increase the mental effort on the participant while performing the task by asking them to do two things at once – the task and verbalising the task – which may make it harder for them.

CO-DISCOVERY

Co-discovery is observing two people working out how to perform a task together. This feels more natural than think-aloud protocol to most people. Co-discovery is a good method if you can access two participants at the same time, and works if the design is new to both.

ACTIVE INTERVENTION

This method is good for gathering more detailed and relevant information, however, asking the participants about their thoughts and actions while they are performing the task may disrupt their natural actions and lead them to act or answer a particular way (which introduces some bias).

ACTIVITY: IDEA DUMP

Variations of brainstorming include brainwriting and braindrawing.

To learn more about braindrawing, see Chapter 5.

Resource
Idea dump activity

IDEA DUMPING

The method is adapted from *The Universal Traveler* by Don Koberg and Jim Bagnall and is also informed by the idea of the primary generator discussed in *How Designers Think* by Bryan Lawson. This method is also be known as a 'brain dump'.
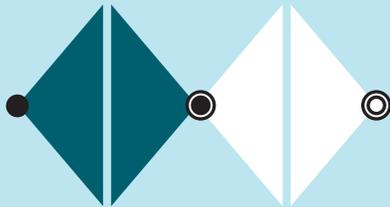
WHEN

This is most useful very early in the Discover phase, soon after you begin the project (e.g., after the first client briefing).

Rawpixel.com/Shutterstock.com

RULES

Work fast and don't get bogged down developing any of the ideas – that comes later.

METHOD

1   Start a timer for 15 or 20 minutes.
2   On a fresh sketchbook page, draw as many design solutions as you can. Focus on speed and variety and don't worry too much about quality or detail.
3   After the timer ends, review your work and identify any research questions they raise for investigation.

FAQ

Q: Is it OK to go with the first idea I think of at the start of the project?

A: Yes, but only if it's not the only idea you think of. Occasionally your first idea might end up being the best one to build on, but unless you seriously consider a variety of approaches, you'll never know if you could have come up with something better.

WHAT

You'll need:
+ your design sketchbook
+ sketching materials
+ a timer.

ACTIVITY: KEYWORD DISTILLERY

This method helps you understand the design problem and *distil* it into a statement that better describes the essentials. This can be very helpful in identifying things to research in the Explore phase and helps you prepare your design brief in the Define phase.

Resource
Keyword distillery activity

WHEN

This activity is best used during the Discover and Define phases.
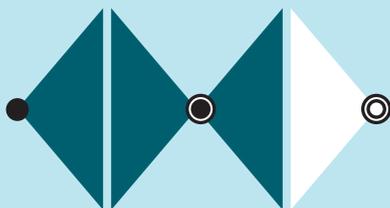
WHAT

You'll need:
+   pen and paper (in your project sketchbook)
+   optional: the project description supplied by the client (or your teacher)
+   optional: a dictionary to look up word meanings and interpretations.

RULES

If doing this activity in a group, make sure everyone has a copy of the results for their project sketchbook. Your teacher may instruct you to record the names of your group alongside the distilled statement in your sketchbook.

METHOD

Look up the definitions of the keywords – what do the words imply and how can they be interpreted differently? Record this on your page.

1   Either alone or in a group, compose a written statement that describes everything you think is important about the design problem, including goals, concerns, context etc.

2   Go through the statement word by word and underline (or circle or highlight) all of the words that seem essential.

3   Use only these key words and phrases to write a new problem statement that *distils* the essence of the problem.

4   Repeat these steps as often as seems useful.

ACTIVITY: INSPIRATION BOARDS

Inspiration boards are just like mood boards except instead of a collection of images that capture the aesthetic preferences of stakeholders (user groups), inspiration boards are images that inspire the designer. The purpose is to inspire and excite *you* to do good work, so the designs you include may have nothing to do with the current project and have no appeal to the stakeholders. You may like to compile a separate notebook of inspirational designs to draw on for different projects – as long as you keep adding to it, your mental library of ideas will grow.

Resource
Inspiration boards activity

WHEN

Create inspiration boards any time but especially during the Explore phase.

WHAT

You'll need:

+   your project sketchbook
+   paper
+   a way of collecting images (e.g. online, a camera)

RULES

Don't confuse inspiration boards and mood boards.

METHOD

1   *Collect* images of designs that excite you, either whole designs or small details that you like.

2   *Compile* these in your project sketchbook and annotate the portions to remind yourself what aspects inspire you. You are the audience so there's no need to be very formal or tidy.

3   *Refer* to your inspiration board when you're designing during the Develop phase.

ACTIVITY: MOOD BOARD

Designers use mood boards to create visual summaries of the kinds of things that appeal to the project stakeholders, and specifically users (the target market). This helps designers better understand the styles and tastes that may make the design more acceptable and appealing.

Resource
Mood board activity

Note: The mood board doesn't *dictate* the aesthetic direction of the project, it *informs* it. Sometimes it's very important to develop a new or updated style in the design proposal, something that is new but also acceptable to the target market.

The 'board' in mood board comes from the technique of assembling images mounted on a sheet of stiff card to make it easy to handle and use during a design presentation. Mood boards can also be created and shared digitally using a wide variety of websites and online tools such as Miro or Apple's Freeform.
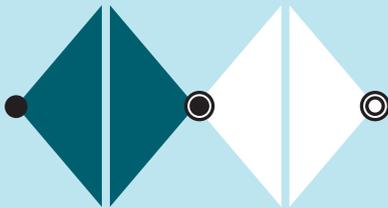
WHEN

Mood boards are useful to visually summarise stakeholder tastes during the Explore and Define phases, and then again to guide design choices during the Develop phase.

WHAT

You'll need:
+ A3 paper
+ paper glue
+ as many printed images of things that appeal to your stakeholders as possible. Use digital images if you're making your mood board digitally.

RULES

1   Try to create concise mood boards that fit in one or two sheets of paper. You want a visual summary not an extensive reference library.
2   If you'd like to use some of your mood board during the final design presentations, use just a few images on your design proposal pages, not the whole mood board, so that they don't distract attention from your design or diminish the layout standard (pages from your sketchbook can be informal but presentations should be much more polished).

METHOD

These steps assume you're working on paper, although it's often easier to use graphics software to assemble your board.
1   *Gather* images of items that surround and appeal to the people you're designing for.
2   *Print* out the most useful images, making the most important ones a little larger.
3   *Assemble* the images on your board as a collage. Add notes to remind yourself of the important elements, such as colour schemes, shapes and patterns.
4   *Keep* the board in your project sketchbook so that you can refer to it during the project. Display it during concept presentations.

FAQS

Q: Can students share mood boards?
A: Yes, in class projects where there is shared research or group work, mood boards can usefully be shared.
Q: Must I follow the styles in the mood board closely? They don't appeal to me.
A: Your design proposal should appeal to the people who will use it, so your tastes are not the only consideration. It is good to offer the users something new, but if you go too far they may not accept it. Consider testing your ideas with users to see if they appeal to them.

ACTIVITY: PERSONAS

Personas are used to personify a designer's understanding of their users and to build empathy. Personas are fictional representatives of the user group.

Resource
Personas activity

Westend61 GmbH/Alamy Stock Photo

Name:
Etta Mcintyre
Age 28

Education:
Environmental Science Degree
Occupation:
Marine Biologist
Relationship:
Single
Location:
Cairns
Bio:
Etta works CSIRO monitoring marine ecologies on the Great Barrier Reef. She's a believer in science, hard work and the FNQ lifestyle.
Needs:
Sun-safe garments that protect her from the elements
Wants:
Sun-safe garments that don't look like they come from the bargain bin at BCF; 'Even a tiny bit of style would be nice'
Pain Points:
Loves her work, thinks the equipment and clothing could be better easier for women to use
Personality:
Altruistic, focussed, modest, impatient, picky
Motivations:
• Passionate about the environment
• Interested in design, considered studying Fashion
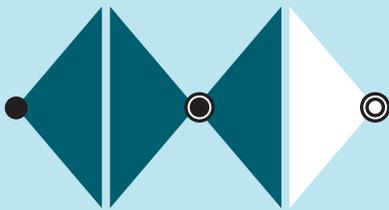
WHEN

Use this method during the Define phase, perhaps alongside writing your design brief. Personas may be useful during concept presentations to help you convey user groups and their needs to other people.

WHAT

You'll need:
+ a draft of your design brief along with good information and insights into your intended users
+ pen and paper
+ portraits of people sourced online or created with generative AI. There are many examples of personas online that may inspire you. Note that many are created by or for marketing people rather than designers.

RULES

1 It may seem obvious but remember that personas are not real people, they are tools to help you think about your users.
2 Create your personas informally in your project sketchbook. You may create more formal persona sheets for use in presentations later if it seems useful.

METHOD

On separate sheets of paper, create a persona for each important type of user category you're designing for, and write entries in the following headings:

1 *Essentials:* Start with statistics such as age, education, occupation, relationship status, location and income. Tailor this list to make it relevant to the project.

2 *About:* Write a short biography describing who they are, what they do, what they like and so on. Keep it to a sentence.

3 *Needs:* List three of four of their relevant needs or goals. Personify some of the needs you've written in your design brief.

4 *Frustrations:* List some of their frustrations relevant to the design project. These are sometimes labelled 'pain points', areas of friction with existing designs or contexts.

5 *Other details:* Add additional headings such as 'personality', 'motivation', 'current feelings' and so on if it seems helpful.

6 Add a *photo* to give them a face. You might use photos of people online or even use AI image generation to create them.

Resource
A3 persona template

Persona portraits: female surfer, elderly lady grocery shopping, worker in hardhat, office worker

GENERATING AND DEVELOPING DESIGNS

You can use an eraser on the drafting table or sledge hammer on the construction site.

Frank Lloyd Wright

In this chapter:

Learn the language:

+ AI
+ braindrawing
+ brainstorm
+ concept
+ creative bank account
+ design
+ extrapolation
+ idea
+ img2img
+ invention
+ kill your darlings
+ mood board
+ rapid iteration
+ SCAMPER
+ style transfer
+ tool bias
+ txt2image
+ user testing
+ visualise

Now it's time to get into what for many designers is the most interesting and fun parts of the whole process – creating designs! By now you'll have completed the Discover and Define phases of your design project and formulated a design brief to guide you through the Develop phase.

This chapter will focus on the Develop phase and Chapter 6 on the Deliver phase, but in practice these are closely intertwined, as indicated by the arrows in the Double Diamond. We'll discuss coming up with ideas, developing and improving them, and resolving their details to create designs.

5.1 DEVELOPING IDEAS

The Explore phase sets the agenda and direction for the Develop phase, summarised by the design brief. It defines goals and constraints, and sets you on a path to create viable solutions to the design problem based on the research you've gathered from stakeholders.

At the end of the previous chapter, we mentioned there are usually many ways of responding to a design problem. This is why a whole class of design students working with the same brief will produce a variety of design responses, each a reflection of the designer's personal experience, values and interpretation of the problem.

As you generate design ideas, develop concepts and create designs, you'll ask more questions and uncover new knowledge that may cause you to question the design brief. (Perhaps some of the constraints need to be relaxed to expand the solution space.) 'The brief is wrong, I need to change it!' you may think. This can be disconcerting but it's not uncommon. This is what the design process is designed for.

Although changing the brief may be desirable, it's not trivial. In professional projects, the design brief is a written agreement between client and designer (a legal document) and any adjustments require the client's approval. In the classroom, your teacher's approval is required for changes to the brief. They won't let you change the brief every time the work seems too difficult or because your favourite ideas don't fit the criteria because this will create more work for students and make it difficult to do a good job in the remaining time. Finally, remember that you may not be able to change aspects of the brief that are dictated by the assessment task (an example of a 'reliable constraint' in design terms).

IDEATION: GENERATING IDEAS

Coming up with design ideas may feel a little mysterious – where do ideas come from? Creative people have pondered this through the ages and the Ancient Greeks thought that goddesses were the sources of inspiration for all kinds of literature, science and the arts. More recently, research has suggested more down-to-earth sources for creativity in two general categories:

1 *Extrapolation* is simply modifying an existing solution to improve its application to a problem. Most designs are extrapolations of designs that came before. (See Kirby Ferguson's *Everything is a Remix* video series.) For example, an architect designing a residence is more likely to extrapolate upon familiar ideas of 'home' and 'house' than attempt to invent a whole new way of living.

Weblink
Everything is a remix

2 *Invention*, in the pure sense, is less common in design. It involves combining two or more existing ideas to produce something genuinely new. For example, horse-drawn carts existed and steam engines existed, but the first person who combined them (Nicolas-Joseph Cugnot, 1769) invented what we now know as the 'car'.

Both of these ways of generating ideas benefit from knowledge of existing designs (and ideas) and with the ability to find connections between ideas. You'll acquire the knowledge by 'soaking up' ideas from everywhere you find them. Read about and experience designs that inspire you. Watch interesting films. Read thought-provoking books. Have diverse experiences in the world.

Rawpixel.com/Shutterstock.com

▶ There are lots of ways to start you thinking about new ideas: visit a gallery, read about design or talk with people who are interested in design..

Illustrator Jake Parker uses the analogy of 'making deposits' in your 'creative bank account' – the more inspiration you expose yourself to – designs, films, books, experiences – the more you have to draw on in your designs.

Weblink
Your creative
bank account

In practical terms, this means that if you're struggling to think of designs for your project, don't stare at a blank sketchbook page – seek inspiration, on topics both directly related and unrelated to the project.

⬤⬤⬤ These activities, introduced in Chapter 4, address two processes for seeking inspiration and ideas:
• Activity: Mood board on page 46.
• Activity: Inspiration boards on page 45.

Another activity you might find useful is the SCAMPER process. SCAMPER stands for substitute, combine, adjust, modify, put to other uses (adapt), eliminate and reverse. You can use the research you've collected in your sketchbook, as well as your mood and inspiration boards, as inputs to the SCAMPER process. It may be necessary to work through these actions with multiple inputs in a fairly mechanical fashion first

before evaluating the ideas it produces. Some may be nonsensical or unhelpful, others may show potential, but collectively this activity can help you see the problem differently. Even outputs that don't make sense as practical solutions can suggest different ways of seeing the problem.

⬤⬤⬤ See Activity: SCAMPER on page 57.

If you're working on a group project, braindrawing can be a good way of quickly generating design ideas. This method is very similar to brainstorming but works with sketches instead of words.

⬤⬤⬤ See Activity: Brainstorming on page 40.

⬤⬤⬤ See Activity: Braindrawing on page 58.

Rapid iteration techniques

It can be very useful to think up ideas quickly. As you move from research into ideation, you may get stuck when trying to move from information gathering to designing – a sort of performance anxiety. The following design activities may seem counterintuitive – they amp up the pressure but tone down expectations a little. Each of them requires you to work intensively to come up with ideas in a very short period of time, such as within a single class or studio, ideas that can then be used to stimulate more methodical iteration. These activities feel very intense but also strangely satisfying. You may surprise yourself at what you can achieve in such a short time. Take this feeling home with you and use it to be productive when you're working on your design project homework.

The first activity has a dramatic title – the 'concept bomb'. (In some design schools this is known as a 'design sprint' and is similar to the *charrette* tradition in architectural education, although charrettes may last days.) Your teacher may 'drop' a concept bomb on the class to get your ideation started for the current project. Alternatively, they can be fun to do for completely self-contained exercises. The concept bomb consists of a short briefing phase (five minutes), intense ideation phase (25 minutes) and feedback phase (20+ minutes).

⬤⬤⬤ See Activity: Concept bomb on page 59.

Rapid iteration is a similar technique with a repeating, iterative structure and no formal feedback phase. Your teacher will start a timer (15–25 minutes) and you'll spend the time doing ideation sketching in silence, drawing only on what you have in your project sketchbook, with no time for online research or other distractions. At the end of the time, leave your work on the table for everyone to look at and walk around to look at what other students produced. Repeat for as many cycles as the class allows.

See Activity: Rapid iteration on page 60.

The third intensive-mode technique draws on the social learning benefits of design studio – your colleagues will design for you, and you for them. At the end of the activity, you'll have some design ideas to consider and do with as you will. Round robin relies on the aspect of human nature that makes you feel that everyone else's problems are easier to solve than your own. It's a lot of fun to contribute design ideas to other people's projects, secure in the knowledge that you have no responsibility for resolving the details. Relax and have fun.

See Activity: Round robin on page 61.

ITERATION: IMPROVING IDEAS

After generating some ideas, you'll need to is refine them. We looked at this in Chapter 3 when we defined design as a 'non-linear process that uses parallel ideation and iterative development to create designs that solve problems'.

At the heart of iterative development is the repeated process where we analyse a design problem, synthesise a possible solution, and evaluate it against the brief. We explore multiple ideas (parallel ideation) to be more confident that the final design proposal will be the best we can come up with.
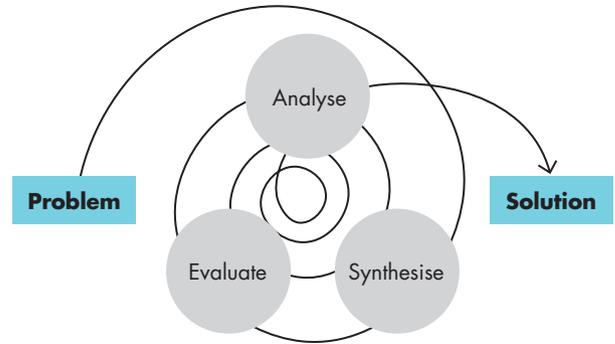
DIVERGENT AND CONVERGENT THINKING (AGAIN)

As we discussed in the previous chapter, the design process relies on divergent and convergent thinking. In the Develop and Deliver phases, you'll move from divergent thinking to generating multiple design concepts, and convergent thinking to choosing the most promising ideas for further development.

It's not quite as neat and tidy as it sounds because there tends to be multiple cycles of divergent and convergent thinking throughout the Develop phase. The initial round of parallel ideation is clearly a divergent-thinking process, and choosing ideas to develop is convergent. However, what follows is multiple cycles of this process with the focus shifting progressively from the big picture into the fine details. For example, an interaction designer will use divergent thinking to generate multiple fine details (e.g. button styles, colour choices, icons) for the many details of their app, and convergent thinking to develop the most promising.

The pursuit of delight is in the details.

Helen Tran
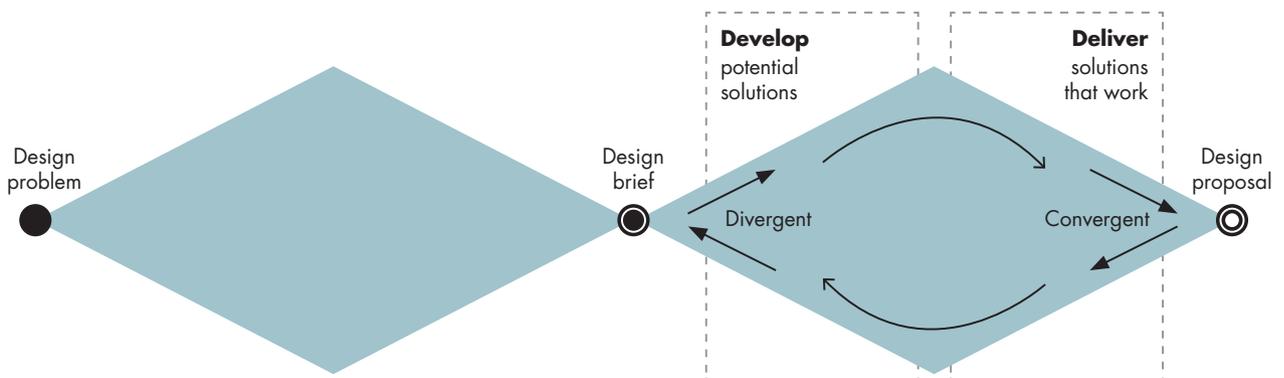
PA Images/Alamy Stock Photo

5.2 TURNING IDEAS INTO DESIGNS

At each cycle of iteration we try out variations of our ideas and build the most promising ones. We can draw a distinction between 'ideas', 'concepts' and 'designs'. These aren't universal interpretations of these words but they may help us approach the process with the right attitude.

+ Ideas: think about design ideas as pure potential, a seed that may grow into something wonderful.
+ Refined idea: when we iterate on an idea, we test and improve it, like a seed that we plant and water to help it grow. A refined design idea (designers may use the term 'concept' for this) is an idea that's been developed but isn't yet a complete solution – perhaps not yet meeting all of the design brief criteria.
+ Singular design concept: some refined ideas prove themselves, through successive cycles of iterative improvement, to become viable 'designs' that address all the criteria. One of these singular concepts will be chosen and communicated as the final design proposals. To follow our analogy, the seed has been nourished and grows into a magnificent tree.

What this means is that we expect to have many, many *ideas*, develop some into *concepts*, and then a few into *designs* that we can choose between for the ultimate design proposal. The fundamental difference between ideas and designs is therefore lots of thinking and effort. Ideas are plentiful and cheap; designs are rare and expensive (in terms of the effort invested). The design process never stops at the first ideas; instead, it calls for a rigorous exploration of the possibilities.

Inexperienced designers tend to place premature value on their first ideas. This is understandable – it's exciting to think of ways of solving problems! – but it's important not to lose focus on the most powerful part of the design process – seeking multiple solutions to a design problem.

There are usually many promising solutions to a design problem and no perfect solution, because each approach will have its own strengths and weaknesses. Ultimately, the path you take will involve making many decisions and trade-offs before you develop your final design proposal.

Experienced designers therefore know that it's important not to become fixated on the first ideas. Instead, when a promising idea pops up, they explore it in their design sketchbook for a while and then set it aside. Then they challenge themselves to see if they can come up with a completely different way of addressing the problem.
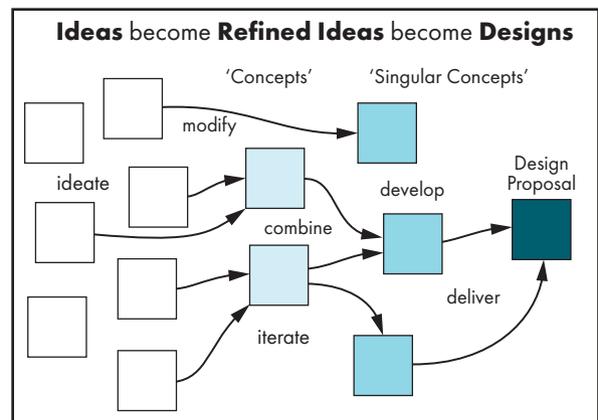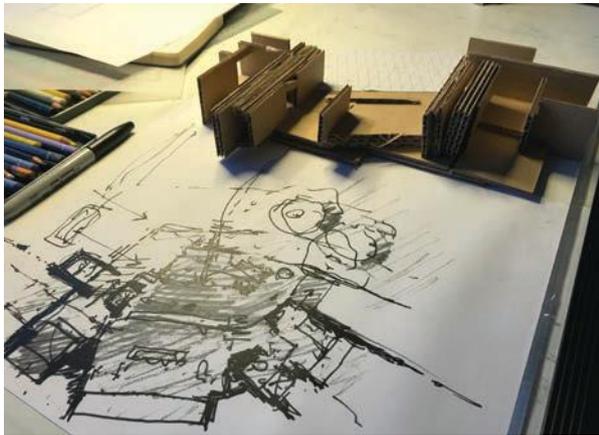

Andrew Scott

VISUALISING IDEAS

How do we choose which ideas to transform into concepts and then into designs? We evaluate or test them. We don't need to build a fully functional prototype of each idea – that's both unnecessary and infeasible. Clearly it would be impossible (and crazy) for an architect to build every idea for a building in order to evaluate it. Instead, we *visualise* our design ideas.

Visualisation is seeing the design in some way to assess its value. Visualisation ranges from the loosest gestural sketch to the a fully functional prototype, and all the variations in detail and fidelity in between. Getting an idea 'out of your head' and onto the page in the form of a quick sketch can yield enough information to see if the idea has potential. Redrawing the idea with a little more detail is a form of iteration and development. In a sense, the whole iterative design process is merely doing this repeatedly in more precise detail until the design solution is fully resolved. (Design 'resolution' is a term designers use to express how finished a design is. A highly resolved design has had all the details worked out.)

In the Visualisation section of this book, we examine some of the tools and techniques designers use to 'see' their designs. The term Visualisation embraces not just two-dimensional simulations of ideas but three-dimensional forms of simulation, too. Conceptually, making a quick pencil sketch of a building floor plan is not very different from making a quick cardboard model of it.

Each visualisation method is a way of rapidly evaluating, and creating, an idea, although each allows us to see different aspects. The floor-plan sketch allows us to see the proportions and relationships between the spaces but not the three-dimensional form. The cardboard model gives us some sense of the form but less about the interior. When looked at together, they can show us different things about the design concept.

▶ A rough floor plan and cardboard model (Ian Weir, Apex Point House)

Visualising as testing

You might think of visualisation, at least during the Develop phase, as a way of building and testing design ideas. (During the Deliver phase, visualisation becomes more of a communication tool.) We test our ideas early and often because we want to judge their worth before investing too much time into them. It's an aspect of human nature that when we invest a lot of time into making something, we tend to form an emotional bond with it. If we invest too much time into a weak idea, it can be very difficult to let it go. can lead to 'design fixation' – getting stuck on an idea. Design fixation can lead us to short-circuit the whole divergent–convergent design exploration process and miss out on exciting and innovative new design solutions.

This is a common problem for all kinds of creative people. Writers have a phrase that illustrates how painful it can be to let go of ideas you love: 'kill your darlings'. In design, such 'darlings' are cool ideas that you've fallen in love with but that don't truly benefit the design solution. You can think of testing as a form of risk mitigation – the more a design has been tested and proven, the less likely it is to have unanticipated issues and the more confidence you can have in your design proposal.

In general, as you progress through the Develop phase, your visualisations (drawings, renderings and prototypes)

become more detailed and fewer in number. In other words, you tend to create many rough sketches and low-fi prototypes in the early stages, and a few very detailed renderings and a single prototype (analogue or digital, as needed) for the design proposal.

KEEP RECORDS AS YOU GO

Remember to photograph your physical prototypes and print copies for your project sketchbook. It's much better to do this progressively rather than leave it to the end of the project – low-fi prototypes are fragile. Likewise, include exports or screen captures of digital prototypes in your sketchbook.
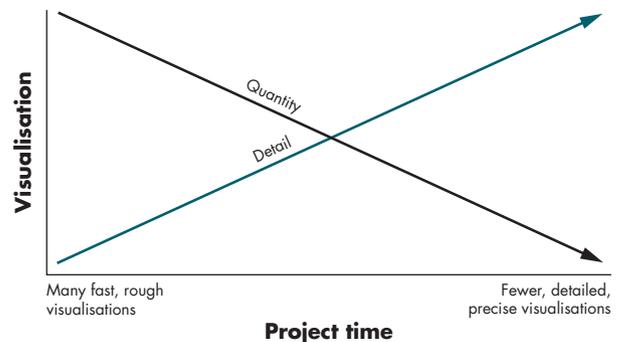
▶ Create many quick sketches (and other types of visualisation) in the early stages of your project and slowly shift the quantity–detail balance until your design proposal visualisations are very detailed but few in number.

User testing

Some forms of visualisation allow designers to engage other people in the evaluation of ideas, too. A physical prototype of a design solution is a tangible object that non-designers can readily try out. There are many techniques that fall under the heading 'user testing' that are heavily relied upon in some design fields.

User-testing techniques are similar in nature to the user-observation activity in Chapter 4, except instead of observing people using existing things and places, designers ask them to simulate use of design prototypes. In the classroom you might do this by showing your design models or paper prototypes to other students, or even people outside your design class, to see if they can understand how your design might be used.

See Activity: User testing on page 62.

Aesthetic user needs

Testing doesn't just mean evaluating the usability of a design – it can also mean testing the aesthetics. We want to give our users and clients designs that are beautiful as well as useful and meaningful. Although aesthetic appeal is not nearly as subjective as many people assume, specific user groups may have tastes and preferences that are quite different from those of the designer. This is a good reason for creating mood boards, a visual collection of things that appeal to the users, but it's something you can also test with representative users by asking them what they think of the style of your design concepts. The most productive way to do this is to ask them to choose between different style options and comment on the reasons for their selections. (If instead you just show them your favourite design, they may tell you what they think you want to hear – 'I love it!' which feels nice but might not help you at all.)

See Activity: Mood board on page 46.

You'll naturally be guided by your own tastes and preferences when you begin designing and it will require some conscious effort to develop a style that appeals to your user group. The style transfer activity can help you do this. It's quite simple: study a style (use your mood board), identify the visual hallmarks that make it distinctive (its visual language), and express those traits in the thing you're designing.

See Activity: Style transfer on page 63.

To learn more about design styles, see Chapter 17.

Choosing visualisation tools

The visualisation chapters (Chapters 7–9) discuss some of the most common tools used by designers, organised into three chapters. Drawing is a very broad category that spans analogue and digital media across the whole design process, and ranges from extremely loose sketches to highly detailed plans. Drawings are useful for ideation and communication. Rendering is generally for communicating designs to other people. Prototyping, like drawing, covers a broad range of digital and analogue techniques and technologies and is used for ideation and communication.

To learn more about drawing, see Chapter 7.

To learn more about rendering, see Chapter 8.

To learn more about prototyping, see Chapter 9.

The distinction between these three visualisation categories is somewhat arbitrary because most tools can be used in different ways and at different times. For example, CAD (computer-aided design) is not ideal for rapid visualisation of early ideas, but using it to create a quick 3D outline to print out and sketch over has value early in the design process. Additionally, usage varies considerably across the design disciplines. For example, early use of digital tools is common in digital media design and interaction design because these disciplines are very much within the digital realm.

Tool bias

Each visualisation tool can give us a different appreciation of a design idea. Moreover, there's no perfect visualisation tool because each has its strengths and weaknesses, and each may subtly steer the designer towards particular ways of thinking.

To illustrate this idea, consider three useful visualisation tools and their 'biases':

+ *Pencil and paper:* effective for quickly capturing ideas but time-consuming to visualise with precision. The strength of a quick sketch is not its precision but it's imprecision – the ability to see possibilities that you didn't intend. This makes the quick sketch, even in the digital era, so powerful for rapidly exploring many ideas early in the design process.
+ *Plasticine:* terrific for easily exploring organic, complex shapes but taxing for visualising rectilinear or precise forms.
+ *CAD:* capable of great precision but time-consuming to use. Its exactness makes it less useful for quickly exploring ideas but indispensable for documenting and rendering design proposals.

Precision is not impossible with paper and speed is not impossible with CAD – but that is despite rather than because of the innate advantages of the tools.

What this means for you as a student designer is that you should try not to get locked into a handful of visualisation approaches. Experiment with everything that is available to you. If you're struggling to 'see' an idea, try switching tool or medium. If you can't work out how to draw a particularly tricky 3D form, try using cardboard and hot glue.

Jumping between 2D and 3D media is especially useful for all kinds of 3D designs (and even useful in interaction design for something known as 'paper prototyping').

Working in 3D isn't the last step; it's sometimes the first. Try this: create a page of quick pen sketches and then try making your favourite sketch out of cardboard or clay. Next, photograph this 'sketch model', print out the photos and sketch over them. The cardboard or clay allows you to explore true 3D form quickly, while sketching over photos allows you to add detail and refine your thinking. This 'dimension jumping' allows you to work to the strengths of each tool or medium and avoid the biases.

Using AI in your design process

In recent years, generative AI has received a great deal of attention and some concern, especially from authors and artists who are worried that their work will be stolen and their livelihoods threatened by this rapidly developing technology. However, many designers are exploring generative AI as a tool to aid their work.

Generative AI based on large language models offers two general categories of image generation.

+ *Txt2img* begins with the writing of a text prompt that describes the visual qualities of the desired image, including subject, viewpoint and style. Software based on generative artificial neural networks, trained on millions of images, then generates a variety of images for the user.

+ *Img2img* uses the same underlying mechanism but modifies a starting image guided by a text prompt to produce new images.

Img2img generation is especially useful to designers, who can create a sketch of a loose design idea and use AI software to rapidly generate variations.

The 'intelligence' in 'artificial intelligence' is a misnomer – generative AI does not understand the world the way robots and computers in science fiction do. Truly intelligent AI is known as 'artificial general intelligence' and has not (yet) been invented. Instead, generative AI relies on statistical analysis of very large data sets to put together words or pixels without any underlying understanding. Generative AI can't design for you any more than tossing a coin can intelligently choose between two options, but it can be useful if used wisely.

Designers can use the randomness inherent in generative AI to inspire and stimulate their thinking by rapidly generating alternatives and details they might not have thought of. (This is why it's useful to discuss using generative AI in the Develop phase of the design process.)

Generative AI can create persuasive, full-colour renderings from a line sketch, which is useful for quickly exploring a variety of visual styles and approaches. It cannot, however, understand the design problem and create a solution that strikes an effective balance between competing constraints and stakeholder needs.

Use of AI in design is still emergent and somewhat controversial, and there are many unresolved issues. Your school may have strict policies on how and where you can employ AI tools in your work, so rely on your teacher for guidance and clearly identify any AI usage in your project sketchbook and perhaps the prompt you used.

Weblinks
Vizcom

QCAA Design syllabus: Visual representation skills

CHAPTER RECAP

+ Design ideas come from extrapolation, modifying existing solutions and invention, and combining several different ideas.
+ Don't stop at your first good design idea: generate, evaluate and improve many different design ideas during your design project.
+ Ideas often come faster when you work quickly.
+ Turn the most promising ideas into concepts by evaluating and improving them.

+ Turn the best concepts into designs by refining the details.
+ Visualisation is how designers 'see' and 'test' their design ideas, both in two and three dimensions.
+ Experiment with different ways of visualising to explore and develop your design ideas and concepts. Practise with them to build speed and skill. Be aware of the biases that are present in your visualisation tools.

CHAPTER REVIEW

1 Create an 'inspiration file' by collecting photos of designs that inspire you. Draw or trace these designs to analyse and understand why you love them.
2 What questions do your latest design concepts raise? Without getting too sidetracked, what information can you research? Who can help you answer these questions?
3 How do you come up with most of your ideas? What can you do to build your 'ideation muscles'? Defer judgement and challenge yourself to generate as many ideas as you can for 15 minutes. Work hard and fast.
4 What will you do today to make a deposit in your 'creative bank account'?
5 Does your school have a policy on the use of generative AI in design projects? Ask your teacher if you're not sure how to use AI in the right way.

ACTIVITY: SCAMPER

SCAMPER is a checklist, created by Bob Eberle, that helps you to think of changes you can make to an existing idea in order to create a new one. Use these changes either as direct suggestions or as starting points for new ideas or concepts. SCAMPER is particularly useful in product design, but it can be applied to any concept that requires creative development.

Resource
SCAMPER
activity

You may choose not to use all aspects of SCAMPER in every design – make use of the parts that are relevant and inspiring. In using the tool, consider your application of design factors such as elements and principles of design, materials and sustainable practices. Think about the use and incorporation of different graphical representations. The table shows what SCAMPER stands for.

SCAMPER	Actions
Substitute	Consider replacing all or part of your design with alternative options.
Combine	Create something new by combining parts of the design or introducing new combinations.
Adapt	Think about how the use or function of the design could be changed to suit a different purpose or set of circumstances.
Modify	Consider radical change to all or part of the design. Think about the distortion of some aspects.
Put to another use	Think about how the design could be used in another way. Could an aspect be sourced from another design?
Eliminate	Reflect on what could be removed from the design. Less is more, or is it?
Reverse	Consider completely 'flipping' one or more aspects of the design, either physically or conceptually.

SCAMPER TEMPLATE

SCAMPER elements	Key questions to ask	What are the possible results in your design?
Substitute	What if I swap this for that and see what happens? Who else could find this appealing or useful? What other materials or design factors could I use instead? What happens if I substitute the shape, texture, form or colour?	
Combine	What elements or principles of design can be combined? What graphical representations could be combined?	
Adapt or add	What part of the concept can I change? What if I were to use parts of other design elements or principles? What if I reuse aspects of my design in other ways or other places?	
Modify, magnify or minimise	What happens if part of the concept is expanded, exaggerated, minimised or changed? What is the effect of altering proportions and relationships in the design?	
Put to another use	What other function or use can my concept be applied to? Can another design feature from another product be used in my idea?	
Eliminate or erase	What can be removed from my concept? What can be understated or streamlined? What happens to the design if parts are taken away?	
Reverse or rearrange	What is the opposite of what I am currently doing? What if I did it the other way around? What if I reverse the elements or the way it is used? What happens if I mix up the design?	

ACTIVITY: BRAINDRAWING

Think of braindrawing as visual brainstorming. Just like brainstorming, you need a group of people for this method. This method won't generate as many ideas as brainstorming but can be easier to record concepts that are hard to put into words.

Resource
Braindrawing activity

To learn more about the Brainstorming activity, see Chapter 4.

WHEN

Use this method during the Explore, Define or Develop phases.

WHAT

You'll need:
+ a quiet space that allows everyone to be heard
+ plenty of A3 paper and pens for each person
+ a list of brainstorming topics

+ a group of four or five people (a minimum of two, maximum of seven)
+ at least five minutes, no more than 20. End the session when ideas start to run out.

RULES

+ Defer judgement: do not criticise ideas during the process.
+ Speed and quantity: work hard and don't stop until the time limit is reached.
+ Diversity: this is all about divergent thinking so include every idea, no matter how odd or crazy.
+ Build: build on the ideas other people suggest.
+ Respect: respect other people's time to speak. Write down your ideas and wait your turn to share.

METHOD

1   Agree on a single, clearly stated *goal* for the activity and make sure everyone can see it (or has written it down).

2   Allow a few minutes for everyone to *draw* their response to the goal.

3   Each person *shares one idea*; go around the circle taking turns. Only one person should speak at a time and when someone says something that triggers an idea in your head (and they will!) write it down.

4   After five minutes – or when ideas start to run out – *move on* to the next topic.

By the end of the braindrawing session, you should have a large sheet of paper with lots of ideas on it.

You can now begin discussing which ideas seem to have the most potential.

FAQ

Q: Who owns the ideas generated?

A: Everyone. Remember, ideas are cheap and plentiful and it takes lots of work and many decisions to transfer an idea into a final design proposal. It's very unlikely two designers will end up with identical proposals even if they start with the same idea.

ACTIVITY: CONCEPT BOMB

This may seem like a stressful activity because it demands you work intensively and design in a seemingly impossibly short period; however, many students enjoy concept bombs. You may be surprised at what you can achieve in a short period of time.

Resource
Concept bomb activity
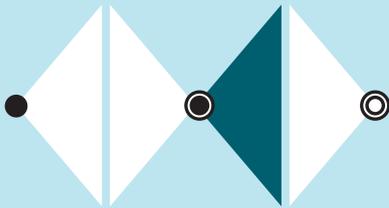
WHEN

Concept bombs are useful early in the Develop phase to help engage with the design problem and kick start ideation. They can also be used as a short class exercise to develop ideation skills.

WHAT

You'll need:

+   a problem statement, drawn from the design brief or created for the activity
+   stimulus material, from your project sketchbook (research notes, mood boards etc.) or supplied by your teacher
+   three or four sheets of A3 paper, pens and markers
+   a space to share design concepts, ideally a large pinboard.

RULES

1   The objective is to generate interesting ideas with *potential*, not finished concepts or designs.

2   Feedback should be constructive and encouraging (but avoid misleading flattery). You may find it helpful to use the 'I like …', 'I wish …' and 'What if …' format for your feedback; that is, positive feedback, negative feedback, and a suggestion.

METHOD

This method follows three main steps:

1   *Brief* (five minutes): Review the design criteria, either in your design brief or as supplied by your teacher for the exercise.

2   *Design* (25 minutes): Think up a few ideas and choose the most promising ideas to sketch in more detail. You'll be more productive if you divide your time for these two tasks – 10 minutes ideating followed by 15 minutes developing and presenting. Present your chosen idea so that it can be seen clearly from a distance – a little marker shading and black detail lines work well for this (avoid insipid, pale pencil lines), with a few bullet points listing features of the concept.

3   *Feedback:* Share your ideas with the class, either by pinning them on a large pinboard with everyone else's or laying them on the desks. The important thing is that everyone in the class has the chance to see all the work and give constructive feedback.

Follow-up: This last step is not really part of the concept bomb so much as what comes later – evaluating and developing the idea if it is part of a larger project. That may not be necessary if your teacher had conducted the concept bomb as an independent exercise.
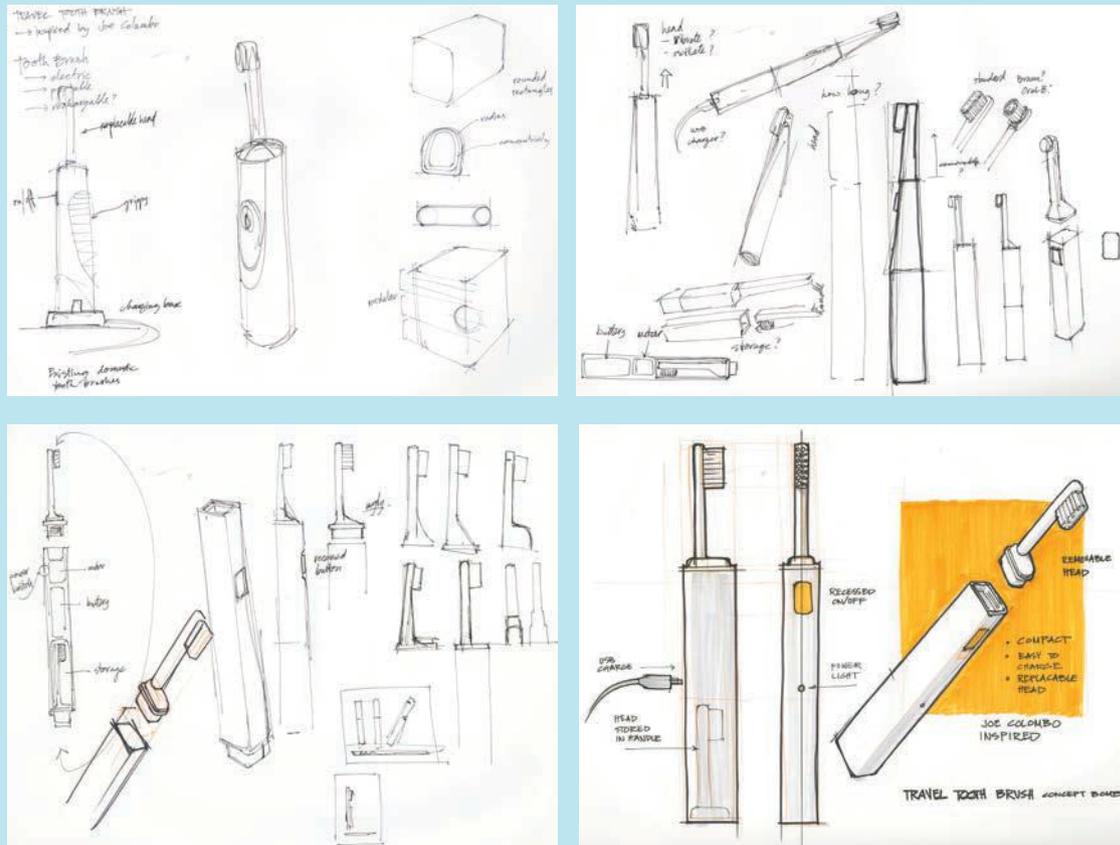
▶ Ideation pages and one presentation sheet for a 30-minute concept bomb for a travel toothbrush

Andrew Scott

ACTIVITY: RAPID ITERATION

This is similar to back-to-back concept bombs: a repeating cycle of around 25 minutes of very focused, distraction-free work followed by a five-minute break. This technique is good for iterative development – developing an idea quickly – but can be used to generate multiple ideas (parallel ideation) too. In fact, these two activities tend to blend together in an organic way and designers should be free to do what seems right at the time.

It helps you beat procrastination by demanding short periods of intense focus.

Resource
Rapid iteration activity

WHEN

Use this activity during the Develop phase.

WHAT

You'll need:

+ your project sketchbook containing your research, design brief and existing design idea
+ lots of A3 paper, pens and markers
+ time to run through at least two cycles – a single class may be enough but a double period may be better
+ optional: a feedback sheet.

RULES

Don't let yourself be distracted by anything while you're focusing.
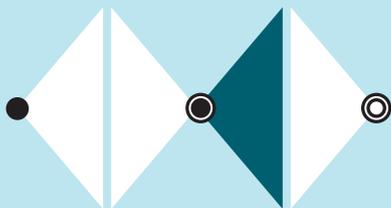
METHOD

1   *Review:* Review your existing design ideas and brief on your project sketchbook.
2   *Focus:* When the timer starts, generate a design idea that addresses the brief. It's OK if it's an iteration of an existing idea but it's better if it's something new. Don't get distracted by your colleagues, researching online or anything else – just *design*.

3   *Break:* When the timer ends, leave your work on the table for all to see and look at what other people have done. You have five minutes to chat, stretch and be inspired. If you're using feedback sheets, then add constructive comments for your colleagues.
4   *Repeat:* After the break, get back to work, either generating a new concept or iterating on the previous one.

ACTIVITY: ROUND ROBIN

In professional design firms and departments, a designer will take responsibility for leading a project but contribute ideas and feedback to other designers' projects too. This allows for more diverse perspectives and a variety of ideas. Work in trios (or pairs), each person taking a turn in the role of lead designer.

Resource
Round robin activity
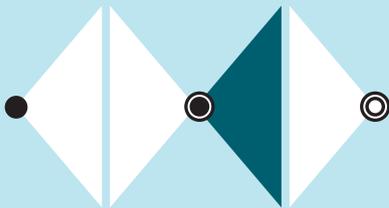
WHEN

This method is useful during the Develop phase when you're looking for lots of ideas to explore. It works best when everyone has different design briefs.

WHAT

You will need:
+   your project sketchbook and design brief
+   pens, a few markers and lots of A3 paper.

RULES

Agree that after each round, the sketches for each project will be given to the person whose brief they apply to.

METHOD

1   *Timing:* Divide the time you have among the number of people working together and set a timer. If you have 45 minutes and three people, that means 15 minutes per person.
2   *Brief:* The first person becomes 'lead designer'; with the timer running, they explain what their project goals are using their design brief, and what they've explored in their sketchbook so far.
3   *Design:* Working on fresh sheets of A3 paper, everyone sketches as many ideas as possible for this design brief.
4   *Share:* When the timer ends, everyone records their name on their sketches (to acknowledge their contribution) and gives them to the lead designer.
5   *Repeat:* Repeat the process with a new lead designer until everyone has taken their turn.

FAQ

Q: Who do the sketches belong to?
A: The lead designer for that round. Remember, it takes a lot of work to turn an idea into a design so be generous with the ideas you give to others. You should be flattered if they adopt one of your ideas and develop it further.
Q: Won't this make my sketchbook a mess of different styles?
A: Yes, but who cares? Your project sketchbook does not need to be pretty (and you're probably wasting time if it is).

ACTIVITY: USER TESTING

User testing is similar to user observations except that it involves design prototypes instead of existing things. Prototypes don't need to be fully or even partly functional – designers can simulate how they operate in many ways; for example, with 'paper prototypes'. It's an effective way of evaluating your design concepts once you've made low-fi prototypes.

Resource
User testing
activity
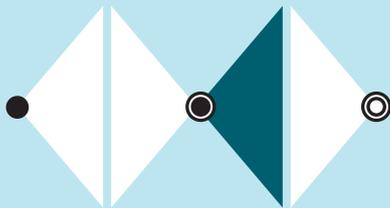
WHEN

User testing is useful during the Develop phase.

WHAT

You'll need:

+ a place to conduct the observations that allows volunteers to avoid distraction
+ a prototype of your design, or some other way of simulating use, and a task to do with it
+ paper to take notes
+ optional: recording equipment
+ at least two people, you and a colleague, to conduct the observations. One person should concentrate on communicating with the volunteers and another person focus on managing the setting and any equipment. Other colleagues can focus on observing if you have a third person.

RULES

1   Respect the privacy of your volunteers. If you make recordings, don't share them outside the design team without permission.
2   Make sure volunteers know that they can stop the task and leave at any time, and do not need to give a reason.

METHOD

1   *Identify* what, who and where you should make your observations. Creating a list of questions you're seeking answers to can help maintain your focus.
2   *Test* the task with one volunteer before you do it with a number of people. This is known as a 'pilot study' and helps ensure the task makes sense, clarify how you'll communicate your requests and work out how long it will take. Improve your task and test again if necessary.
3   *Recruit* people to observe. Tell them what task they'll be doing, how long it will take and why you're doing this, but don't share your assumptions.
4   *Conduct* the observations and take careful notes. You may decide to video record the task, with your volunteers' permission, but note that this means spending time watching everything again later, which may not be necessary. (You can take notes as you go as well, and add to them later while watching the recordings if you wish.) Resist the urge to tell people what to do or answer questions about the task. When people are confused by a task, this can reveal interesting 'pain points' and design opportunities for improvement.
5   *Analyse* your notes and identify themes and patterns of behaviour. Did anything surprise you or challenge your understanding of the task? What might this mean for your design brief?

RELATED TESTING TECHNIQUES

As for user observations, you can take user testing to a deeper level using 'verbal protocols'. Note that this level of testing may be too demanding for all but the most in-depth school design project. See the user observations activity in Chapter 4 for details.

ACTIVITY: STYLE TRANSFER

Style transfer is a way of trying different aesthetic approaches for a design.

Resource
Style transfer activity
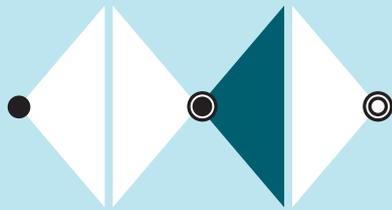
WHEN

This method can help you think of different styles for your designs. Most people use a general style or look when they're designing, often unconsciously but sometimes quite deliberately as informed by the project brief (see also mood board). The method is quite simple: study a style (see Chapter 17), identify the visual hallmarks that make it distinctive (its visual language), and express those traits in the item you're designing. The style transfer method can be used as part of a normal design project process or as a short exercise to provoke different aesthetic thinking (see concept bomb).

WHAT

You'll need:

+ a collection of reference images of examples of the style you're transferring to your design
+ images of the thing you're transferring the style to, either sketches of your current project design

concept or photos of something else that's specific to the exercise
+ pen and paper, perhaps markers or coloured pencils
+ between 30 minutes and a few hours.

RULES

Work quickly and explore as many ideas as you can think of.

METHOD

Start a timer before you begin – working against the clock will prevent you from getting lost in details.

1 *Reference:* Examine your reference images carefully. You may find them easier to understand if you make thumbnail sketches of some of them.
2 *Analyse:* Rapidly sketch more thumbnails to build a visual summary of the visual 'style language'. Colour is often an import facet, so recording the hues and colour proportions of typical colour schemes may be helpful.
3 *Transfer:* Try out aspects of the style language on the item you're redesigning, again with quick, small thumbnails. This allows you to quickly explore different ways of transferring the style without investing too much time in any single idea.
4 *Develop:* Depending on your needs and how fitting these ideas are, you may choose to develop one or more thumbnails into fully fledged design concepts for your project.

1. Reference
Thumbnail sketches of Jake Parker illustrations (pen + marker + pencil on A3 bond paper)

2. Analyse
Visual Summary of reference material

3. Transfer
Transferring the visual language to a Wi-Fi cmaera. (Note the thumnail line drawings of existing cameras along the top of the page.)

Andrew Scott
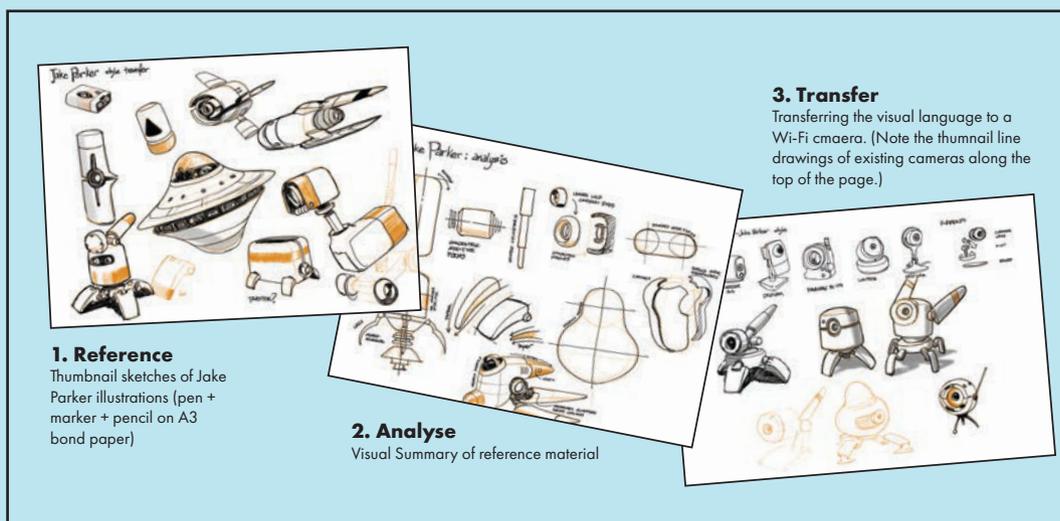
▶ This shows the style transfer method being used for a short industrial design exercise: applying the style of illustrator Jake Parker to wi-fi cameras.

FINISHING YOUR PROJECT

Good design is obvious. Great design is transparent.

Joe Sparano

In this chapter:

Learn the language:

+ concept presentation
+ design freeze
+ final presentation
+ flatwork
+ pitch
+ prototype
+ resolution

▶   The Double Diamond design process. Focus on the Deliver phase.

in this chapter we'll guide you through the final phase of your project: turning design concepts into design proposals and communicating them to your client.

Looking at the Double Diamond, we can see the convergence arrows indicating that we're now narrowing in on the most promising design concepts to produce an effective design proposal. In truth, there's some divergent thinking during the Deliver phase, too (in much the same way as there's convergent thinking within the Develop phase). Throughout the design project we're often thinking of multiple approaches (parallel ideation) to aspects of the design problem before choosing and moving on to another aspect. For example, a graphic designer working on a logo might explore multiple motifs (divergent thinking) before choosing several to develop (convergent thinking). Then, they might explore divergent font options, converging on the most suitable, and so on through details such as colour combinations, paper options, printing effects and so on. This cycle of divergence and convergence goes on throughout the Double Diamond.

6.1 REFINING YOUR DESIGN

The difference between design concepts and design proposals is *resolution*. Not resolution in terms of pixel density but in terms of how refined, polished and detailed the design has become. A *highly resolved* design has had all aspects carefully considered. The Deliver phase is thus one of working through all the necessary details to make the design as finished as it needs to be.

Close attention to detail is a hallmark of this phase of the project. It's a process of optimising all aspects of the design to meet the design criteria specified by the brief.

Some designers think of themselves as 'big picture' people, coming up with grand ideas and leaving the details for others to sort out. The appeal of this notion is understandable – dreaming up ideas is fun, whereas resolving them requires meticulous work, which, while satisfying, may not be quite as exciting. However, if you don't work out the details, then you're leaving that essential task to someone else, which means there's no guarantee that your design intent will be maintained. Will you then even be even the designer of the item that eventually gets made?

The details are not the details. They make the design.

Charles Eames

FINAL CUT

Preserving the design intent is 'the final cut' in the film industry – powerful directors can insist that they have final cut, whereas other directors may have their film edited and fundamentally changed by the studio. A 'director's cut' of a film is a revised version of a film that restores the director's vision.

MAKING DESIGN DECISIONS

In a sense, design is all about making decisions. It's the designer's job to make decisions on behalf of stakeholders.

If you've fully embraced divergent thinking and parallel ideation, this will mean needing to choose between many tantalising options. It's likely that you've created multiple exciting concepts or details that you love, each offering benefits in different ways. Choosing between them can be painful – it's that 'kill your darlings' process discussed in Chapter 5. It may be possible to combine ideas from different concepts, but it's quite possible that this will lead to a fractured rather than harmonious design proposal – a case of avoiding decisions rather than making them.

Making lots of good design decisions will lead to a design proposal that is true to itself and its purpose. One way of trying to achieve a highly refined design is to subtract from it as much as you can. Ruthlessly remove all redundant elements and unnecessary features until only the essential remains.

Always refer to your design brief and the criteria when making decisions. If you're finding it difficult to choose between several promising design concepts (or between detail options), try using a decision-making method to draw out the comparative values.

A decision matrix is a way of comparing design concepts on a graph. Choose two qualities to assess each concept, evaluate each concept against these qualities and map them on two axes. For example, you might wish to compare the perceived value (cheap/premium) of concepts and sustainability approaches (reusable/disposable). You can then place each concept somewhere on the graph, depending on how they achieve these qualities.
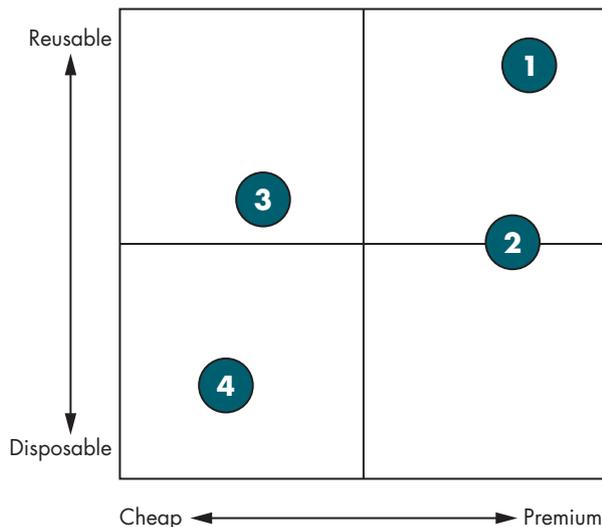
Another comparison method rates designs against multiple criteria using points. Each criterion is weighted to reflect its importance to the project. This produces a score for each choice with the highest scoring option being the best one. This method draws out the strengths and weaknesses of different design concepts if you assess each one honestly. If the resulting winner isn't your favourite concept, then it may be possible that the criteria you've used are not a good reflection of what's really important in the project, in which case, reconsider them. It's also possible that you're fixated on a design idea that you should let go of.

AVOID BUSY WORK

No project would need to employ all of the activities in this book and in many of your projects you might have no need for any of these methods because the comparative strengths between concepts are easy to identify. Resist the urge to create charts and tables if you don't need them – you'd be better off putting the time into refining your design. When it seems useful, experiment with some of the methods and rely on those that work best for you.

6.2 PRESENTING DESIGNS

The word 'presentation' has two related meanings in design:
1   drawings, renderings and text that show designs in two dimensions, sometime referred to as 'flatwork' – see 'Rendering your concepts' on page 68
2   the act of speaking and showing your designs to a group of people, the oral component of presenting.

The talking part of a design 'presentation' is a way of explaining your design to other people by speaking to them and showing them sketches and renderings. Presentations can be informal – designer and client looking at drawings side-by-side – or formal, where the designer uses presentation software to address a room full of people. Presentations can also take place online or in virtual environments.

Presentations occur at different times during the design project. Presentations during the Develop phase involve clients, and sometimes other stakeholders, in the decision-making process, something professional designers know is essential. It allows the client to have a say in the direction the project is taking and gives them 'buy-in' on the final design proposal. In other words, they share a sense of ownership in the outcome because they've contributed to it. This is good communication practice because it reduces misunderstanding and misinterpretation between client and designer. Involving other stakeholders also provides useful feedback while there is still time to make use of it. This is especially important in projects that have a substantial impact on a community, such as landscape architecture and architecture projects. Community engagement that starts a dialogue with the designers can help identify issues early and create acceptance for the end result. Imagine presenting your finished design and everyone hating it!

It's almost never feasible to have the client and other stakeholders with you while you're designing; instead, designers present their work-in-progress in meetings with the client. Sometimes a presentation of research findings will take place when the design brief is being discussed.

Timing and terms for these interim presentations differ between design disciplines and even between design firms. In the classroom, it will also depend on the duration of your design project. In a short project, there may only be time for one presentation during the Develop phase and then one at the end for the design proposal, whereas a longer project might have enough time for more.

CONCEPT PRESENTATIONS

Presentations during the Develop phase tend to be relatively informal. If your teacher thinks there's enough time, you might present concepts to them and the class, and perhaps the client if you have one. Initial concept presentations are about getting feedback on a choice of design concepts. Remember, design concepts are ideas that you've developed to the point where you think they should work but which are not completely resolved yet. This means that you believe them to be viable: they meet the design criteria, at least as far as you can tell so far. It's important to avoid showing any concepts that you know to be fatally flawed and non-viable.

During the concept presentation, you'll get feedback, which may take the form of a clear instruction on the preferred concept and the direction the rest of the project should take. Your client or teacher may say, 'I like concept 2. Please focus on that now'. This is very helpful because you can start to converge your thinking towards the final design. It's also why it's so important to only present viable concepts. Imagine how embarrassing it would be for the client to 'fall in love' with what you know to be a non-viable concept. What will you do – admit it's no good ('Why did you show it to me then?') or keep developing something that doesn't meet the criteria?

Not all design disciplines share multiple concepts during the Develop phase. For example, architects may discuss what they believe is the best 'schema' to develop even in the concept presentation, but they'll be ready to respond to feedback and suggestions that take the project in a different direction if required.
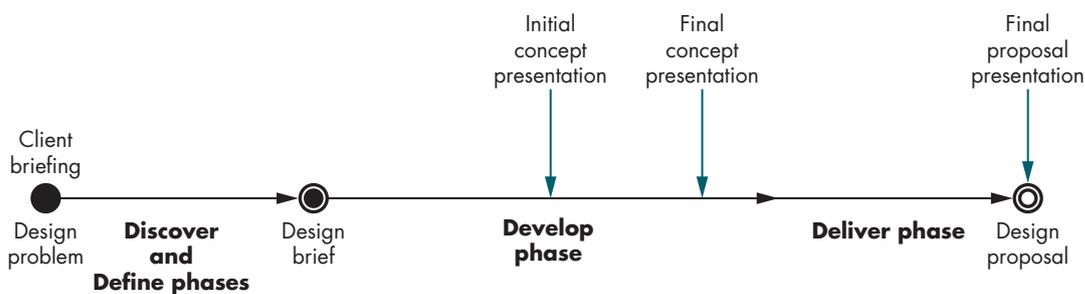
▶ Industrial designers often present three or more initial concepts to the client, followed by a final concept and then the final design proposal at the conclusion.

CONCEPT STRATEGIES

The concept presentation to a client is often the first time your client sees the quality of the design work so it's important to make a good impression with the quality of your work. It may also be the first time you get a good sense of what the client is looking for in the final design. Despite earlier discussions and the design brief, the client may not have been able to fully describe what they want. Rather than presenting concepts to a client that they many not like, designers try to present a diverse range of concepts.

For example, your client may stress their desire for innovative solutions but may not be ready for just how wildly innovative you can be! To prepare for this, consider adopting a Goldilocks strategy – show one safe, conservative concept, one highly innovative concept, and a third that is somewhere in the middle. Your client may choose the concept that is neither 'too hot' nor 'too cold' but just right for them.

▶   Just right!

Client tastes can be difficult to predict. Your teacher may decide to simulate this by asking the audience to vote on your concepts. You may try to skew the vote by showing a clear preference for one of your concepts but your audience may have other plans! Always be ready to develop whichever concept is chosen, so don't present anything you don't want to work on further.

RENDERING YOUR CONCEPTS

We use the term 'rendering' to mean drawings that are specifically used to communicate design concepts to other people, as distinct from ideation sketches that are primarily for the designer. Render your concepts to make the designs clearer and easier to understand for other people.

Concept design renderings are looser and less formal than final design proposal renderings. This is because you don't want to invest too much time in rendering any single concept (you may have three or four to do) and you don't want them to be too polished or else your client may think the project is over. A certain sketchiness to the renderings says, 'These designs aren't final', which helps everyone understand feedback is welcome and further development will follow.

This means you shouldn't spend too long on your concept renderings but they should be much neater than any page from your project sketchbook (which is not for show). It's also important to consider the distance the audience will view your renderings from – make them big and bold with good contrast (no faint pencil sketches!).

●●●   To learn more about rendering, see Chapter 8.

PUBLIC SPEAKING

Orally presenting designs is a kind of public speaking, which many people find challenging. If you are very nervous about public speaking, don't be tempted to 'call in sick' – you know your audience, and a real client will know that you're still learning so they'll have realistic expectations. Presenting to an audience will help you refine your speaking skills and build your confidence.

You'll usually be given a time limit for your presentation and a few minutes for discussion and feedback. You don't need to speak for the full length of time – if you can explain your designs concisely, you'll have more time for feedback. Good preparation will help reduce your anxiety. For concept presentations, you generally don't need much preparation.

1 Review your design brief and identify the main design criteria your audience will need to be aware of.
2 Choose which design concepts to show and render each on separate a A3 page.
3 Decide on the best order to show your design concepts.
4 Rehearse your talk several times until you know it well. Time yourself to make sure you get through everything in the time you have.
5 Anticipate questions people may ask. For example, what are your most unusual design choices or most surprising research findings?

GIVING AND RECEIVING FEEDBACK

One of the best things about concept presentations is how much you learn from your colleagues. Not only will they give you useful suggestions but you'll also be inspired by how they've approached their own design projects. This may give you ideas on design approaches, sources of inspiration, and communication tips.

You'll experience class presentations both as a presenter and as an audience member, both of which can help make you a better designer. When you're in the audience, try to be an active listener. One of the best ways of doing this is by taking notes. Record any ideas you have, questions you'd like to ask and suggestions you'd like to give the presenter during the discussion time. Use the 'Presentation feedback' activity as a guide to sharing feedback with your colleagues.

6.3 THE DESIGN FREEZE

At some point, you'll realise that time is running out and you need to complete your design by entering the Deliver phase. If you've spent too long on the previous phases of the project, this can make you feel very anxious. You should allow about a quarter of the project duration for the Deliver phase, but that's often very hard to do because you want to keep making the design better and better. That impulse is admirable but can lead to a lot of stress as the time runs out. As you finalise your design, you'll probably see ways to improve the design solution. For small details that's fine, but at some point the law of diminishing returns comes into play – each incremental improvement takes longer to achieve and improves the design less.

Instead, you need to set yourself a deadline to stop refining and start delivering; otherwise you won't have enough time to deliver it properly. This deadline is known as the 'design freeze'. After the design freeze, nothing but extremely minor changes to the design proposal are possible: no changes to the style or function, no new features. While it might be possible to make small tweaks to some details, your attention after the design freeze should be on presenting and communicating whatever the design has become. In the real world, a design solution helps nobody until it gets off the 'drawing board' and into the world, and for that to happen it needs to be clearly documented and communicated. In the classroom, this means allowing time to present your design proposal so that its quality can be clearly understood.

Using and respecting the design freeze may be the single biggest difference between a well-managed design project and a highly stressful scramble to meet the submission deadline. Your teacher may help you by setting a 'soft' design freeze deadline for the whole class.

► Freeze your design to allow enough time for the Deliver phase.

RESPECT THE FREEZE

Fight the urge to change your design proposal in substantial ways during the last quarter of the project. You won't have time to consider the implications of big design changes, let alone communicate them. Big changes at the last minute can be a form of self-sabotage.

6.4 PROTOTYPING

During the Devise phase, your prototypes will have been low-fi in nature with a focus on exploring and refining your concepts. Now, in the Deliver phase, you may need to make a more realistic prototype. The form this will take will depend on what you've been designing and the facilities available to you.

For example, fashion design is often very 'hands-on' in terms of making physical prototype garments and these may play a big role in your design proposal presentation. How satisfying would it be to have someone model your design during the presentation!

It's often feasible to prototype graphic design outcomes, too – render the final design at full size, and perhaps on the correct stock, if possible. (This might be impractical if you've designed billboards and similar large-scale outcomes.)

High fidelity prototypes may be possible for digital media design. For example, creating a functional website may be quite achievable, although app designs might need to rely on simulation rather than full function.

Industrial design outcomes may need to rely on realistic appearance models, depending on the product. Functioning products containing electronic and mechanical functions are usually out of reach, although purely physical products, such as furniture, might be achievable.

Built environment outcomes will almost always depend on scale models, although virtual representations are increasingly possible.

Whatever form your prototypes take, be sure to make full use of them. This includes:

+ quick photos for your project sketchbook
+ screen captures or exports of digital models for your sketchbook
+ photos of scale models, appearance models for use in your design presentation
+ photos of users (or stand-ins) wearing fashion prototypes or simulating use of appearance models.

Models of all resolutions (low or high fidelity) can be tremendously useful for preparing design proposal renderings too, either by editing a photo of a model into a realistic background or just tracing over it to supply a reliable, accurate perspective for a 2D rendering.

DESIGNERS DON'T MANUFACTURE (USUALLY)

In many design disciplines, designers don't manufacture the things they design. For example, architects don't build the buildings they design – they create plans that builders follow to construct the building. These plans are a type of design documentation.

Digital media designers are sometimes an exception to this – they may well create the code that their apps and websites use to function, although 'commenting' the code to allow others to understand it could be thought of as a type of documentation.

6.5 FINAL DESIGN PRESENTATIONS

A great design proposal needs to be communicated (indeed, *proposed*) if it's to gain the support required to become a reality. In a professional context, a designer may present a draft, prototype or model as a proposal to a client. Digital modelling, fly- throughs or walk-throughs, virtual or augmented reality, may be used to help stakeholders experience a design that does not yet exist.

In school, a combination of the requirements of the original design brief and the available resources determines the breadth and visual complexity of the design proposal. It is an opportunity to respond creatively and to present thoroughly researched, developed and synthesised ideas. The design proposal may form a significant amount of assessment value.

All your hard work culminates in your design proposal – the clear communication of your design intent and the evaluation of your learning. As mentioned above, this usually takes the form of several deliverables – the components required for your assessment submission. (For a professional designer, deliverables are the agreed-upon documentation required for realising the design once it's complete.)

As the final representations of your design, design proposals need to be the most formal and detailed representations you'll produce in the project. The standard, format and contents of your presentation will depend on the unit submission requirements and your teacher will guide you in this. Many forms are possible and will depend on the nature of the design problem, the design criteria set in the design brief and, of course, the needs of the stakeholders
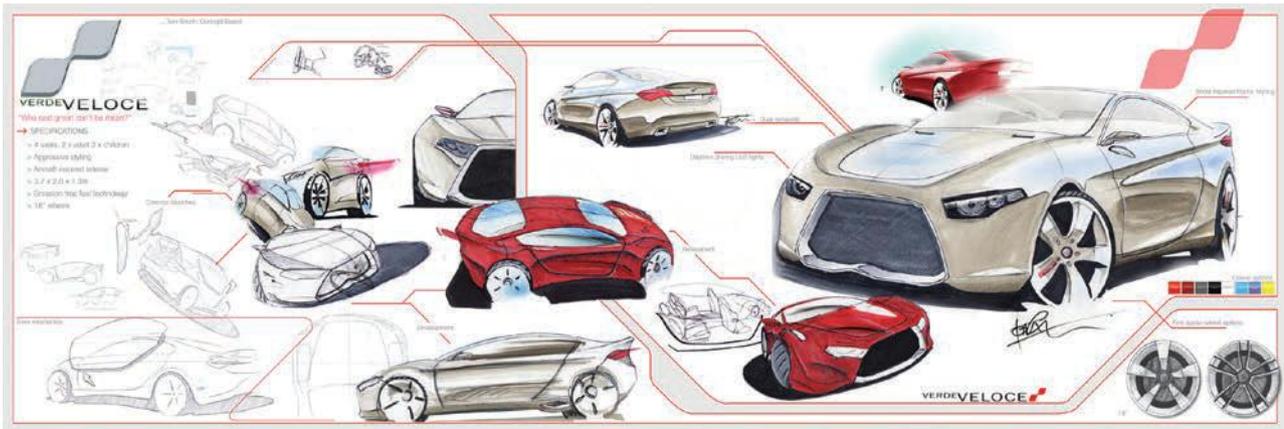
Tom Grech

▶ This student created a concept board to explain his design ideas to his client. The board uses a combination of hand-drawn and computer-generated imagery illustrating details about the appearance and features of a new car design.

(client and audience). Practical considerations will influence your decisions on the form of the final design. These may include choice of materials, scale and form of the final presentation, as well as the presentation space and location.

There are many visuals that might be included in a design proposal. The most important factor is to ensure that the message remains clear. The purpose of the design proposal is to communicate the design solution, so ensure that the presentation supports the principles of good design and presents information with clarity and relevance.

6.6 COMMUNICATING BY PITCH

A 'pitch' is a type of oral presentation and in the classroom it generally refers to presenting the final design proposal. The word 'pitch' is also associated with selling, persuading someone to buy something, which has connotations of exaggeration and being 'selective with the truth', which is why some designers avoid the term. While designers seek to persuade their audience to see the value of their designs, they understand that any exaggeration will harm their relationship with their client. Instead, it's important to acknowledge any limitations as well as the benefits of the design.

By this stage, your expertise with your design and the design problem can make it difficult to communicate clearly to other people because it's difficult to remember what they don't know. You have only a short time to communicate the results of weeks, or even months, of knowledge and decisions, so identifying the essentials and conveying them to others takes careful thought and empathy.

The pitch is a means of presenting the design ideas and solutions that have been developed and refined over the

Daniel De La Hoz/Dreamstime.com

▶ Being able to communicate your ideas is just as important as creating great designs.

course of the design process. It is an opportunity to explain to stakeholders, such as the client or audience, the journey from brief to the final design concepts.

As an evaluation tool, a pitch provides an opportunity to gauge the success of a design. The pitch may also provide opportunities for feedback from stakeholders. This, in turn, may lead to changes and adjustments to the design. Your pitch is an opportunity to convey your ideas and to showcase your thinking and design skills. It is essential to use appropriate design terminology, so think carefully about the language you'll use.

CREATING AN EFFECTIVE PITCH

We could divide pitch preparations into two parts: deciding *what* to show and preparing *how* to say it. Preparing a good design proposal pitch takes time and planning. (You did the design freeze for a reason!)

What to show

Be strategic in deciding what to show. You have limited time and space for your physical presentation and each rendering or depiction of your design takes time and effort to create, so select the most meaningful and informative views and avoid unnecessary repetition. Often designers invest a lot of their effort in creating one principal view or depiction of their design, known as the 'hero', and several supporting and subordinate views to support it. As always, this depends greatly on the type of item being designed, but the principle of an exciting, persuasive hero render to create a positive first impression is universal.

Your presentation may need to convey glimpses of your design process to illustrate how you arrived at your design proposal; for example, how you engaged with stakeholders. Carefully balance the need to show process with the need to show outcome of process.

Ultimately there's so much you could show but so little space and time to cover it that you need to prioritise content carefully. You might find it helpful to draw up a list of things you'd like to show and give each a priority from 1 to 10. Sort and re-sort this list to develop a structure for your visual presentation.

How to say it

Once you have a plan for your visuals, turn your attention to the words you'll use in your spoken pitch. If you're using slides, your script will naturally follow the sequence of slides. If using presentation boards (posters and similar flatwork), try to follow the left-to-right sequence of information so you can point to the images as you speak.

You may decide to write out a full script as part of your preparations. This can help you get your phrasing and terminology right as well as your timing. Time yourself reading the script aloud (not in your head) to gauge its duration. Trim to suit the time you've been allocated.

You may be tempted to read your script when you deliver your pitch. The only time this makes sense is if you're creating a recorded pitch. If you're delivering it to a live audience, don't deliver it verbatim. Instead, use the script for initial rehearsal and then create cue cards to use in front of your audience. Cue cards help you stay on track without losing eye contact with your audience.

Repeated rehearsals tend to flatten the spontaneity of spoken deliveries so make an effort to convey enthusiasm for your design proposal. You may feel 'a bit over it' by the end of the project and quite tired if you've not been getting much sleep. Try to put that behind you. Modulate your speaking to avoid a boring monotone and use eye contact to engage the whole audience, not just your

⚫⚫⚫   See Activity: Pitch preparation on page 81.

client and teacher. There's an old saying that applies here – fake it 'til you make it – if you need to, pretend to be enthusiastic and confident and you may find yourself feeling that way.

DELIVERING THE PITCH

Bringing all these elements together takes practice. It's something you'll get better at the more you do it. Keep in mind the following elements and qualities for your pitch:

+ Dress well. You'll probably be required to wear your school uniform for most pitches but take time to make sure you look your best. How you look is part of communicating that you take the work seriously but it also helps you prepare yourself mentally – look good, feel good.
+ Demonstrate a strong understanding of the original design problem. What key information did your research give you?
+ Display understanding of and empathy with the stakeholders, especially the users and their needs.
+ Highlight key decisions informing the design, showing that there is a reason for all design choices (although there won't be time to mention most of those choices).
+ Make clear connections between the design brief, design criteria and final design. This is the most important point.
+ Be persuasive but avoid hyperbole. You have negotiated between competing design criteria to produce an effective solution – there's no need to pretend you didn't need to make some trade-offs to do so.
+ Be open to advice and suggestions. Even though the project is complete, feedback can make you a better designer. (And don't be tough on yourself for missing things that may seem obvious in hindsight).

TEAM PRESENTATIONS

💬

Some projects will feature team presentations. For example, Unit 2 assessment requirements call for students to:
+ work as a team to present visual and spoken (live or virtual) pitches of design proposals for identified clients
+ reflect on the process of collaborative design and how well teams meet goals.

Keep notes of your contributions to presentation preparation in your project sketchbook. If your team produces a script for the presentation, be sure that everyone has a copy for their sketchbook too.

BEING A GOOD AUDIENCE MEMBER

We discussed giving and receiving feedback during concept presentations above. The same applies for design proposals but the stakes are higher so it can feel more stressful. This means it's even more important for you to be a good audience member. Respect other presenters and trust them to respect you when it's your turn. Pay attention, take notes and ask questions. Be supportive and encouraging.

6.7 DECONSTRUCTING DESIGN ASSESSMENT

You're studying Design because you're interested in it but you'd also like to get a good mark. How well you learn should dictate the mark you get in your assessment, but although design is a highly visual medium, your teachers don't know what goes on inside your head. This means it's necessary to show *how* you designed not just *what* you designed. The evidence of learning that you provide will determine your mark, and the key to providing this evidence is understanding how your work will be evaluated.

The Design Syllabus is helpfully specific in stating the learning objectives of each unit. Units 3 and 4 also state how your work is assessed, both for internal assessments and for the external assessment in Unit 4.

FYI It's important to remember that the Design syllabus is constantly evolving. The assessment details shown here will fall out of date sooner or later, so use this advice as a general guide only. Always follow your teacher's guidance on the specific requirements for each assessment.

Sometimes it's difficult to grasp the learning and assessment objectives at the start of the project, but as you enter the Deliver phase it's a good idea to look at them again. Discuss them with your teacher and ask questions about anything you don't understand while you still have time to act on this understanding.

Let's examine one of the Design Syllabus assessments in terms of the design process we've been discussing in this chapter. The requirements of each assessment differs but the projects are a good place to start as they represent the design process we've been discussing. Review the assessment objectives, specifications, conditions, response requirements and marking guide before reading on – your teacher can provide you with this if you need help.

Briefly, the response requirements – the physical form of the work you submit to be evaluated – specify three parts:

+ *Design brief*
+ *Design proposal*
+ *Design process*

By the end of your design project, you'll have a project sketchbook that shows all the twists and turns of your design process, stakeholder notes, research findings, exploration and iterations of ideas, design concepts, photos of prototypes, and design details. It will tell a fascinating story of your design journey. You can't submit your complete project sketchbook, so be selective – choose pages that are representative of your Explore and Develop phase. They should give an authentic sense of the breadth and depth of your work.

Authenticity is important. An honest and representative slice through your project sketchbook will show the rigour of your efforts to design something wonderful without needing to be pretty or forced or even tidy. Authentic project sketchbooks are messy because they serve the design process, which is nimble, looping, exploratory and, indeed, messy.

Your project sketchbook
A3 record of your design process

Your response
*Word limits, page limits and format as required by the assessment

Design process
A3 pages* selected from your project sketchbook to include:
- authentic examples (not refined or enhanced) of how you explored and developed your design problem
- stakeholder engagement

Design Brief
A3 page including:
- description of the design problem*
- design criteria*
- several useful images

Design Proposal*
A3 page showing your design solution, including:
- 1 or more renderings of your proposal that show how it addresses the design criteria you mentioned in your design brief
- labels that identify features (avoid long sentences or written descriptions, show rather than describe your design)

Or, *if required,* an audiovisual recording of set duration including:
- Images of your proposal
- Spoken 'pitch' addressing the client

▶ The pages you select from your project sketchbook give assessors a sense of how you design – no one expects to see everything you did in your project sketchbook.

UNDERSTANDING AND USING THE LANGUAGE

Instrument-specific marking guides (ISMGs) lay out the standards teachers must use to assess your work, in descending order of achievement.

To understand the language of ISMGs, let's deconstruct the ISMG for Unit 3, Internal Assessment 2: Project (30%). Understanding these standards will guide both your design process and the selection of work you'll submit to be marked. We'll focus on the A standard but you can still achieve an A mark overall if your work earns some B qualities.

Standard	Exploring	Marks

A	+ insightful analysis of needs and wants
	   • using relevant primary data about the stakeholder, secondary data about existing designs and designing with empathy knowledge
	   • to identify the significant aesthetic, cultural, economic, social and technical features and constraints of design problems and the relationships between them
	+ discerning description of the
	   • features and constraints that define a HCD problem
	   • essential design criteria that integrate the stakeholder's specific requirements associated with the features and constraints of the problem and the principles of good design
		9–10

A little over half of your marks are drawn from the pages you curate from your project sketchbook. Some of these pages should be devoted to your Explore and Define phases. Here you need to show some of your primary research, gathered from stakeholders, and secondary research, from existing designs. Add annotations that reveal the insights you gained from this research. Also show your insight into the nature of the design problem by showing relationships between the design considerations (aesthetic, culture, economic etc.). A mind map is an excellent way of doing this because it is a compact way of expressing relationships. You might, quite literally, draw lines between these considerations on your mind map and design criteria that make their way into your design brief. Use labels, headings and consistent terms to help make clear links between research, analysis and design brief.

Standard	Devising	Marks
A	wide range of credible ideas perceptively devised using designing with empathy in response to the HCD problem that demonstrate flexibility in ways of responding, originality and detailed attributes	4–5

Your project sketchbook is important to show your Devise phase work. We've discussed how important parallel ideation and iterative development are to the design process. Illustrate the breadth (wide range) of your ideation by showing samples of your most varied concepts. 'Credible ideas' are those that are viable in terms of the design criteria, and 'perceptively devised' means that these were conscious, 'flexible' ways of responding to the criteria, not random variation to pad out your sketchbook.

Demonstrate empathy by showing that your design decisions are guided by your stakeholder research and their needs. Use the same words you highlighted earlier (in your mind map) to show the link between stakeholder needs, design brief and concepts. (Note that empathy doesn't necessarily mean following all client or user suggestions for the reasons we've discussed – your external perspective means you'll see possibilities they won't.)

In Exploring, you showed your insights into existing designs. Build on that to show that your designs build on the work that has gone before without slavishly copying. Acknowledging this inspiration shows intellectual honesty (and it's never a good idea to try to hide inspiration sources from people who know a lot about design!).

We've stressed that resolving design details is a key part of the Deliver phase. Show how you've thought about the details of your proposal by selecting sketchbook pages that demonstrate your iteration on the small details of your design. This should integrate nicely with the final details of your proposal, evident in your design proposal presentation.
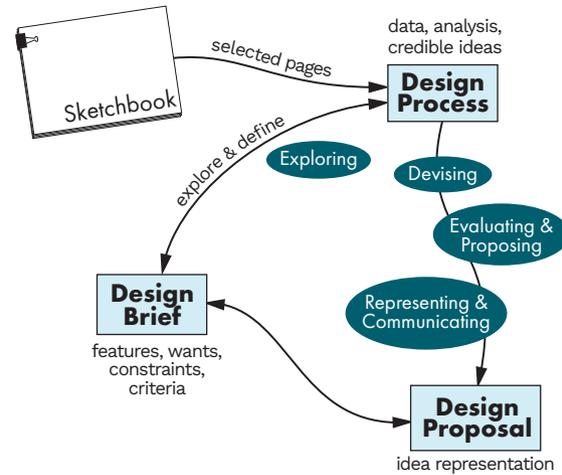
Andrew Scott

▶ All three parts of your submission (design brief, design process, design proposal) will be used to determine your mark.

REFLECT

Finally, after you've submitted your work, take some time to reflect on your experience. Every design project helps you become a better designer and you'll get the most from your experiences by taking time to reflect. Flick through your project sketchbook one more time to jog your memory. On a blank piece of paper, write down the answers to these questions:

+ What did I do well?
+ What do I wish I knew at the start?
+ What resources do I wish I had more of?
+ Where could I do better in the next design project?
+ What took longer than I thought it would?
+ What will I do differently in the next design project?

However you feel, remember that you've finished a design project and that's an achievement. It's said that most design projects are more like marathons than sprints. However much fun it is, design can exhaust you mentally and physically. You deserve a pat on the back.

CHAPTER RECAP

+ Designing involves looking at options and making many careful decisions.
+ Presenting your design concepts is a useful way of getting feedback on your design ideas during the Develop process.
+ Refining your design into a design proposal takes time, so schedule the Deliver phase at the start of your project and take it seriously. The 'design freeze' (stopping design development) at the start of the Deliver phase gives you time to concentrate on detailing and communicating your proposal properly.
+ A verbal design pitch may be required at the end of your project. As with the other parts of the design process, you'll have more success if you allow enough time and avoid rushing it close to the deadline.

+ You'll get better marks if you communicate your work by bearing in mind the language and goals of the instrument-specific marking guides.
+ What you submit for evaluation at the end of your design project should include representative portions of your design process and thus your design sketchbook in addition to your design proposal drawings. Don't limit your sketchbook pages to the number of pages allowed for the 'design process' part of your submission or you'll compromise the quality and rigour of your work.

CHAPTER REVIEW

+ Explain the design you're working on to someone outside your class, preferably someone who knows nothing about it, and take note of the questions they ask. This will help your understanding of what you'll need to communicate during your design pitch.
+ In the same way, ask outsiders for feedback on the design options you're considering. Which choices do they think you should go with? This outside perspective can give you fresh eyes on your design.
+ Are you procrastinating about your design work, perhaps because you're not sure what choices to make? Lay that part of the project aside for a day and turn your focus to a much more straightforward part of the project. For example, work on the style, format, colour choices, and titles for your design presentation. This allows you to be productive while your subconscious continues chipping away at the troublesome parts of the project.
+ Early in the project ask your teacher for a paper copy of the instrument-specific marking guide for your submission. Read through and highlight the key words and discuss any terms you don't understand. Keep these pages tucked into your project sketchbook for easy reference.

ACTIVITY: DECISION MATRIX

This method creates a graphical comparison between two qualities for several design concepts. You can create as many graphs as you need to compare different pairs of qualities.

If design options are clustered too close together, this might suggest more variety should be explored. Empty spaces in a matrix might suggest opportunities to explore with new design ideas.

Resource
Decision matrix activity

WHEN

Use this method during the Develop and Deliver phases to help make decisions. It can also be used during the Explore phase to make comparisons between existing designs.

WHAT

You'll need:
+ multiple concepts or designs to compare (or existing designs if using this method in the Explore phase)
+ paper and pen
+ optional: small photos or sketches of each option to place on the matrix.

RULES

The positions you give the choices are comparative and relative, and rarely precise.

METHOD

1 *Choose* the two qualities or criteria that seem useful or important for the project. The design brief is a good source for these.

2 *Consider* each existing design concept (or existing designs if you're using this activity during the Explore phase) against these qualities or criteria and position them on the matrix. For example, in the right-hand matrix example below, concept 4 is quite 'cheap' and also 'disposable', whereas concept 1 seems expensive ('premium') but highly 'reusable' (perhaps it's well made or easy to repair).

3 *Adjust* the ratings for each concept relative to each other to make sure they seem fair and consistent. It may be difficult to be precise for many criteria so don't ascribe false precision to these values.

4 *Review* the 'solution space' the concepts occupy. Can you see any opportunities for combinations of attributes that aren't currently explored? For example, the right-hand matrix example below shows no design concepts exploring 'premium + disposable' or 'cheap + reusable' qualities. There may be a good reason for this or it may be something you haven't considered yet.

FAQ

Q: How many comparisons or matrices should I consider?

A: Use your judgement. When you're not learning anything new, move on to other activities. As with all of these activities, don't use them to procrastinate or prevaricate.
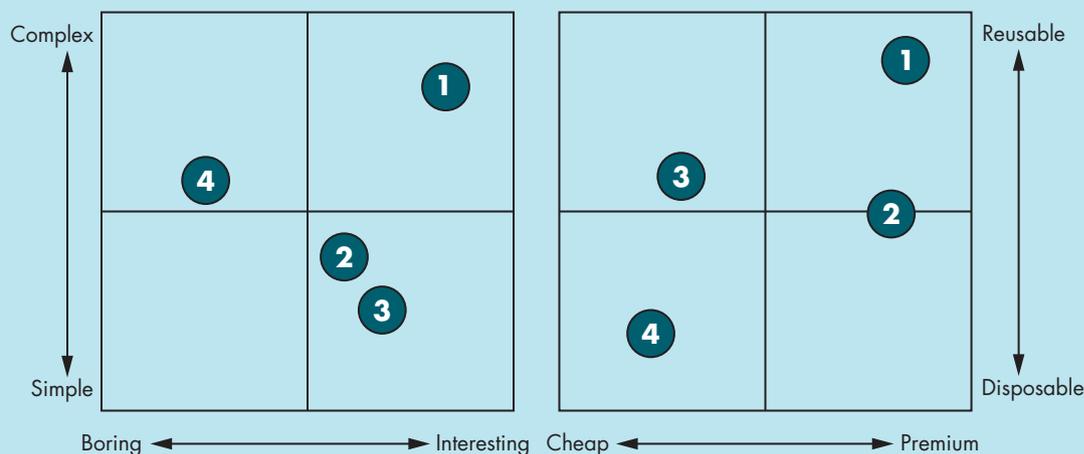
▶ In this example, the circles represent four design options compared in two matrices. The example on the left compares boring/interesting against simple/complex; the example on the right compares reusable/disposable against cheap/premium.

ACTIVITY: WEIGHTED OBJECTIVES

This is a systematic way of comparing design concepts against project objectives or design criteria. The most important criteria, dictated by the design brief, carries the most weight while less important criteria have less weight. This results in a weighted score for each choice, with the highest score being the best option.

Resource
Weighted objectives activity

WHEN

This method is especially useful during the Develop phase when you have several design concepts with different strengths and weaknesses. You may find it useful at other stages when there are too many considerations to easily judge the best choice to make.

WHAT

You'll need:

+ pen and paper (if there are few objectives to consider) or spreadsheet software if there are many objectives.

RULES

1 The final scores for each choice can create the impression of false precision so don't let the ratings overrule your instincts.
2 It's also possible to skew the weightings of the criteria and the ratings of each option to rig the outcome to get the result you want. If you already know what you want, why are you undertaking this activity?

METHOD

1 *Identify* the design considerations ('objectives') you've determined in the design brief.
2 *Determine* which objectives are the most important and which are least important, and give them a weighting out of 10. A weight of 10 means it's very important for success, while a weight of 1 means it's unimportant (although perhaps still worth considering).
3 *Rate* each design concept out of 10 for each objective/design consideration. Ten points means highly effective, 5 points means reasonably effective, 1 point means not effective for this objective. It's important to be methodical and dispassionate as you make each evaluation.
4 *Multiply* the objective score by the objective weight for each objective in each concept and then add up the total score for each concept. The concept with the highest weighted score should by the most effective one to develop further.

This sounds more complicated than it is, so let's look at an example. Image you're designing a logo and the design brief identifies the two most important objectives are that you create a unique and distinctive logo that adopts the existing style and colours of the client's brand. Other considerations might be contrast and impact, and legibility at small sizes. But legibility at small sizes may not be important because the logo will only appear on billboards and on the sides of trucks.

If you then rate each concept against each objective, without any weightings to reflective importance, it might be quite hard to see which concept you should choose. Adding weighted values for each can allow you to make a choice that reflects what's really important to the design brief.

In this table, each objective has equal weight. The concepts have different merits but it's harder to identify the most promising concept. (Concepts 2 and 3 have the same score.)

Objective	Concept 1 Score/10	Concept 2 Score/10	Concept 3 Score/10
Uniqueness	2	8	7
Style matches current client brand	10	6	9
Contrast and impact	8	10	9
Legible at small sizes	6	7	6
Total score	**26**	**31**	**31**

Introducing weights to each objective better reflects what's important in the design brief. This makes it easier to see the most promising choice (Concept 3).

Objective	Weight	Concept 1		Concept 2		Concept 3	
		Score/10	Weighted score	Score/10	Weighted score	Score/10	Weighted score
Uniqueness	10	2	20	8	80	7	70
Style matches current client brand	9	10	90	6	54	9	81
Contrast and impact	7	8	56	10	70	9	63
Legible at small sizes	5	6	30	7	35	6	30
Total weighted score			**196**		**239**		**244**

ACTIVITY: TALK TO YOURSELF

Prepare a design presentation by rehearsing, either by talking to yourself in a mirror or by recording yourself presenting with your laptop or phone's camera. If you'd like to be extra prepared and get some feedback, you could also present it to a classmate or friend.

Resource
Talk to yourself activity

WHAT

You'll need:
+ your design proposal drawings (not necessarily complete)
+ your design brief
+ speech/script notes
+ a video recording device or just a mirror
+ a timer.

RULES

1   Reading your script silently or giving your speech in your head is faster that speaking aloud so if you don't rehearse your talk out loud, your timing and pacing will be off.

2   Vary your pace and voice modulation and use pauses to add emphasis and drama to help your audience enjoy your presentation more.

METHOD

1   *Prepare* your what you want to say during presentation. Use your presentation drawings and notes to determine the sequence that you'll use to explain your design brief and design proposal to an audience. You might start with a written script but turn this into cue cards you can use during your presentation – this allows you to maintain rapport with your audience.

2   *Rehearse* your presentation by speaking out loud to a mirror or video record yourself on your phone. Go through from start to finish and time yourself.

3   *Repeat* your rehearsal, adjusting your pacing and content to fit the available time. The more you practise, the less you'll need your cue cards. You'll know you've rehearsed enough when you start to feel confident about your presentation delivery.

ACTIVITY: POOCH

The POOCH model assists in critical thinking and decision-making. POOCH can be used to help choose between design options. POOCH stands for:

P – Problem
O – Options
O – Outcomes
CH – Choices

P   O   O   CH

Problem   **Options**   **Outcomes**   **Choices**
               What might be done? Possible results?   Best options to pursue?
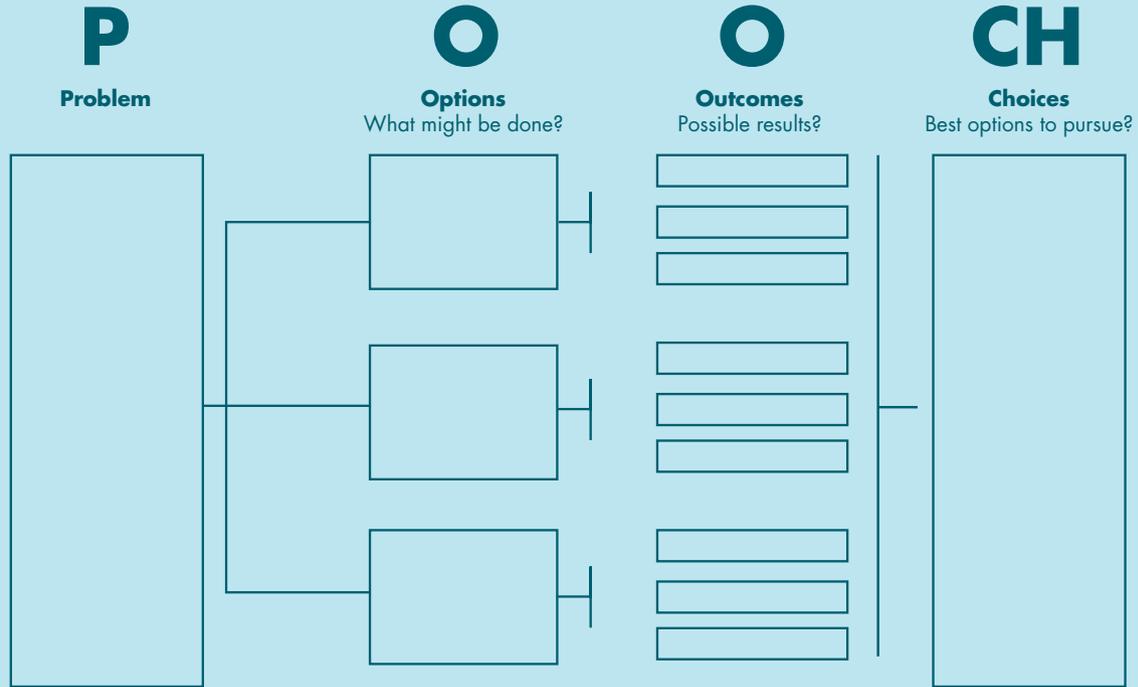
ACTIVITY: PITCH PREPARATION

Preparing a pitch or presentation is a process of deciding what you need to explain about the 'why' of your design project and the 'what' of your design solution. It involves identifying and prioritising information and ideas, organising a coherent way of sharing it and optimising this narrative for the communication context.

Resource
Pitch preparation activity

WHEN

Presentations can take place during the Develop and at the end of the Deliver phases. Use this activity as a checklist as you prepare for a live or recorded presentation/pitch.

WHAT

You'll need:
+ your design sketchbook, pen and paper
+ design concepts or the final design proposal.

RULES

You might find it useful to begin your pitch preparations even while you're still developing concepts or refining the final design proposal, but don't forget to be clear about what you're presenting if your audience is going to have a chance to understand it.

METHOD

1 *Review* your design brief and flip through your whole design sketchbook. You may be tempted to skip this step but it's easy to forget some details while you're focused on others.
2 *Identify* the most important information you've discovered during the project and what you need to explain about your design. This breaks down into three main categories:
   + **Research/background:** What will your audience need to know about the project to understand the design problem?
   + **Design objectives:** Distil the essentials of the design brief. What have you tried to achieve?
   + **Design features:** How does your design meet the objectives of the project? What are the most valuable and interesting features?
3 *Prioritise:* There's so much you could say but your time will be limited so focus on the most important aspects. Work through the information you listed in step 2 and categorise it as essential, useful or optional.
4 *Sequence* your information into a coherent and engaging narrative sequence. It's tempting to think of this as the *story* of your design project, but you only have time to explain *what* you designed and *why* you designed it, not *how* you designed it. (The twists and turns of the design process, how hard you worked, and all the good ideas you thought of but rejected are a story in itself, but it's not one your audience has time for.) A popular sequence for presentations is to cover the content in the order shown above – research, objectives, solution – but it's also possible to play with this sequence for dramatic effect, such as beginning with a glimpse of the design, before jumping back to the research and design objectives, and following up with details of the design solution.
5 *Refine:* Create your presentation visuals, and rehearse and refine your pitch delivery to fit the circumstances of the presentation. The most pressing circumstance is the amount of time you have allow for the medium of the presentation. Is it online or in person, using slides or pin-up boards? For rehearsal tips, see Activity: Talk to yourself on page 79.

The final step is, of course, to deliver your pitch. If you've worked through these steps thoroughly, you might find that your nervousness has transformed into excitement and anticipation It's exciting to share the results of all your efforts.

ACTIVITY: PRESENTATION FEEDBACK

Class design presentations are valuable learning experiences for presenter and audience alike. This method will help you listen to other presenters and give them constructive feedback.

Resource
Presentation feedback activity

WHEN

This is useful in any class presentation.

WHAT

You'll need:
+ pen and paper
+ optional: sticky notes.

RULES

Don't talk to your friends while other people are speaking – it's distracting for the presenter. Presenting is difficult enough without having to talk over rude people in the audience.

METHOD

1 Identify things that you think are good in the presenter's design work (positive feedback).
2 Identify weak aspects of the presenter's design work (negative feedback).
3 Think of suggestions for improvement that might help them.
4 During the discussion, share your thoughts. Be considerate of people's feelings.

Your teacher may open the floor for feedback or prompt audience members to share their thoughts. Respond with your feedback as follows:
+ 'I like ...' (positive feedback)
+ 'I wish ...' (negative feedback)
+ 'What if ...?' (suggestion)

When it's your turn to receive feedback, listen carefully and record it in your project sketchbook when you sit down.

SECTION 2

VISUALISING

DRAWING

Quit trying to make it so damn perfect; it's okay to show the wobbles. Let someone know that a human touched it.

Carolyn Sewell

In this chapter:

Learn the language:

+ aerial views
+ angle
+ charts
+ crating
+ development drawing
+ diagrams
+ diameter
+ dimension
+ elevation
+ fold
+ functional diagrams
+ horizon
+ idea sketch
+ layout
+ maps (mind, empathy)
+ nets
+ parallel
+ patterns
+ proportion
+ radius
+ scale
+ sketch plan
+ study sketch
+ tab
+ third-angle projection
+ vanishing point
+ views

Designers often use sketching as a powerful tool to think visually and communicate ideas. Sketching allows designers to explore different concepts quickly, iterate on designs, and convey their vision to clients, team members and stakeholders. The more you practise sketching, the better you become at creating and capturing your ideas effectively on paper or digitally.

Learning to sketch like a designer is not about artistic talent but about mastering a variety of drawing techniques that empower visual *thinking* and *communicating* skills. There are numerous resources available to help designers improve their sketching skills, including drawing books, online tutorials and videos. These resources discuss various topics that this chapter only covers briefly to help you improve your work.

Design sketching is not an innate talent; it's an acquired skill. If you can write your name, you can learn to sketch like a designer. Each technique you learn will expand your repertoire and enhance your ability to visualise and communicate ideas. The more you practise, whether sketching by hand or using digital tools, the more skilful you'll become.

As ideas become design concepts and then developed designs, designers invest more detail into fewer drawings. The shift from ideation drawing (visualising to think) to communication drawing is often matched by a shift of drawing tools: loose sketching on paper (or tablet) shifts to more detailed sketching using technical drawing, or more commonly, computer-aided design (CAD). (To learn more about the relationship between quantity of sketches and detail see 'Visualistion as testing' in Chapter 5.) This chapter provides no guidance on use of the many CAD applications available; you should make use of dedicated support documents and video tutorials for whatever software you have access to.

USING VIDEO TUTORIALS

Video tutorials have become invaluable resources for learning various skills, including drawing, rendering and prototyping. With a range of creators offering support in these areas, navigating through the vast array of tutorials can be overwhelming. Teachers can play a crucial role in guiding you to find the best creators whose tutorials align with your desired outcomes.

Many software applications also provide their own online support and content, further expanding the resources available to students. The key to effectively using video tutorials lies in an active learning approach: watching a segment of the video and then immediately applying what has been taught. Instead of passively watching the entire tutorial in one go, students benefit more from watching a step, pausing to apply it, and then proceeding to the next step. This method enhances retention and comprehension, allowing you to recreate outcomes without missing key information.

7.1 IDEATION DRAWING

Ideation drawing is an important skill across all design disciplines, facilitating the quick visualisation of concepts, particularly in the early stages of the design process. Many professional designers begin by roughly sketching their initial ideas on paper before transitioning to digital media. Sketches offer immediacy, allowing ideas to flow freely and be documented without delay. They often result from brainstorming sessions, team discussions or client consultations, enabling the rapid sharing of creative and collaborative ideas. Ideation drawing serves multiple purposes, including:

+ rapid visualisation of creative concepts
+ exploration of alternative visual ideas
+ communication of spontaneous or collaborative concepts.
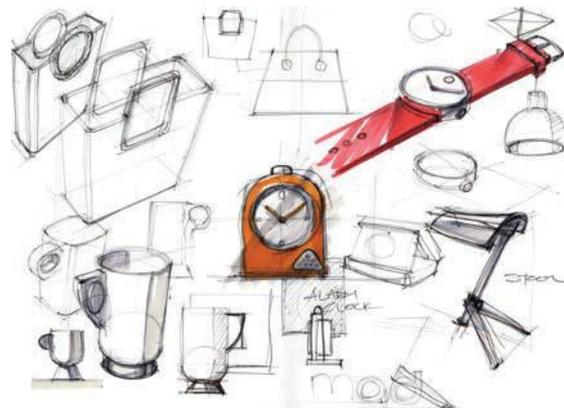
Mark Wilken

▶ Ideation examples

The qualities of sketching in design are as varied as the practitioners themselves. It is not essential to be a great illustrator to convey ideas and meaning through drawing. However, it is an important skill to develop, and many university design courses still require students to draw their early ideas.

Mark Wilken

▶ Design sketch for a stylus–tablet–keyboard combo product

Sketches for ideas are usually freely and loosely executed and do not represent a finished drawing. Consisting of loose but confidently applied line work and some rendering of tone and texture, design sketches can convey substantial visual information about form, textures and materials. Industrial design, in particular, uses the application of design sketching in the early ideation phase of the design process. Designers use sketching to explore concepts before undertaking more time-consuming and labour-intensive CAD representations.

There are techniques that can help you to build your skills in sketching design ideas. The use of three-dimensional drawing methods is relevant in sketching as they help create a high level of realism and realistic proportions for some designs. Selection of media is a first step in sketching. Find the medium that is most comfortable for you; anything from a ballpoint pen to a basic collection of pencils and markers on bleedproof paper can lead to good-quality results. Popular with industrial designers, architects, interior designs and landscape architects, markers can produce instant results. They take some getting used to, but once mastered, markers often become an essential tool for designers.
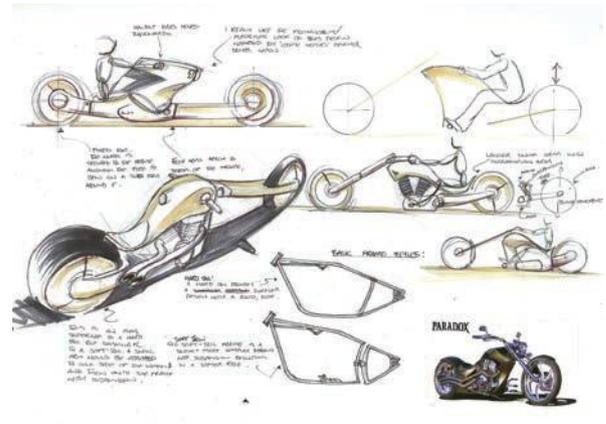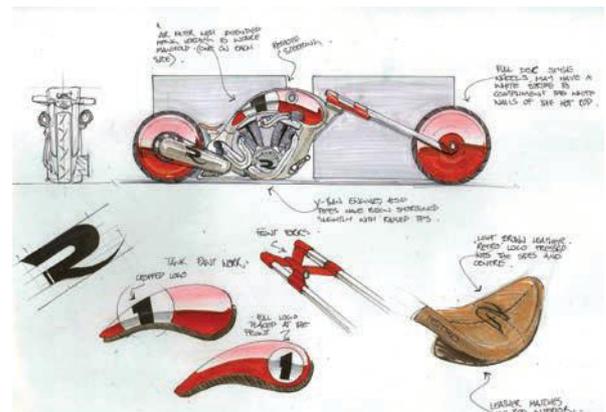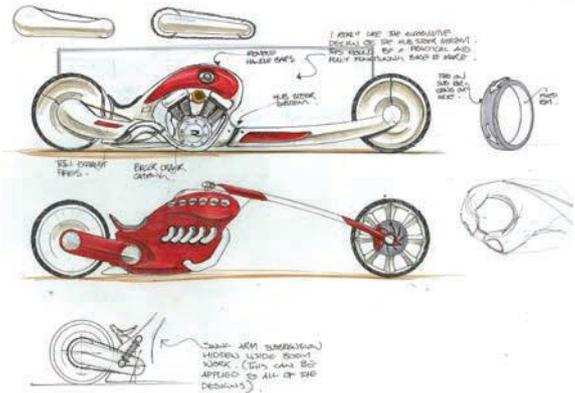
Tom Grech

▶ This student used sketches to generate early ideas about the form and function of a custom motorbike.

Rough, or 'thumbnail' ideation sketches are a most effective means of getting your ideas onto paper. These drawings are designed to communicate your initial ideas and are the first of your visual steps in response to the communication need. The sketches do not need to be detailed, but they should depict your concept and provide you with sufficient visual information to build upon as your ideas develop.

DESIGN SKETCHES VS HAIRY SKETCHES

▶ Effective design sketches are drawn confidently and lightly. They have light construction lines and light line work. The line weight builds gradually as the object moves away from the light source.

▶ Sketches that are heavy-handed appear to be 'hairy'. There is no obvious construction work, lines are consistently heavy, and no consideration is given to the direction of the light source.

Varied use of media in the early stages of design concept development is encouraged, as the properties of different media can have a direct impact on the direction of a creative idea. For instance, an object will appear quite different rendered in pencil than when rendered with markers or pastel. Ideation drawings may be primarily linear or fully rendered with representations of tonal variations, light and shadow, as well as surface textures. Tone and the representation of light and shadows are very important in drawing. To suggest the form and textures of the image, consider how light is absorbed or reflected on surfaces.
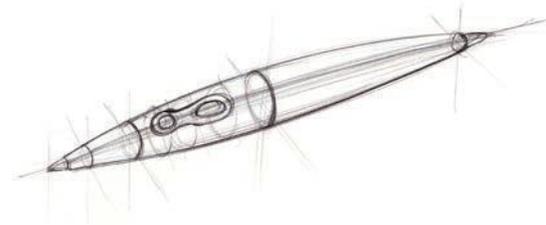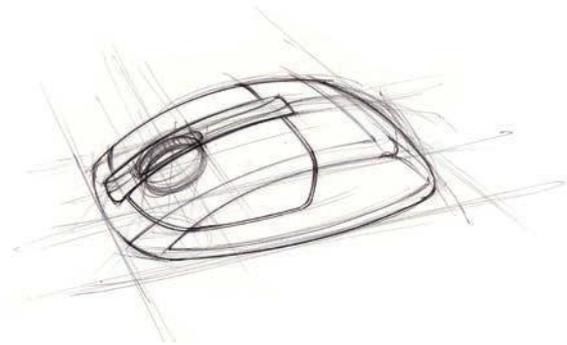
▶ Observe how simple forms have been used and combined to create these three objects. Applying perspective drawing techniques enables a simple hand sketch to appear realistic and proportional.
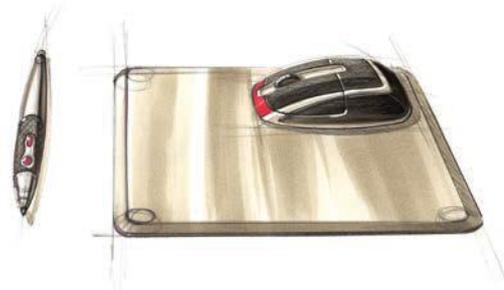
▶ The final objects rendered and grouped together

FREEHAND SHADOWS

Freehand shadows can be an effective means of 'grounding' a sketch and placing it within a given context. This provides a sense of realism and three-dimensional form.
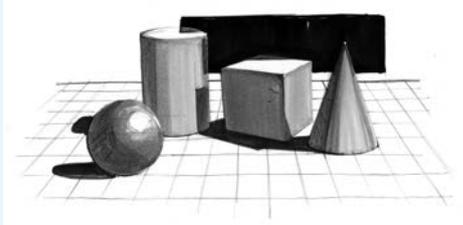
Ben Jennings

▶   Ideation drawings using tone to emphasise form

TRACING

Tracing existing designs can be an enjoyable and confidence-building process. It offers a practical way to learn drawing techniques while also fostering a sense of accomplishment. Tracing allows beginners to familiarise themselves with the method and style of drawing they are tracing, making it easier to understand and apply.

For example, when learning two-point perspective drawing, tracing objects can be particularly helpful in grasping concepts like vanishing points and construction lines. By tracing over existing images or drawings, beginning designers can improve their fluid line work, and can make their own changes and adaptations.

Several resources can be useful. A lightbox provides a consistent and well-lit surface for tracing, while laminated images ensure durability and reusability. Additionally, using tracing paper or photocopy paper (often thin) allows for easy transfer of linework and sketches.

Framestock/Adobe Stock Photos

▶   Tracing using a lightbox and a perspective streetscape

CLASS ACTIVITY

Choose from a range of sketches that are of a similar scale. Trace one design in two minutes. Make it quick and fun. Now take another object and attempt to merge the two designs. This can be silly and unconventional.

WEB

To learn more about sketching your ideas, watch the short video, 'Ideation Sketching' on Andrew Scott's YouTube channel.

Weblink
Ideation sketching

7.2 THREE-DIMENSIONAL DRAWING

We are accustomed to observing the length, width and depth of objects, something that isometric drawing and perspective drawings, also known as pictorial drawing, provide. Pictorial 3D drawings can be done by hand or using CAD.

Paraline

Isometric   Planometric
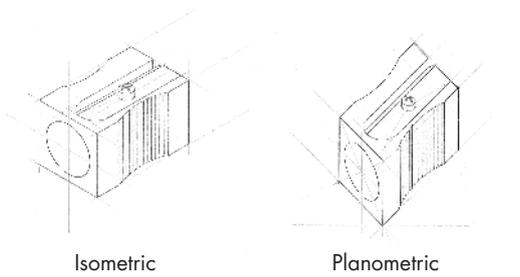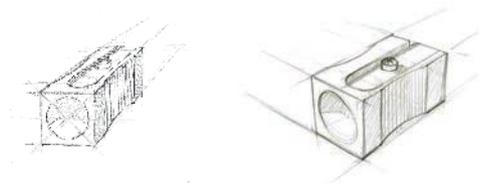
Perspective

One-point perspective   Two-point perspective

▶ Notice how unnatural some of these views of a pencil sharpener appear.

ISOMETRIC DRAWING

Isometric drawings were historically used by engineers and industrial designers, but have been replaced by CAD-generated perspectives. Isometric drawings are constructed of lines that remain parallel and do not converge at any given point, which is why they are sometimes referred to as 'paraline' drawings. This makes isometric drawing a convenient way of representing three-dimensional form using a drawing board and set squares, but the resulting representation feels distorted and unnatural and is generally not used by professional designers anymore, although it is sometimes used in engineering drawings.
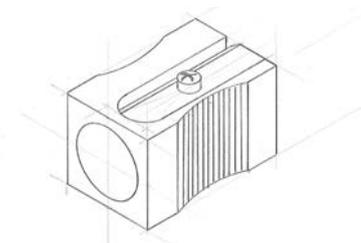
In an isometric drawing, the height (or corner) of the object faces the viewer, and the width and depth of the object recede (remaining parallel) at 30°.

ISOMETRIC GRID PAPER

If you are drawing by hand, you might find it helpful to draw your isometric drawings on isometric grid paper, which is predrawn with 30° and 90°.

PERSPECTIVE DRAWING

Perspective drawing simulates the way that the human eye perceives an object in space. When we see an object, our brain tells us that the object gets smaller as it recedes into space. We know that isn't true, but it is what our eye sees. We have an innate understanding of this phenomenon as representing depth and distance.

A long, straight highway is a good example of the perspective phenomenon. A road seems to narrow as it heads towards the horizon. However, if you were to travel along the road, it would be clear to you that the road does not diminish in size. You might also notice that any houses, trees and power poles along the sides of the road appear to diminish in size as they recede into the distance.
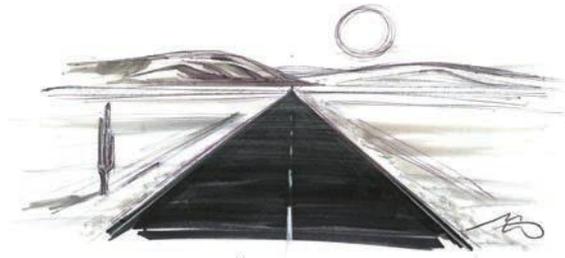
Mark Wilken

When drawing in perspective, the principles are the same. A row of objects drawn facing the viewer represents just that – a row. Redraw the same objects so that they appear to diminish in size, approaching a point on the horizon, and you have a composition that implies depth as well as representing the form and detail of the objects themselves.
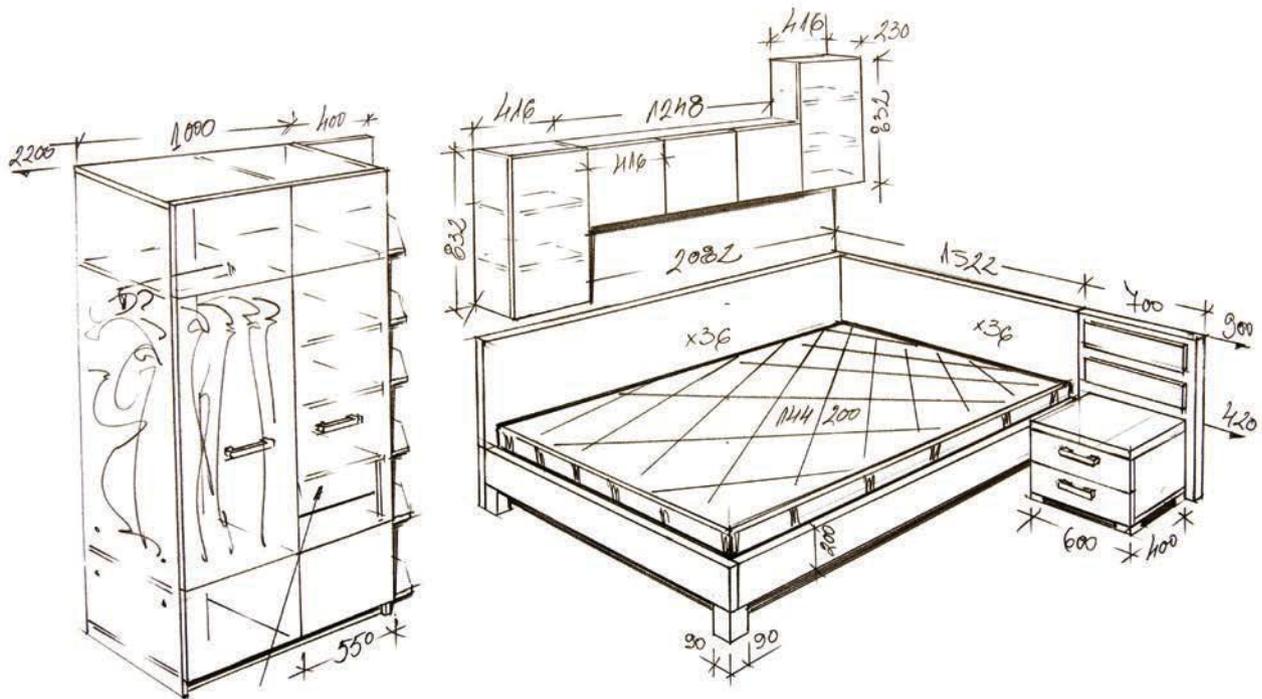
▶ Used to describe the physical arrangement of an interior designed space, this perspective sketch provides measurements and imagery that assist in the installation of furniture and fixtures.

Designers in the twentieth century were taught how to construct perspective views on paper, a laborious and time-consuming process that has been almost completely replaced by freehand perspective for ideation, and CAD for design proposal rendering. It remains useful to understand the principles behind perspective views in order to create more convincing rough sketches or detailed CAD renders, so we'll examine the principles below. If you'd like to learn more about perspective principles, there are many dedicated books on the topic.

Establishing your point of view

When drawing in perspective, your first task is to visualise what it is you want to represent. Ask yourself: What are the important features of the object I wish to illustrate? What is the key information about this object that I want to convey to the viewer? This will help you to plan the 'point of view' of the object; that is, the position from which you plan to draw it.

In any perspective drawing, the placement of the object in relation to the horizon line will affect the point of view of the depicted object. The horizon line sits at the level of the viewer's eyes. This is called eye level.

An object placed below the horizon line – below eye level – will give more information about the top of the object. Place the object above the horizon line, and then the area underneath the object becomes most obvious. If you place your object directly on the horizon line, the 'point of view' will appear to be quite realistic, as it sits at eye level. Again, it all depends on the effect you wish to create.

The most common methods of perspective drawing are one-point perspective and two-point perspective. Three-point perspective is sometimes used in illustrations where a dramatic and exaggerated representation is required.

One-point perspective

Remember the following key concepts when drawing in one-point perspective:
+ The height and width of the object face the viewer.
+ All depth (or the sides of the object) recedes to one point on the horizon line.

One-point perspective is sometimes referred to as 'linear perspective'. In one-point perspective, an entire plane of an object faces the viewer. The impression of a road

Mark Wilken

▶   One-point perspective views can be very useful for depicting architecture designs.

receding to a point on the horizon is one-point perspective. One-point perspective is evident in many depictions of landscapes and interiors.

A perspective box is a simple way to begin working with this three-dimensional drawing method. Once you can draw a perspective box effectively, you can draw just about anything!

One-point perspective represents the way the human eye sees simple interiors. Once you can draw simple geometric shapes in perspective, you can then add details to form highly descriptive illustrations. One-point perspective is particularly useful when illustrating interiors.

WEB

Watch a tutorial on drawing in one-point perspective on the Virtual Instructor website.

Weblink
Drawing tutorial:
One-point perspective

Two-point perspective

In two-point perspective, only the height faces the viewer, and the depth or sides of the object recede to two vanishing points on the horizon line. Two-point perspective is sometimes referred to as angular perspective.

Key concepts to remember when drawing in two-point perspective:

+   The height of the object faces the viewer.
+   All other dimensions recede to two points on the horizon line.

If you stand outside your house or a school building, you will become aware that the sides of the buildings recede, very slightly, to separate vanishing points.
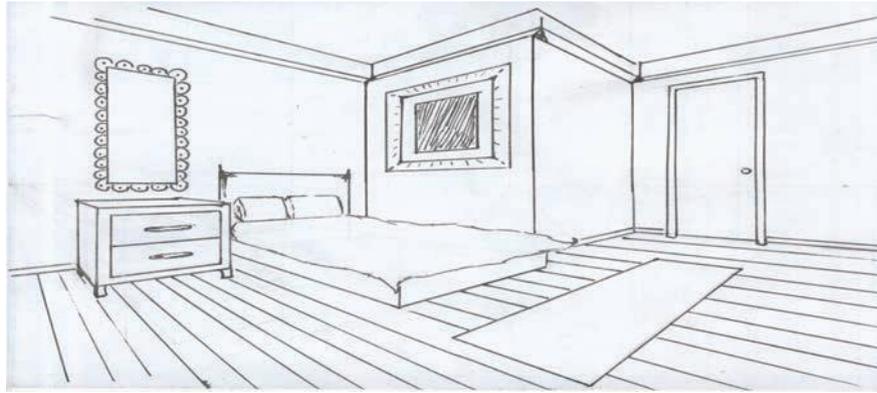
Elena Yachminskaya/Adobe Stock Photos

▶ Two-point perspective example, with the house on the horizon line, the people below, and the spaceship above
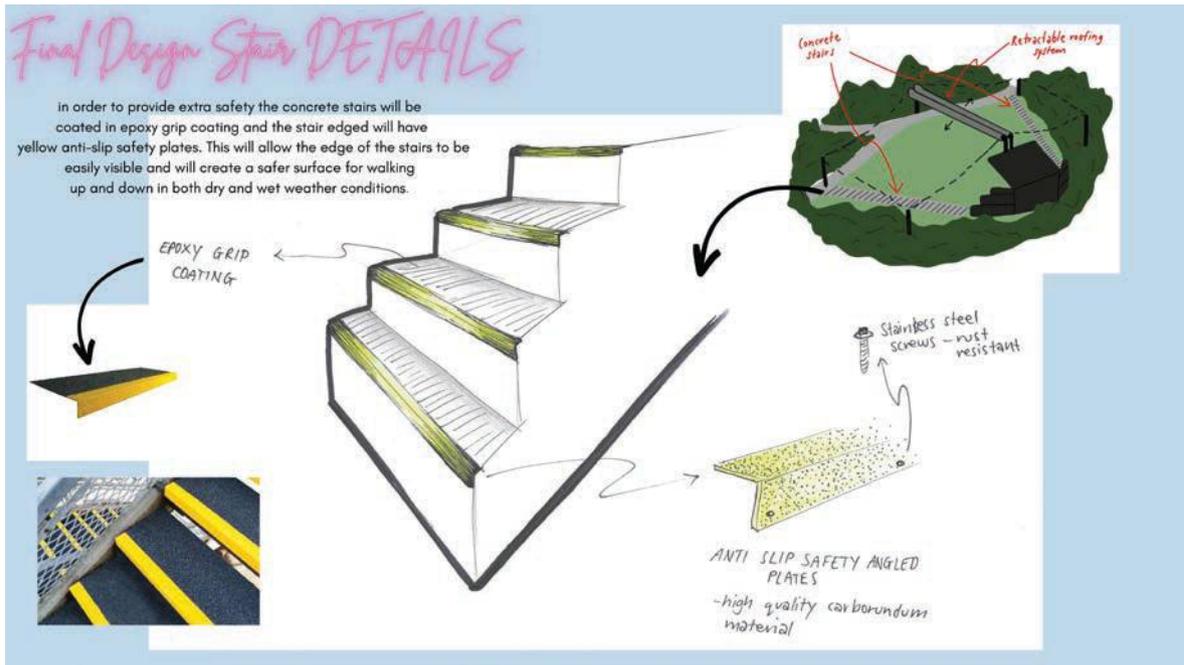
Sophie Armstrong-Werne

▶ Student-designed two-point perspective used to present the details of steps at a community event

In the field of environmental design, two-point perspective is widely used for both exteriors and interiors.

▶ Two-point perspective drawing of an architectural exterior

▶ Two-point perspective drawing of an architectural interior. For more information on creating complex and rounded objects in perspective, see 'Crating' on page 94.

Circles and ellipses

When a circle is viewed in perspective or as part of an isometric drawing, it appears as an ellipse. Depicting circular details in three-dimensional drawing can be quite a challenge but, with practice, will become easier. The more you draw ellipses, the easier it becomes to create them in your visualisation and presentation drawings.

WEB

Watch the video, 'Sketching Basics 1: All About Lines' on Reid Schlegel's YouTube channel.

Weblink
Sketching Basics 1: All About Lines

As a quick guide, drawing a square first can help define the ellipse that represents the circle. There are many ways to create these with greater accuracy if you want to explore technical drawing. Often designers will use CAD if they wish to develop a design to this level.

Crating

An effective method of drawing complex three-dimensional forms is using the crating or boxing technique. This technique involves using basic geometric forms as the foundation for constructing complex objects. There are four basic three-dimensional forms: the sphere, the cone, the cylinder and the cube.

1. Draw the cylinder axis
The imaginary line that goes through the centre of the cylinder.

2. At right angles draw a line for the width of the cylinder
This will become the major axis of the ellipse.
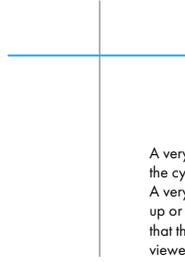
3. Loosely sketch the ellipse
The height (minor axis) determines how much you're looking down at the cylinder.

centre

major axis, the widest part of ellipse

minor axis, the narrowest part of ellipse that passes through the centre
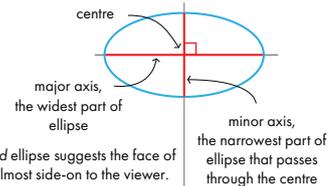
A very *squashed* ellipse suggests the face of the cylinder is almost side-on to the viewer. A very *fat* ellipse suggests the circle is high up or low down in relation to the viewer or that the face is almost perpendicular to the viewer (and if it's exactly perpendicular it's not an ellipse, it's a true circle).

4. Loosely sketch the sides of the cylinder
The lines can be parallel (easier to draw) or converging to create a sense of perspective depth (a little harder to draw).
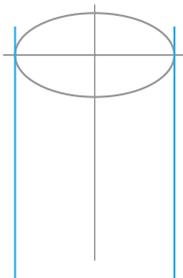
5. Sketch the other end of the cylinder
This second ellipse describes the height of the cylinder. It will have a longer minor axis to imply perspective.
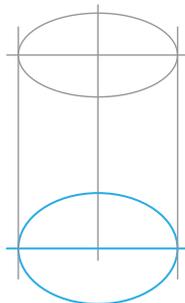
6. Finish the ellipse with heavier lines
You can leave your construction lines in the sketch if you wish.

▶ How to sketch a cylinder

Drawing curves

Curved details on objects can be created by ellipses. The radius, or curved edge of the ellipse, touches the end of a straight line (or tangent). In freehand visualisation drawing, the use of ellipses to form radii or varying dimensions adds realism and emphasises complex, interesting forms.

Using the crating technique

Crating is a drawing method that utilises the basic form of an object as a skeletal structure around which the finished form can be created. When an object is broken down into its most basic shape combinations, realistic proportion and scale can be established.

Many objects are made up of variations of these four basic forms. A bottle is a series of cylinders. A wine glass is formed by a partial sphere and cylinder. A compact camera is a combination of cubes and cylinders.
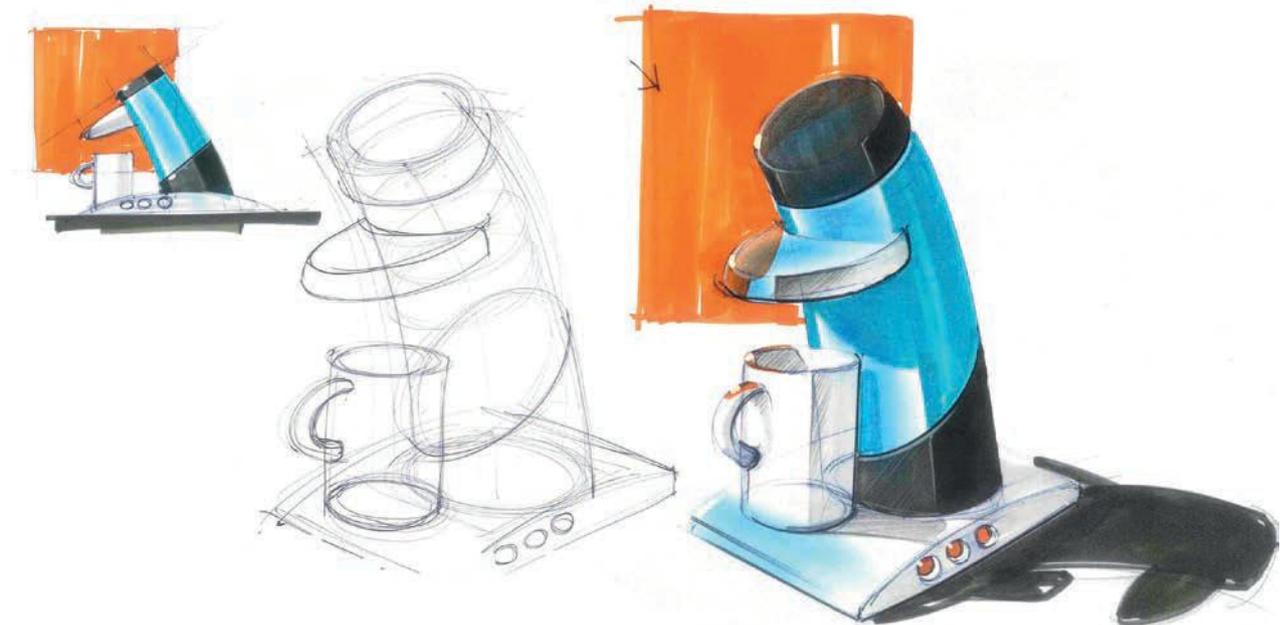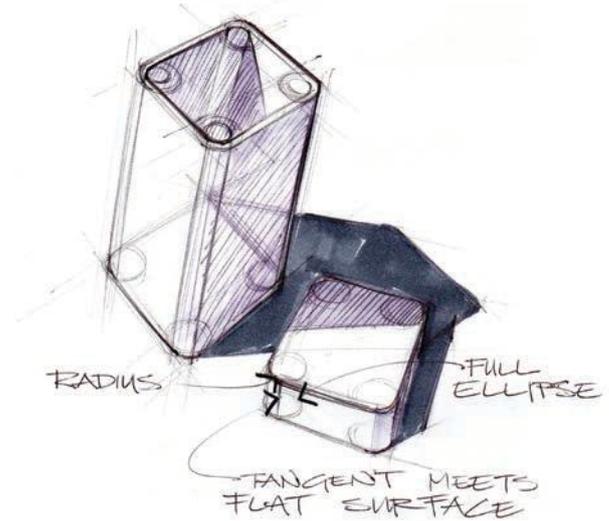
▶ Once you understand the technique of drawing curves and crating, objects take on greater realism.

One-point
linear perspective

Two-point
linear perspective

Isometric perspective
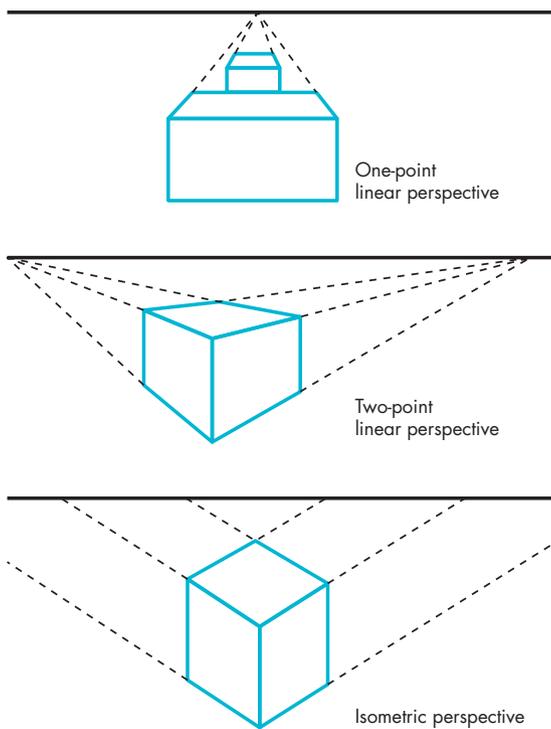
Issaquah Schools Foundation

7.3 TWO-DIMENSIONAL DRAWING

Two-dimensional drawings are a great way to sketch. Here we look at using them to communicate detailed drawings that might be used in the development of an idea.

Two-dimensional drawings can provide a clear means of communicating information about the appearance, assembly, function or construction of an object. Two of the most commonly used methods of two-dimensional drawing are orthographic drawing and development drawing.

Imagine that your innovative new design for a bicycle is to be manufactured in a non-English-speaking country. You will need to ensure that the technical drawings you provide to the manufacturer are clear and contain all relevant details. Your drawings will need to convey information in a visual language that both you and the manufacturer can understand. Similarly, in the design of a building, the plans that are provided by an architect to a builder need to be clearly understood.

Two-dimensional drawing practice adheres to rules set out by a regulatory body, which creates a consistent approach to the communication of technical information.
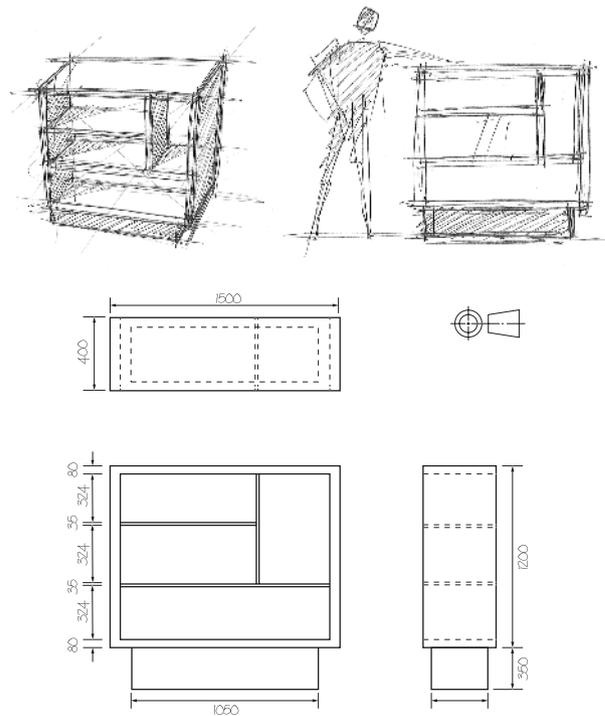
▶ Freehand sketch of shelving unit translated into an orthographic drawing. The orthographic drawing features visual and written information that assists in the manufacture of the product.

These rules are known as 'standards' and are set in Australia by Standards Australia. The use of standards means that a design can be manufactured to precise specifications without misinterpretation or misunderstanding.

TWO-DIMENSIONAL DRAWING IN INDUSTRIAL DESIGN

An industrial designer needs to produce clear technical drawings so that an engineering firm can manufacture their product. It is also necessary for the designer and the engineer to speak the same technical language, so that the product can be manufactured successfully.

Two-dimensional drawing can be a test of your visual thinking skills, as drawing an object that you perceive as having three dimensions (height, width and depth) in only two dimensions (height and width) can be challenging.

A two-dimensional drawing may be used at various stages of a design process, either as freehand sketches of views of the object in order to explain the design concept, or as a finished technical drawing with dimensions and section view included.

Achmad Noerdin/Shutterstock.com
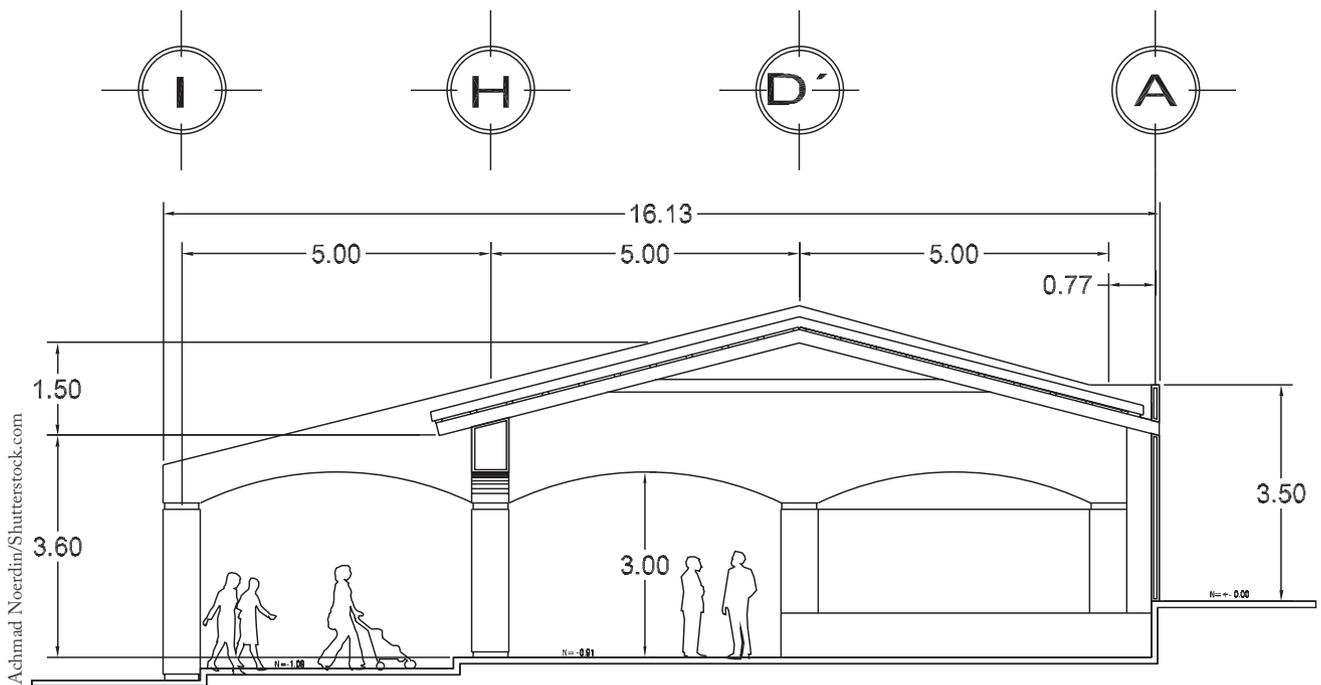
▶   Cross sectional view of a an architectural example.

Orthographic drawing

Orthographic drawing is sometimes referred to as multiview drawing. A series of drawings – known as 'views' – are drawn to show every part of the object clearly. Orthographic drawings are widely used by designers, engineers, builders, architects and manufacturers to specify the precise details of objects to be constructed or manufactured.
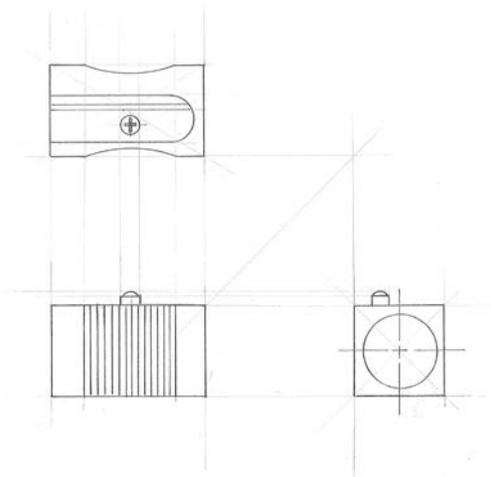
Orthographic drawings usually show the number of views needed to provide the maximum amount of information. The key is to ensure that enough visual information is evident on the depicted views to avoid any confusion. Three views – the front, top and one of the sides – will usually provide enough information for the drawing to be read clearly and understood. Of course, there may be times when more than three views are necessary.
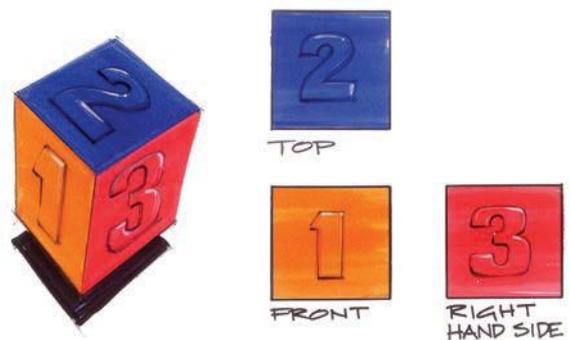
The placement or arrangement of views in an orthographic drawing is important. The common arrangement used in Australia is known as third-angle projection, which means that each view is positioned in

the drawing so that it represents the side of the object in the view beside it. For example, the right-hand side view of the object is positioned on the right-hand side of the front view.

When drawing in third-angle projection:

+ All views should be aligned.
+ The top view is always situated above the front view.
+ The right-hand side view appears on the right-hand side of the front, and the left-hand side appears on the left of the front view.
+ You may be asked to appropriately label each view of an orthographic drawing; for example, FRONT VIEW, TOP VIEW, SIDE VIEW. If so, place the labels centrally under each view and write in capital letters.
+ The third-angle projection symbol must always be included on your drawing.

SEEING IN TWO DIMENSIONS

The best way to visualise an orthographic drawing is to imagine that the object is contained within a transparent box, and each part of the object can be seen on a different side of the box. This may help you to gauge how the object might look if the box were flattened out into a two-dimensional shape.
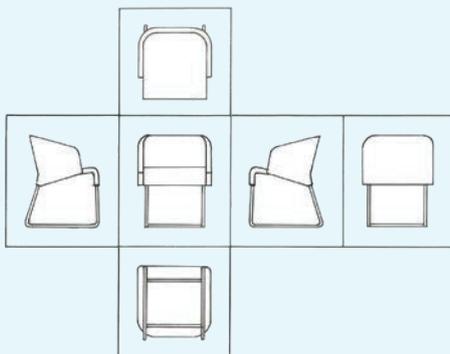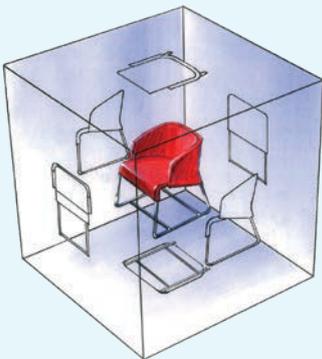
FINDING THE FRONT VIEW

In many tasks, an arrow will indicate the front view of a 3D object. This should be the view that shows the greatest amount of relevant detail about the length and height of the object. In an orthographic drawing of a car, for example, the front view would show one side of the car, rather than the actual front of the car (with headlights, windscreen etc.).
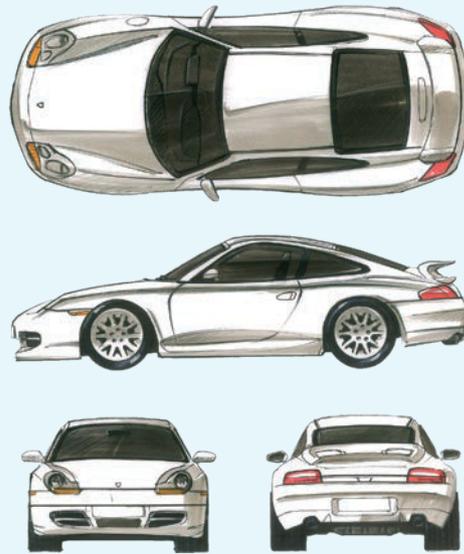
USE A GRID

If you are creating a hand-drawn draft of your orthographic drawing before moving onto a CAD program, try using grid paper for your initial drawings, as this can help you to align views correctly and keep your linework accurate. Once you have the drawing exactly right on the grid paper, you scan it to use on the computer.

Orthographic drawing conventions

More can be explored about the use of orthographic drawings that help provide greater detail. Many designers rely upon CAD software that has these conventions built into the package to provide this detail. The conventions can be used to communicate to a range of manufacturing processes and include rules on scale, dimensioning, creating, line properties, hidden detail and cutting planes.

PACKAGING NETS AND DEVELOPMENT DRAWINGS

Development drawings are a method of two-dimensional drawing used when an object is to be manufactured from a single piece of material. Also known as a net or packaging net, these drawings provide information about the form of an object to be created from material such as cardboard or sheet metal. Examples are cardboard boxes used for packaging and a point-of-sale display.

In development drawings, the representation of lines has great significance. Each line has a different meaning and it is essential that the person viewing the drawing can understand the meaning of each line: Where do I cut? Where do I fold? What is to be discarded and what is to be kept?

+ Broken lines indicate the folds of an object.
+ A solid line indicates the cutting edge.
+ If the object is to be glued, a row of black dots indicates the glue area.
+ Areas where adhesive is required, or where folded areas interlock to create the form of the object, are called tabs.
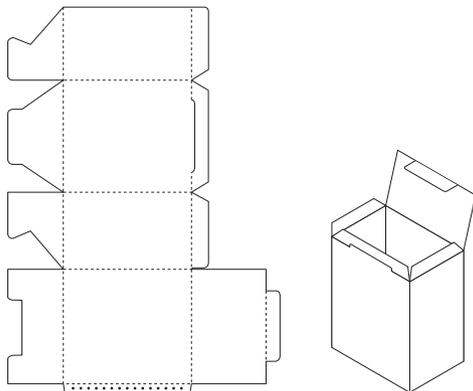
▶ Development drawing of packaging. Note the line and symbol conventions: black dots indicate glue lines, broken lines indicate folds and solid lines indicate cuts.

PATTERNS AND FLAT DRAWINGS

Two-dimensional drawing in fashion design

Patterns

In the production of fashion, the term 'pattern' refers to the design of a garment created in paper. The paper pattern is placed over fabric for cutting and, once cut, the fabric is sewn together to create a garment. Patterns include information about seams and other garment features such as darts, gathers, pleats and tucks. Paper patterns use a unique visual language to show how and where the pattern should be placed onto fabric; notches or small arrows are used to direct the placement and cutting of fabric. In professional design contexts, specialist pattern makers are employed to devise and create functional patterns to help realise the vision of a fashion designer.

ClarkandCompany/E+/Getty Images

▶ Paper patterns show how to create the design on the fabric.

Flat drawings

Drawing in fashion design is key to explaining the appearance, textures and features of garments and accessories. We are used to seeing fashion sketches that appear to be loose, gestural images that depict the form of a garment, often displayed on an elongated human

figure. Fashion designers apply multiple drawing methods, but one of the most common methods is flat drawings. These simple, two-dimensional line drawings serve as the basis for the manufacture of garments. For mass-produced fashion, flat drawings are an essential tool for the clear communication of design between designer and manufacturer. With fast turnarounds and rapid changes in trends and styles, flat drawings are the most common fashion drawings in use today. Usually created using a sketch and then refined in a vector program such as Adobe Illustrator, flat drawings show all features of a garment in two dimensions.

▶ Flat drawings are used in fashion design to specify the appearance and features of a garment.

Two-dimensional drawing in environmental design

Technical drawings of floor plans and elevations are used in environmental design. Along with computer-generated, three-dimensional images, they create representations of spaces and structures that do not yet exist.
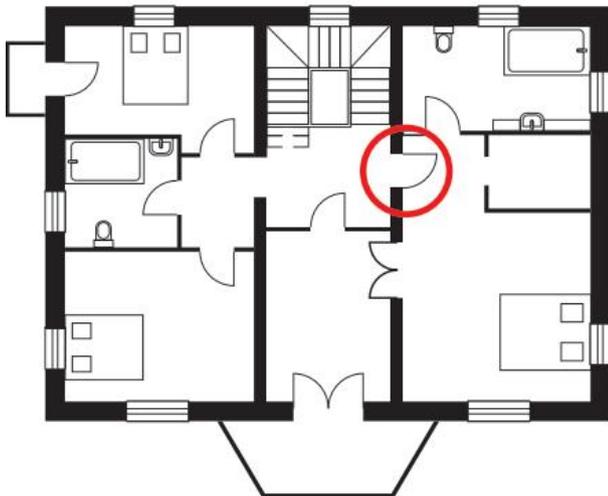
▶ Architectural floor plan indicating the symbol for a door

Drawing for the environment – in architectural design, interior design and landscape design – involves the application of a range of conventions. These are standard approaches that enable the viewer to understand the meaning of a drawing. The depiction of a door on an architectural plan, for example, has a standard appearance that helps us to understand what it represents.

Two-dimensional methods are applied at various stages of the design process and may be used to visualise ideas in the early stages, as well as assist construction with refined technical drawings in the latter stages.
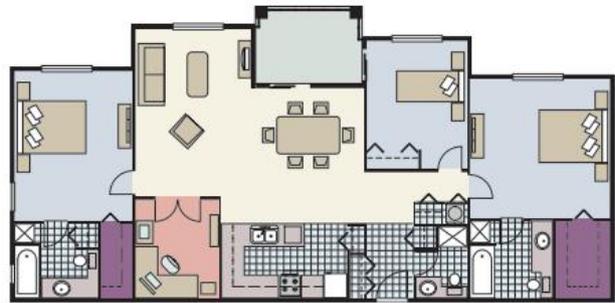
▶ Two-dimensional drawing of a floor plan

Plans and elevations

In environmental design, plans and elevations are typically used to convey visual information about a three-dimensional design. Plans are the equivalent of the top view in orthographic drawing, and elevations show the front and side views.

▶ An elevation view

Plans and elevations designed for the purpose of construction are usually line drawings, whereas plans and elevations designed for presentation can be much more detailed and may include colour, shadows, textures and backgrounds. Plans are often used in real estate advertising and online, to enable potential purchasers or tenants to see the floor plan of a property.

Drawing the plan view

There are a number of conventions used in representing architectural details in two dimensions. One of most common conventions is the use of symbols to describe features. Although their visual appearance may differ slightly if the drawing is completed by hand or by digital means, the meaning remains the same.

▶ Rough sketch of a floor plan

Symbol conventions

Symbols should be drawn to the same scale as the plan and, where possible, be used without a text label or abbreviation. Many details of plans, such as domestic appliances (e.g. dishwasher, refrigerator, wall oven), are indicated by a rectangle with a diagonal line and may require an abbreviation for clarity.
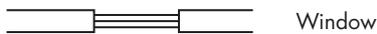
Window
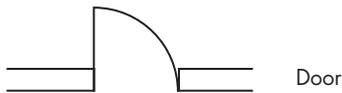
Door

Double door
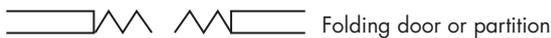
Folding door or partition

▶ Door and window symbols

Bath

Toilet

Basin

Shower

Vanity

Bed

Cooktop

Appliance e.g. dishwasher

Sink
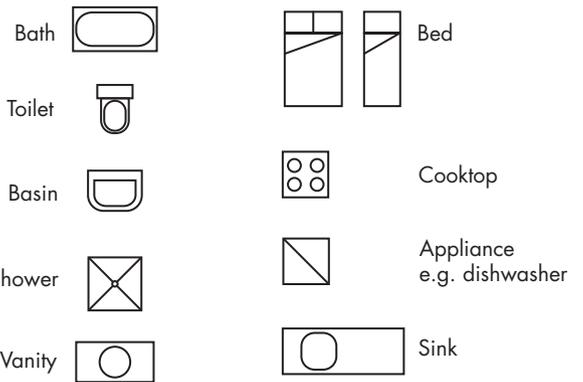
▶ General symbols. Note that the symbol used for general appliances, such as dishwashers and fridges, requires an abbreviation to identify its purpose.

CAD programs offer many examples of architectural symbols and these can help add meaning and function to the drawing of a space. However enticing it may be to fill a plan view with details, always remember to err on the side of clarity.

Line conventions

Line conventions are important in environmental drawing. As in orthographic drawing, the width of lines communicates different information. Although a combination of bold and fine lines is generally applied in plan and elevation drawings, medium lines are sometimes used where a detail needs to be differentiated.
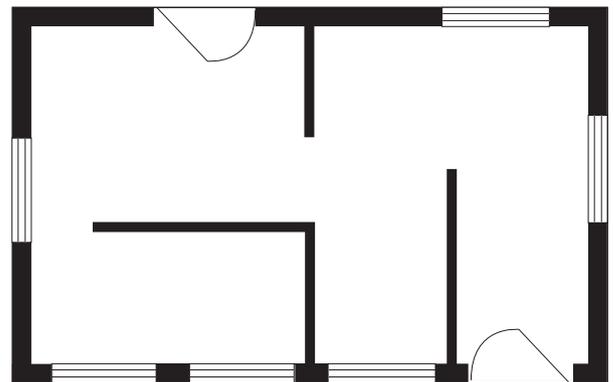
Bold lines (3 mm) indicate the outlines of structural walls and thin lines (1 mm) indicate interior walls, windows and doors. A black, filled shape, or thick outline, is used to identify wall thickness.

Scale

The same scales that are used in industrial design are also applied to architectural drawing:

Reduction scales:

1:2	1:20	1:200	1:2000
1:5	1:50	1:500	1:5000
1:10	1:100	1:1000	1:10 000

Enlargement scales:

2:1   5:1   10:1   20:1   50:1

The most common scale applied in architectural drawing is 1:100.

Drawing elevations

Unlike orthographic drawings, which are identified as 'Front', 'Top' and 'Side' views, elevations are usually named for the direction they face: 'North', 'South', 'East' and 'West'.

To create elevations, it is necessary to have a completed floor plan drawn to scale. The floor plan is used for the projection of lines to create the elevation views. The elevations are usually drawn to the same scale as the floor plan. You also need to establish the roof height of your structure prior to drawing the elevations.

Landscape design

In landscape design, plan views are an integral part of the design process. A landscape plan view provides an overview of a site and may indicate areas for landscaping, construction and planting. It may be a hand-drawn or computer-generated line drawing or fully rendered presentation.

Scott E. Feuer/Shutterstock.com

A landscape plan often includes annotations that indicate the nature of a planting scheme or the specifics of the materials to be used in the construction of a feature. Elevations are also used to illustrate the appearance of views within the landscape design. Like architectural drawings, landscape designs are drawn to scale.

7.4 SCHEMATIC DRAWING

Schematic drawings are a varied collection of drawing methods that convey information that may be conceptually or factually complex. Schematic drawings are used for a range of purposes, including representing data, conveying the steps involved in a system or process, illustrating organisational information and brainstorming ideas. Visual resources such as maps, diagrams and charts assist designers to express and evaluate ideas as well as clarify research and information gathered from multiple sources.

Schematic drawing is used for:

+ the clear communication of, sometimes, complex ideas and information
+ the exploration of alternative visual concepts
+ the communication of ideas between stakeholders.

CHARTS

Flow charts

Flow charts are designed to visually explain the steps in a system or process. They use boxes of data (nodes) to identify the steps of a process and are designed to assist the viewer's understanding of what happens next.

Often used in the design of software systems, flow charts can be useful in explaining very complex technical systems. There are many types of flow charts, and some may use more visual means than others; however, the fundamental sequence-based appearance remains the same.
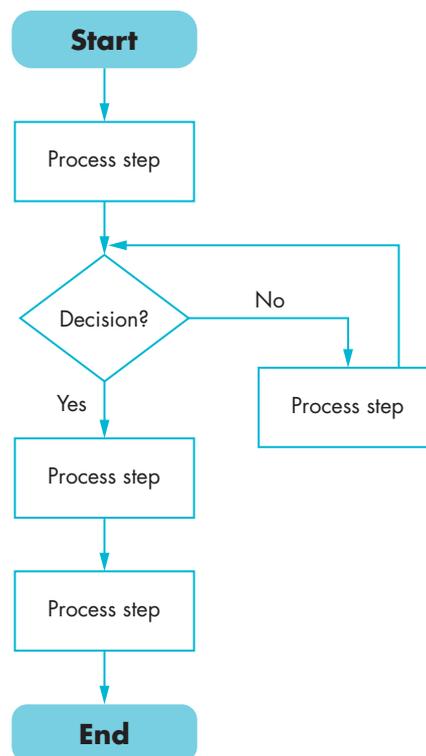
▶   An example of a flow chart

```
                    ┌──────────────┐
                    │  Managing    │───────────────────┐
                    │  director    │                   │
                    └──────────────┘                   │
                         ┌────────────────┐   ┌──────────────┐
                         │ Administrative │───│  Creative    │
                         │    director    │   │  director    │
                         └────────────────┘   └──────────────┘
      ┌──────────────┐   ┌────────────────┐
      │   Interior   │───│ Project manager│
      │design dept.  │   │                │
      └──────────────┘   └────────────────┘
      ┌──────────────┐   ┌────────────────┐
      │   Project    │───│  Site manager  │
      │administration│   │                │
      └──────────────┘   └────────────────┘
  Administration  Marketing   Logistics    Creative
```
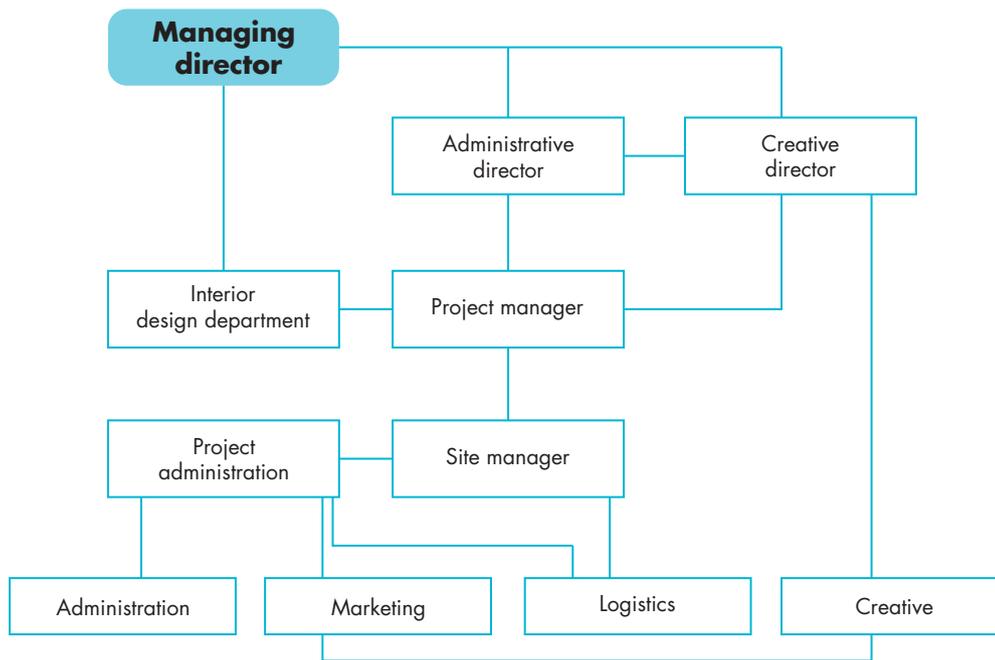
▶ An example of an organisational chart

Organisational charts

Organisational charts are generally used to depict the relationships and hierarchy between roles within an organisation, institution or project team. They typically represent relationships between people but can be used more flexibly. A family tree is a good example of an organisational chart.

DIAGRAMS

Diagrams are visual representations of information or data. They are designed to convey complex information in a visually clear and accessible manner. Diagrams often use symbols and design elements, such as colour, point and line, to convey detailed information visually.

The design of information graphics is a growing field of graphic design; the sophistication of design software and the reach of the internet mean that complex information can often be explained through interactive diagrams. Our world is filled with vast amounts of data and, for many people, data presented as a diagram is more easily understood.

An increasingly common form of diagram is an infographic, which makes use of a range of highly illustrative design elements to convey information. From the term 'information graphics', infographics usually include more than one set of data or information and use simple but detailed illustrations. They may include graphs, maps, illustrations and symbols. Infographics can be applied to explain a process, timeline or event and are commonly used in textbooks, magazines, newspapers and online.

Many large infographics are published online and contain detailed information. The internet is the ideal format for scrolling up and down through information and zooming into featured visual data. In fact, research has shown that infographics are some of the most popular content shared on social networking sites such as Facebook, X and Reddit.

▶ This simple diagram uses illustration to explain how a texture board is used. Image-based diagrams help users understand functionality.

Mark Wilken
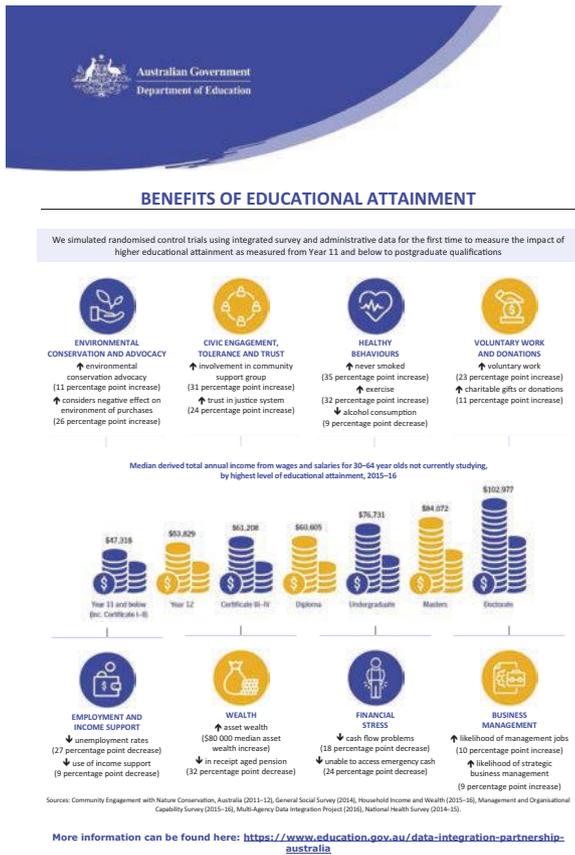
▶ This infographic conveys large amounts of data using a combination of illustrations, symbols and type. Placing the data within a blackboard frame assists with viewer engagement, while serving to visually emphasise what the data is about.

Functional relationship diagrams

Used mainly in environmental design, functional relationship diagrams are integral to the early, ideation stage of buildings and environments. The purpose of functional relationship diagrams is to create a broad and conceptual layout of a proposed design, using 'bubble' shapes and symbols to represent spaces. Functional relationship diagrams consider factors that deal with the function and general layout of a design. At this stage, less consideration is given to appearance or aesthetics, which is done later in the design process.

Created in the beginning of the design process, a functional relationship diagram often forms a basis for the design iterations that follow. Designers are able to use functional relationship diagrams to communicate with other designers and clients concerning the organisation of a site. The simple visual language of these diagrams presents an accessible visual glimpse of scale, proportion and flow. Non-designers benefit from easy understanding and designers benefit from the rapid production of creative ideas. This method provides opportunities for designers

to study alternative design ideas as they search for an appropriate solution.
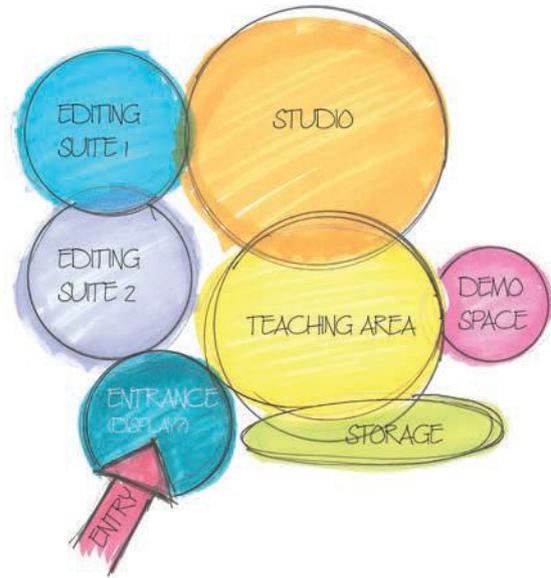
▶ This bubble diagram was used in the design of a photography studio. The designer made decisions about proportion, flow, and exit and entry points using representative shapes. Decisions were made about the space before detailed plans were undertaken.

Website or app architecture diagram

Architectural diagrams for websites and apps are similar to flow charts and organisation diagrams in that they visually depict links and hierarchical connections. For website and app developers, a map of the links contained within a product ensure that logical pathways for the user are maintained. Given the complexity of many sites and apps, a clear visual map of the site structure assists with the planning and development of the final product. Website architecture diagrams are modified as the digital product is developed and refined. Many websites offer access to a sitemap, which also assists users in understanding the hierarchy of information contained on the site.

DON'T LOSE THE MESSAGE

Renowned information designer Edward Tufte warns against the overuse of visual 'decoration' in diagrams, which can distract from the key information and data that is being explained. Tufte is a world leader in information design and more information about his work and ideas can be found on his website.
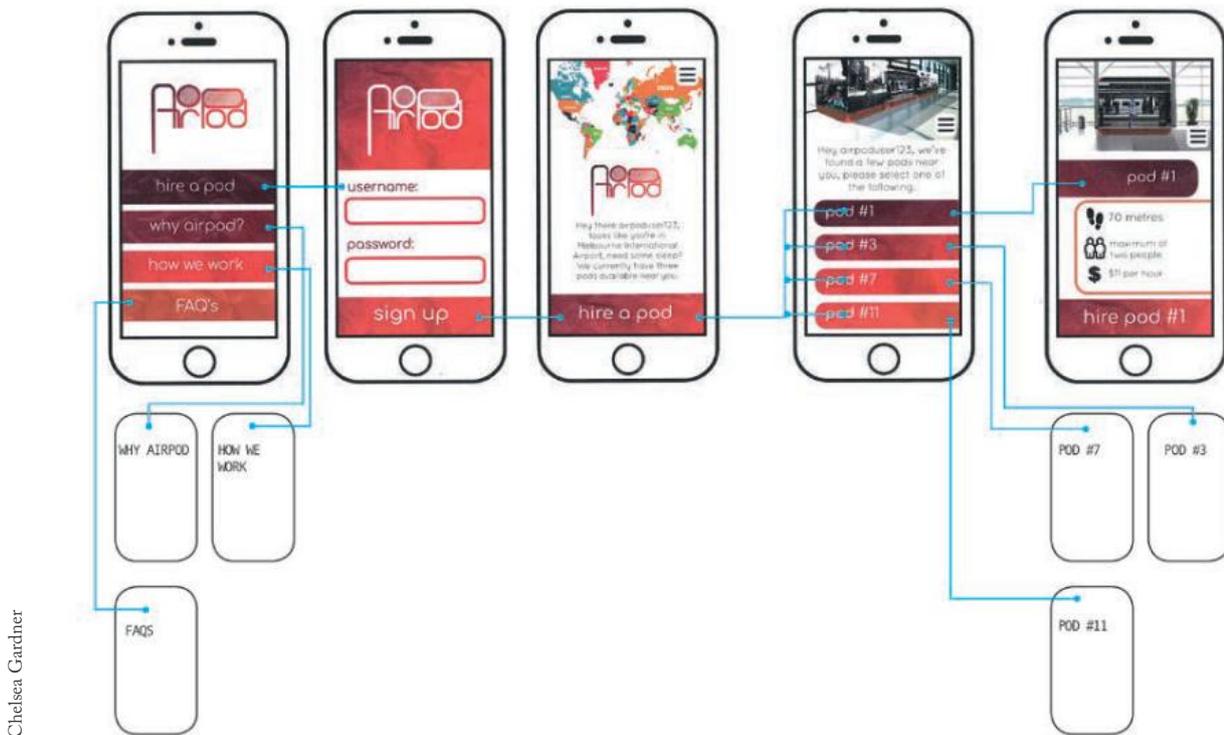
Chelsea Gardner

▶ An architecture diagram for a new app. The app architecture diagram structure assisted this student in the logical development of her design. Understanding how the user might interact with and step through an app or site is integral to effective interface design.

APPLE TIMELINE

Apple Inc took the wraps off a faster 4G-equipped iPad starting at $629, hoping the latest version of its tablet can safeguard its dominance over rivals

Reuters Graphic/Reuters
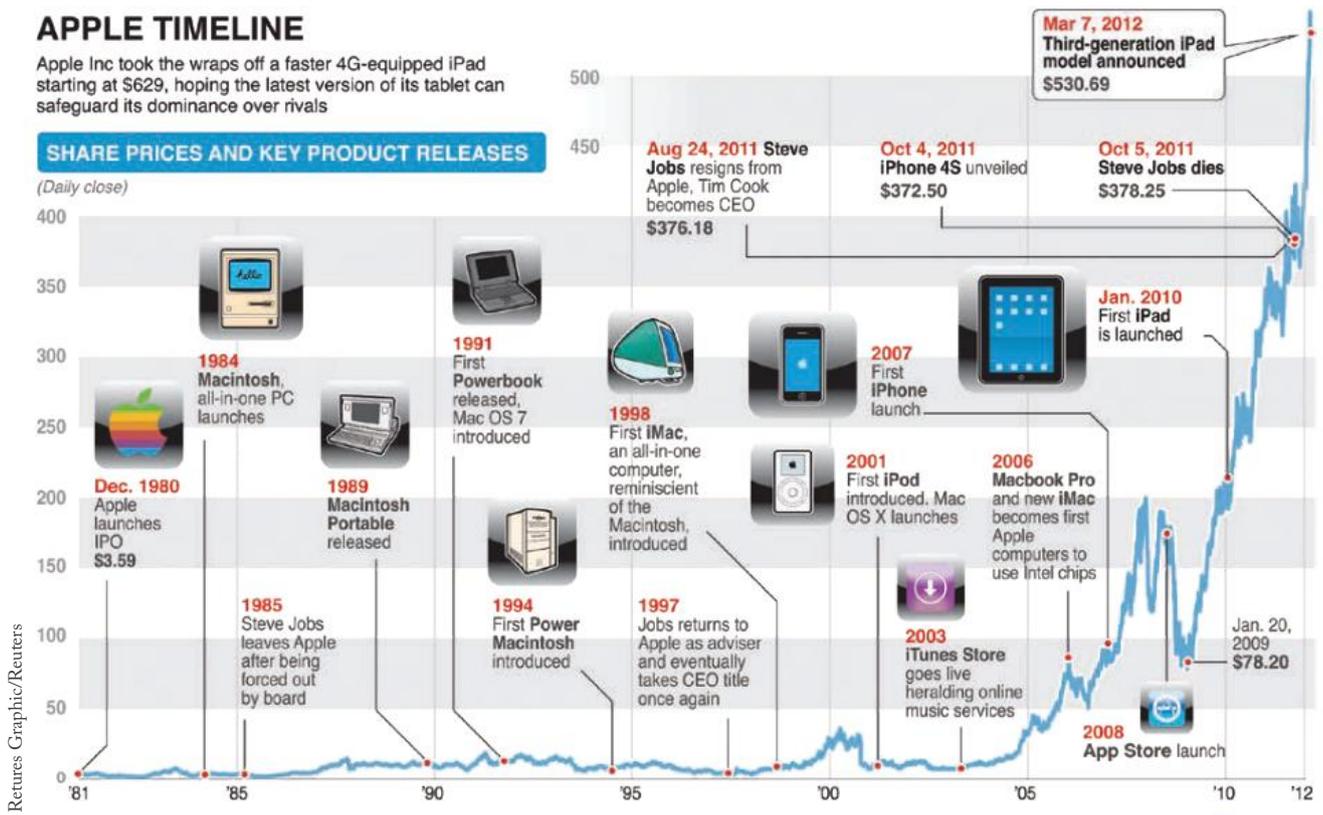
Source: Apple Inc.

REUTERS

▶ Note the use of illustrations and the inclusion of a line graph in this diagram about Apple and the relationship between product launches and share price. The various elements of the design produce a diagram that is rich with information.

EFFECTIVE DESIGN DRAWING TECHNIQUES

Effective design drawing techniques include:

+ scale and proportion
+ context
+ foreshortening
+ hierarchy
+ multiple views and overlap
+ aerial views.

Many great designers can represent what they see through drawing; others use drawing simply as a means of communicating ideas quickly. Drawing objects and products that already exist can help to build skills in drawing and even to inform a new design. To design a new toaster, for example, a designer may sketch the form of an existing toaster to understand the general proportions, shapes and function of the product.

The practice of drawing from the direct observation of products, constructions, spaces, buildings and environments can build drawing and illustration confidence.

Scale and proportion

Some of the most valuable skills acquired in drawing are the abilities to represent correct scale and proportion. Often when observing an object in its natural environment, you automatically refer to the objects around it and develop a concept of scale. When representing objects with a degree of realism, it is important to use correct proportions. Directly observing an object enables you to view relationships between parts of the object and to compare them with surrounding features. A drawing of a mobile phone, for instance, may become more effective by including a human hand in the drawing. Establishing a relationship between the hand and the form of the device allows you to communicate the proportions of each element clearly.

In perspective drawing, the relative proportions of objects change according to the principles of the perspective method being used. The viewing position will also have an impact on the placement of perspective images in the foreground, midground and background. The visual relationships between aspects of a drawing will affect the realism of the representation.

When we view an image of an object, we are provided with clues that help us to understand the relative proportions. Clues such as trees, cars and people are used in drawing to establish scale. We are familiar with the proportions of the human body; therefore, recognising the proportions of an object in relation to a person is easy.

Keep in mind that the depiction of adults and children needs to be clearly defined through the

Jade Leaman

▶ Sketch of potential Surf Life Saving Uniform from a student, demonstrating proportion of life savers

application of details such as clothing or facial features. Otherwise, a short figure next to a much taller figure will distort the scale of the illustration. To draw human figures effectively, establish the placement of the first figure in perspective. Ensure that you are very clear about the eye level of the drawing – floating people simply don't look realistic!
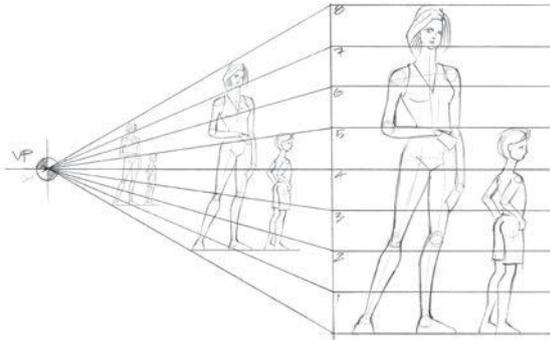
▶   Sketch of people in perspective

To effectively manage proportions in drawing, pencil in the figure and then project lines to the vanishing point. These projection lines form guidelines for more figures. The same principles apply when drawing trees, shrubs, cars, boats or any other object used to establish scale.
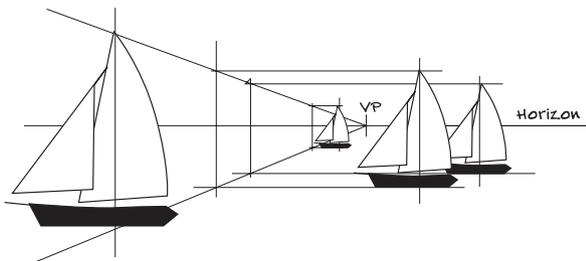
▶   Sketch of boats in perspective

HUMAN PROPORTION: HEADS OR TAILS?
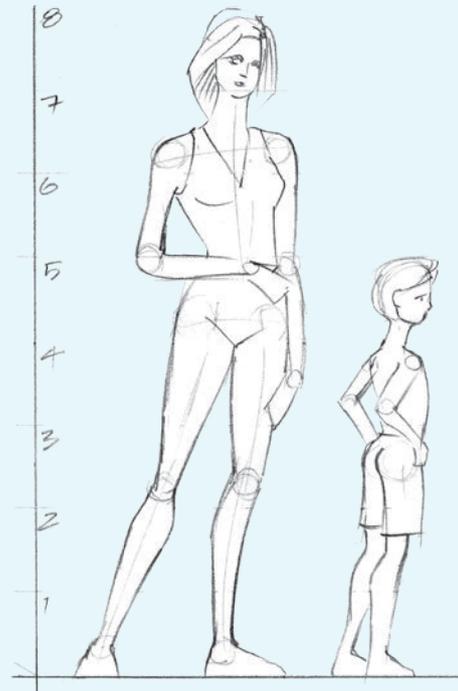
▶   Sketch of woman and child

The height of an adult human figure is approximately equal to 7½ to eight heads. When drawing an adult figure, use eight heads as a guide to gaining the correct body proportions. When drawing children, use four to five heads as a guide.

Foreshortening

Foreshortening is a term used to describe objects that appear shorter than they actually are in order to emphasise the illusion of depth.
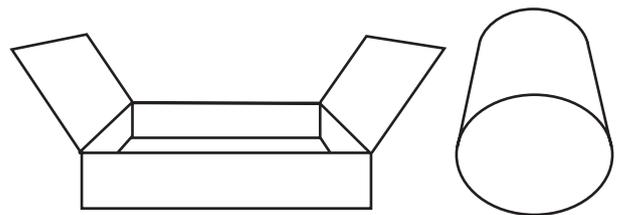
▶   Sketch of box and cylinder using the technique of foreshortening to illustrate depth.

Foreshortening on complex objects is easily depicted by drawing a perspective box and freehand sketching the object within the box.

Mark Wilken

▶ Foreshortening has been used in this illustration of a classic panel van. To emphasise the distinctive design of the back of the vehicle, the proportions have been compressed. Visual information that is closest to the viewer is much larger than the information further away.

Context

The effectiveness of an ideation drawing can be amplified when the drawing is depicted in a clearly recognisable context. The context can indicate the function or use of the design product and can also assist in emphasising scale and proportion. Consider whether a drawing needs to be placed within an environment or beside another object or objects to best communicate how it is used.

▶ The figure provides a clear context for the function of the handbag and a visual reference for the proportion of the bag to a human figure.

Hierarchy

One method of establishing hierarchy in perspective drawings is to overlap objects. Dominant objects appear in the foreground, partly obscuring or cropping other objects. The key to overlapping objects in perspective is to treat objects as though they are made of a transparent material.
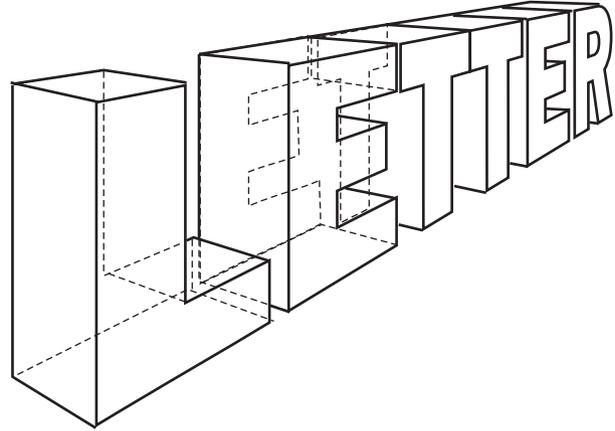
▶ Hierarchy is shown in perspective drawings through overlap.

To create the correct proportions of objects that overlap other objects, draw them as though they are made of glass. This enables you to construct the correct perspective proportions of objects behind the dominant feature. This method is particularly useful when objects have see-through features such as glass walls and cutaway areas. Of course, design elements such as colour and tone can be added, and design principles such as contrast and cropping applied, to create a hierarchy in a three-dimensional drawing.

Multiple views and overlap

A helpful application of observational drawing is to represent multiple views of a single object. This is especially important when dealing with three-dimensional objects. Freehand sketches can help communicate the range of details in an object. This means that key information about the surface, appearance and any textural details can be seen from different viewpoints. During the design process, drawing from different viewpoints can enable a designer to judge proportion and evaluate the aesthetic success of a three-dimensional design.
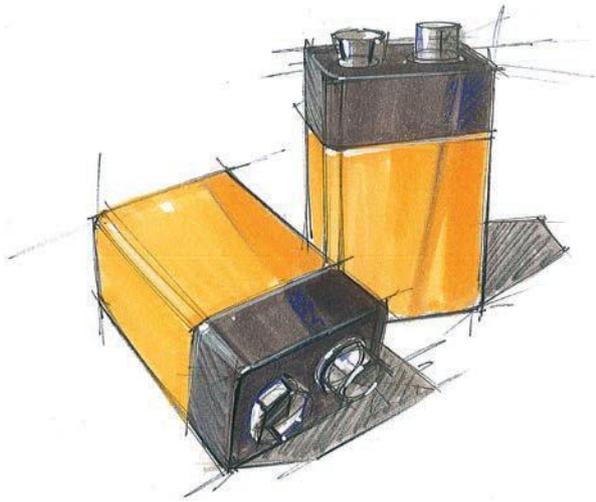
Mark Wilken

▶   Sketch of a 9-volt battery showing two angles of the same object. Overlapping objects help communicate scale and proportion.

Aerial views

A drawing that features an aerial view provides an alternative perspective on a landscape or environment. Aerial views are often used by environmental designers to establish proportions, placement and location of spaces or dwellings. An aerial view may help a designer visualise the use or function of empty spaces or ideate the possibilities within an existing space or dwelling.
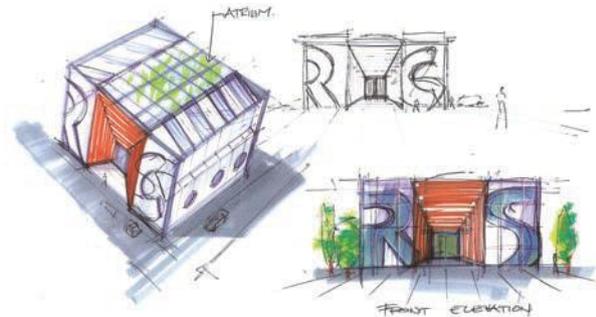
Mark Wilken

▶   An aerial view (left) of an object enables the viewer to see design details that might otherwise be hidden.

Rendering sketches

In sketching design ideas, the application of tone and texture can help to communicate important information about features and details. 'Rendering' is the term used to describe the application of tone and texture to create a three-dimensional appearance and/or to depict the surface details of an object.
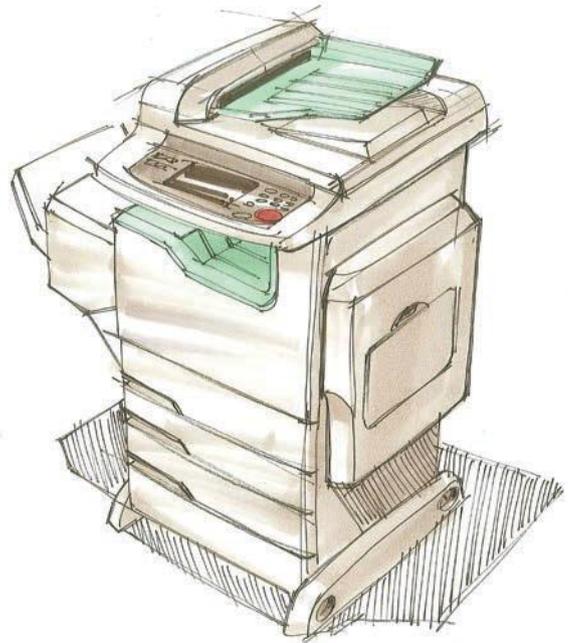
▶   Sketch of a multi-function printer rendered using fine-liner and markers.

The next chapter on rendering will help you to explore ways to improve your design presentation. When you spend a long time on your drawing and are about to render, it is a good idea to photocopy first. Practise rendering on the photocopy before you render your drawing.

CHAPTER RECAP

+ Drawing is a flexible and useful tool throughout the design process. You'll become more skilled with it if you practices often and don't worry about how attractive your sketches are – it's all about the ideas they represent, not how beautiful they appear.
+ The formats you use for your sketches afford you different ways of 'seeing' and thinking about your design ideas, especially for three-dimensional design. Switch between different types of views (top/plan, side/elevation, orthographic, perspective) as well as schematic diagrams to explore your ideas in different ways.
+ Don't invest too much time in a design drawing until you've 'tested' the design idea with lots of rough, quick sketches.
+ There are many ways of drawing design ideas, the usefulness of which depends heavily on the type of thing being designed. Let your design project dictate the types of drawing you employ in your project.

CHAPTER REVIEW

1 For each of the following scenarios, identify how visualisation drawing might be applied.
   a A communication designer discusses possible ideas for an identity design during a meeting with a new client.
   b At an architectural studio, several designers discuss how a dwelling might be positioned within a given landscape to maximise sun exposure.
   c An industrial designer devises alternative design responses to the form and appearance of a new design for a screwdriver.
2 Explain how drawing might be applied at the following stages of a design process:
   a research of stakeholders
   b client interactions
   c exploration of ideas
   d ideation
   e development of concepts.
3 Using an app or website that you are familiar with, observe the interface and draw a functional relationship diagram that describes how a user might navigate information.
4 Suggest appropriate drawings that might be applied to the following:
   a the design of a concept for a baby bottle
   b the design of stage sets for a musical theatre production
   c the design of landscape to be created as part of a wildlife conservation park
   d presentation of design concepts for the user interface of a ride-sharing app.

5   Identify the glue line, fold lines, cutting lines and tabs on this development drawing.
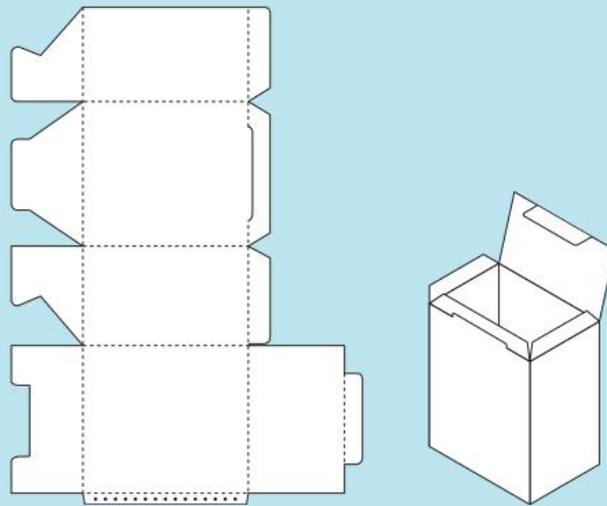
6   Select the correct right-hand side view for the pictured orthographic drawings.

Front

A

B

C
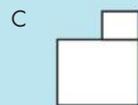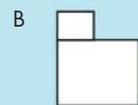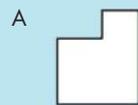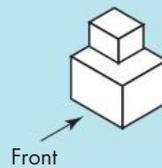
RENDERING

Good design is a lot like clear thinking made visual.
Edward Tufte

In this chapter:

Learn the language:

+ ceramic material
+ composite material
+ eco-material
+ metallic surface
+ reflective surface
+ rendering
+ surface texture
+ tonal scale

Rendering is the application of tone and texture to simulate the appearance of a design concept or proposal. Rendering is a more formal realm of visualisation than the looser ideation techniques designers use to generate and develop designs. The primary purpose of ideation sketches is to aid the *thinking* of the designer who creates them, while the primary purpose of renderings is *communication* to others, most often the client.

Renderings are therefore more formal in character than ideation sketches because they need to be clearly understood. There is also an element of persuasion – the designer naturally wishes to convey the positive attributes of the design concept or proposal in a way that engages the client's enthusiasm. That said, renderings should avoid exaggeration that is misleading or inaccurate because this could damage the designer's credibility.

Part of conveying the appearance of a design proposal is depicting materials and surface details. If a furniture designer, for instance, needed to render a new line of chairs, it would be important to depict the characteristics of the fabrics and materials used in their production. The rendering of materials, using a range of media, can communicate a much more information visually and convincingly than written description, especially for non-designers who are unfamiliar with the design process (and thus are unable to interpret technical descriptions). A good rendering conveys the design idea so the client doesn't need to imagine it.

8.1 RENDERING PRECISION

Renderings are often created for client presentations, when the designer presents their design work to the client. Most obviously this takes place at the culmination of the Deliver phase with the presentation of the design proposal. These formal renderings should be the most convincing and realistic simulations of the design that are possible in the circumstances.

However, client presentations also take place during the Develop phase when the designer wants to show one or more design concepts to garner client feedback and verify the design direction. These renderings need some clarity to aid understanding and are thus more precise than ideation sketches, but should have a looseness about them to convey that the design process is ongoing. Concept renderings aid the 'design conversation' – a too polished, too precise rendering may be misinterpreted by the client as a final design proposal, which can lead to all sorts of misunderstanding.

Andy Dean Photography/Shutterstock.com

RENDERING IS NOT ART

Rendering should not be confused with fine art or illustration, although the media and techniques used may be similar. The purpose of a design rendering is to inform and persuade; any appreciation of the skill required to create it or its innate beauty are incidental. The designer wishes to impress the client with the *design*, not with their rendering skill. Professional designers are in the business of design, not fine art – the most efficient ways of presenting a design will always win out over laborious methods. This is not to say that clients don't appreciate rendering skill, but they don't necessarily want to pay for it.

RENDERING TECHNIQUES

Effective rendering can be achieved through the application of an almost limitless range of media. Analogue media, such as markers, pastel, ink pens, gouache and pencils, have been overtaken by digital media, but this varies across the design disciplines. Analogue media have the advantage of being familiar, accessible and affordable and should not be underestimated. Furthermore, skills developed with analogue media are highly transferrable to their digital counterparts. For example, sketching on paper with pencils and markers translates well to similar approaches with digital tablet and stylus.

When rendering images, establish the purpose of your image before you begin, as this will determine the most suitable medium. What is the purpose of the drawing?
+ Is it to express the realistic form of an object?
+ Is it to emphasise a feature or detail?
+ Is it to create visual interest?
+ Is it a combination of the above?

Test different options before selecting your medium, so that you can be certain that your choice is appropriate to the purpose.

Pencil rendering

Pencils are available in a variety of grades that affect their rendering qualities. Pencils in B grades are softer and offer a smoother application over larger areas. H grades are hard and are more useful in linework and drafting.

Soft pencils enable you to render a surface with a range of tones by layering applications. When using soft coloured pencils, it is possible to layer similar hues of one colour to generate an intense area of solid colour that can add visual interest. When working with pencils, applying colour thickly may damage the paper surface. Layering is more effective and allows for flexibility.

Water-soluble pencils are very soft and can be blended easily. They offer the potential for striking rendering effects and can be used alone or with markers to create effective imagery.

Paper stumps, which look similar to pencils but are made from compressed paper, can be used to blend soft pencils.

In pencil rendering, working with the surface colour of the paper will provide highlight tones. When working on white paper, keep the surface clean and clear of any tone to create effective and bright white highlights.

Marker rendering

Markers are popular with industrial designers, fashion designers and architects because they can be used quickly and consistently. This makes them useful for rapid ideation sketches that keep up with the flow of ideas. They are very effective for concept presentation sketches because they convey the looseness of an idea in development. Historically, industrial designers relied on markers, in conjunction with pastels and colour pencils, to create detailed design proposal renderings but this has largely been overtaken by digital media.

Markers contain intense pigments in an alcohol base, which provide quick-drying, consistent colour. They are best used on a smooth, non-absorbent or non-bleeding surface such as bleedproof paper. Markers often have two tips – a broad tip and a fine tip at opposite ends of the pen – allowing for both fine work and the application of larger areas of colour and tone.

Available in a range of colours, markers are also sold in sets of greys – warm, cool and neutral – which provide scope for rendering products in tonal detail. (Landscape architects may prefer warm tones for the depiction of landscape designs, while industrial designers may prefer cool tones

for sketching products.) Professional grade markers, such as Copics, are more expensive than disposable markers but offer a much broader range of colours and shades as well as refill ink and replaceable tips that extend their life span (and improve the sustainability footprint). Refill inks can also be used with the cotton pads to create broad areas of colour, useful for creating background effects.

Some designers like to have a large choice of marker colours while others require only a handful for their work. For example, fashion designers may need many colours to explore garment styles, whereas industrial designers might need just a handful of greys to explore product forms rather than product colours.

Applying markers takes practice and it is advisable to test on rough drafts before finished pencil or pen drawings.

To create block areas of colour, overlap consistent marker strokes; this will help to disguise streakiness and provide even tone. If using different markers to build tone, use the lightest marker first and build up colour with darker hues as required.
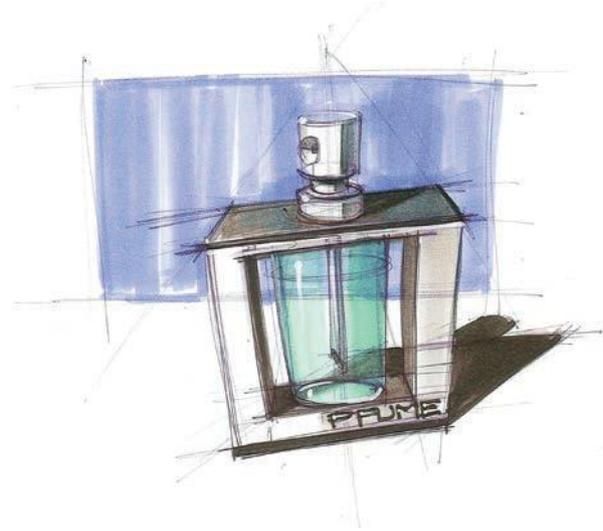
▶   Markers are applied smoothly in product rendering to create textures. Overlap marker strokes by two-thirds to avoid a striped effect. Build up tones by working with lighter hues first.

8.2 DIGITAL RENDERING

There is a wide range of rapidly developing software and hardware available for designers to render design proposals. Methods of rendering vary between bitmap programs, and vector-based programs, but both types allow for the effective representation of tone and texture. It is possible to scan artwork and trace it in either a vector-based program

such as Adobe Illustrator or a bitmap program such as Adobe Photoshop. With a bitmap or raster program, tools and filters can be used to render the drawing, and textures and patterns can be applied. Vector-based programs enable rendering using gradient, pattern and solid fills.

Digital techniques offer speed and flexibility while also being quite forgiving – it's usually easy to 'undo' a stroke or effect.

The best approach to drawing with computers is always to begin with a hand-drawn sketch. Whether you render it or use it as a guide, an initial sketch will invariably lead to better results on the computer. Most top digital illustrators begin their work with a traditionally executed drawing.

RENDERING TO REPRESENT FORM

In depicting the characteristics of form, the principles remain the same no matter which media you choose to work with.

Light source

Natural or artificial light influences the appearance of objects, creating highlights and shadow areas. When light from the source hits an object, it will often create a highlight, midtones and dark tones, and cast shadows. Depending on the surface texture of the object, it may also reflect light.
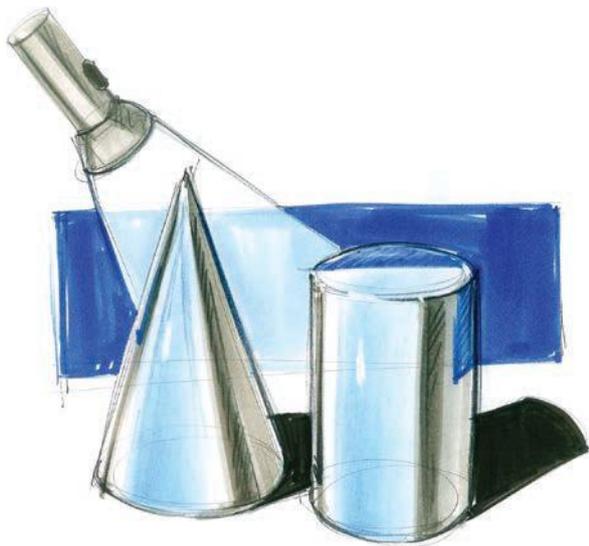
It is through the representation of light and dark areas that a three-dimensional form can be depicted. It is,

therefore, important to identify the light source as the first step. In daylight, it is sometimes difficult to ascertain the primary source of light, but invariably it will be a window or, if outside, the sun. In a dark space, a light globe or lamp will create a light source that will appear more clearly defined than the more diffuse daylight, and will create sharp contrasts.

In rendering the form of objects, you may need to make an arbitrary decision about the primary light source, taking into account reflected light from other surfaces or secondary sources of light.

In the past, formal training in illustration involved learning 'rules' about light and shadow. In fact, in many classical paintings, you can see how strictly these rules were followed, with very specific applications of light and cast shadow areas.

Although it is still very important to understand the effect that light has on an object, the application of tone is much more intuitive today, relying heavily on the designer's observational skills and sensitivity to the subject matter.

Freehand shadows can also be an effective means of grounding an image and placing it within a given context. This, like the more formal construction of shadows, provides a sense of realism and three-dimensional form.
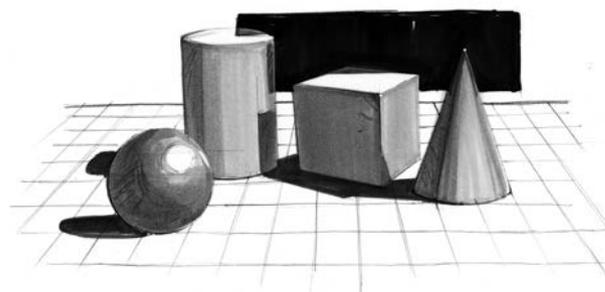
▶ This image uses both shadow and a hand-drawn grid to 'anchor' the images. This provides a believable context for the forms by 'grounding' them upon a surface.

Tonal scale

A good method to use when rendering, regardless of the medium or rendering method, is to first create a tonal scale. A tonal scale becomes a good reference point when rendering, as you can select the tone that best suits your drawing task and chosen medium.
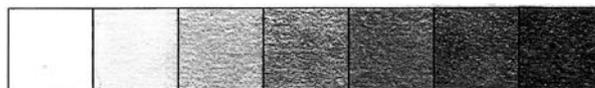
8.3 RENDERING TO REPRESENT TEXTURES AND MATERIALS

Applying materials to objects helps a designer create a sense of realism and enables the viewer to recognise the characteristics of a design. The inclusion of textural details, tone, colour and pattern helps to define the features and forms of objects and spaces. Designers in all design areas apply the rendering of materials to some aspects of their work. Whether executed by hand using sketches or refined in CADD software, the application of materials is key to communicating the specific qualities of a design.

Mark Wilken

VIDEO DEMO: RENDERING ▶

To learn how to render objects to represent different textures and materials, watch the video on Nelson MindTap.

Observe and familiarise yourself with the textures around you. Your clothing, the table, the carpet and flooring all reveal different textural qualities. Once you begin to observe and practise drawing the textures around you, you will see how it becomes easier to create the appearance of materials.

NATURAL TEXTURES

Textures that occur in nature are rarely uniform and have characteristics that are not found in human-made materials. Natural textures have imperfections. For example,

wood includes the grain of the timber, knots and other irregularities due to age, damage and weather.

When drawing natural textures, it is important to include details that give an authentic appearance. However, as important as it is to incorporate texture realistically, you should judge just how much detail is required. Too much detail can detract from the purpose of the drawing.

Mark Wilken

Mark Wilken

Mark Wilken

▶ Irregular lines can create the unique character of wood grain. Avoid being too uniform in your representation.

Mark Wilken

▶ In landscape renderings, abstract shapes and gestural applications of tone and colour can be effective in suggesting foliage and natural materials.

It is not always necessary to fill an area with textural detail, as a section of texture can often convey enough information. Stone, grass and foliage are commonly depicted in illustrations, and small sections of texture can communicate the characteristics of a given area rather than filling space with detail. When drawing trees, avoid representing every leaf and branch as this can cause the image to appear contrived.

FABRIC AND TEXTILES

The diversity of available fabrics makes for equally diverse methods of illustration. In the fashion and furniture design areas, the representation of fabric texture is very important. In the initial stages of a design process, fashion designers might use style sketches to identify the basic form of a garment and use rendering techniques such as crosshatching to identify the texture. More detailed drawings would then follow, showing the selected fabrics in greater detail, with annotations.

When representing fabrics such as woven cloth, you should observe the direction of the threads. Woven fabrics – whether created by hand or by a machine – have threads that travel in two directions. Called the warp and the weft, these threads reflect light differently. It is rarely necessary (or advisable) to show every thread, but it is important to appreciate that fabric is not flat and mono-directional, and to convey this in the rendering.

Fashion designers convey the qualities of fabric through freehand drawing and rendering, and use drawings to show not only the form of a garment but also the characteristics of its fabrics and its physical characteristics, such as reflective or transparent qualities, the richness or texture of the material, or the layering of separate fabrics in one garment. By their nature, these renderings tend to be loose and may use a range of methods such as marker, pencil, watercolour, collage and mixed media.

Mark Wilken

▶ The textural details of these fashion designs are indicated through marker and pencil rendering techniques. The use of a texture board and the inclusion of tone help to illustrate the characteristics of the fabrics.

▶ In this rendering of a leather handbag, note the inclusion of some grain and a form that suggests stiffness.
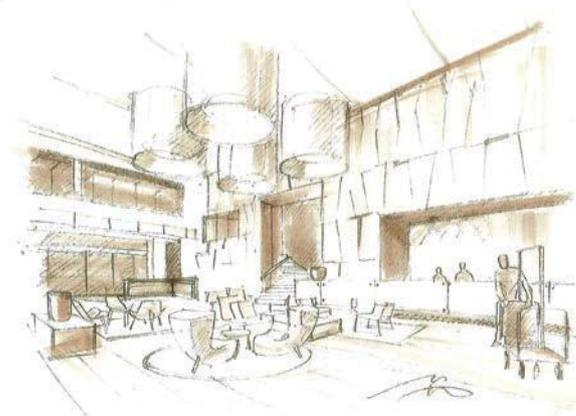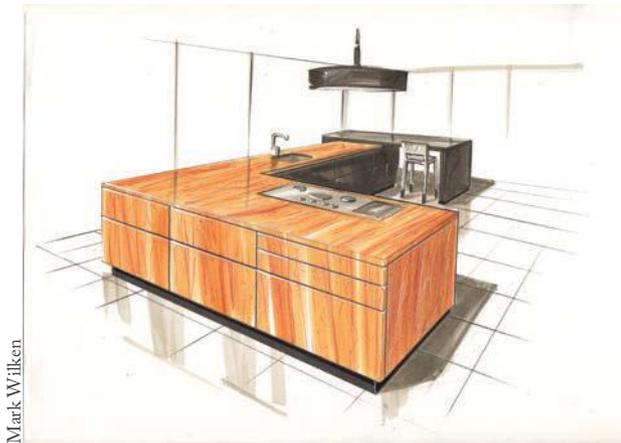
Mark Wilken

▶ Interior designers often need to represent multiple materials in a single interior. Application of tone and the use of crosshatching can indicate where textures exist in an environment.

METALLIC AND REFLECTIVE SURFACES

Materials that reflect light – such as glass and metal – can be challenging to draw. The textural characteristics of reflective surfaces are often smooth or slick.

Metallic surfaces such as chrome have no colour of their own and only reflect the surrounding colours. To capture the appearance of metallic objects, colours should be crisp, intense and bright. The application of colour often depends on the shape of the object to be drawn.

Mark Wilken

Mark Wilken

▶ When drawing high-shine or reflective surfaces, be sure to leave some areas white to emphasise their reflective qualities.

A metal cylinder, for instance, may use a series of bands of colour, which, along with a white highlight band, serve to reinforce the cylindrical and reflective nature of the object.

When drawing glass, designers often use a series of horizontal or vertical lines to indicate an otherwise clear or transparent surface. This technique is ideal when working with pen or pencil.

Glass absorbs colour, so when using other media such as markers, represent glass by drawing layers of subtle colour, such as cool greys and light blues. Remember that glass is transparent, so you may need to render what is behind the glass, as well as any reflections. Reflections on the glass appear as white, which can seem to be floating on the surface.

Mark Wilken

Mark Wilken

Mark Wilken

▶ When rendering glass objects such as this office desk, remember to show transparency. Add colour to the glass surface in the final stages, to cover any details that are underneath.

Mark Wilken

▶ The use of a background, in this instance a simple coloured panel, helps to reinforce the illusion of transparency.

PLASTICS

Acrylic materials and plastics often reflect light in the same way as other reflective surfaces. There are, however, many matte plastics that show little or no reflection. The properties of acrylics and plastics allow moulding and shaping into a wide range of shapes and forms.

Mark Wilken

Mark Wilken
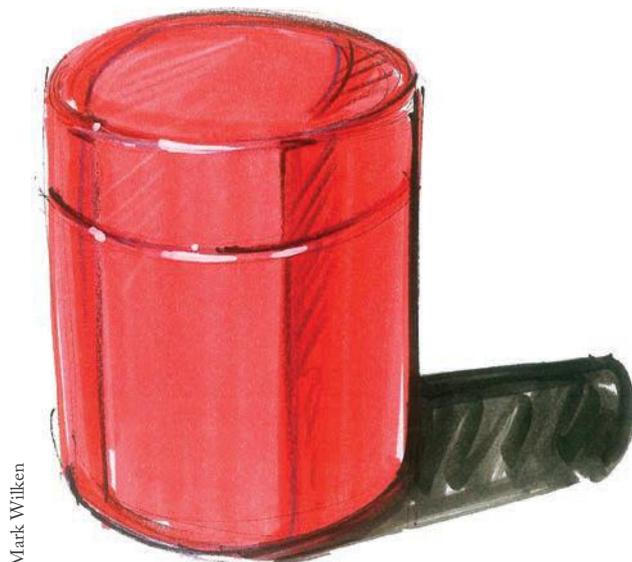
Mark Wilken
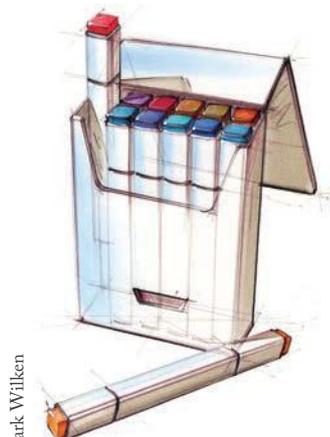
Mark Wilken

Mark Wilken

▶ In this image, the subtle suggestion of semi-transparency is created with light pencil outlines of the packaging contents.

Acrylic materials can be manufactured in a vast range of colours and textures. The colours of acrylic products often appear to be saturated and vivid. When rendering work from the lightest area to the darkest, build layers of colour to achieve a saturated appearance.
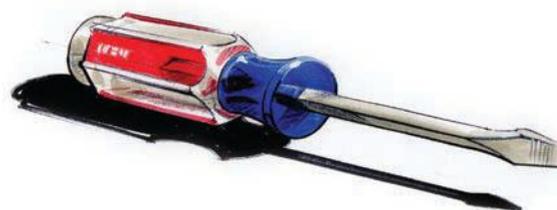
Leave some areas completely white to represent reflections and suggest form. Although plastics are not as highly reflective as metallic surfaces, there will always be highlight areas, and these should be indicated.

ECO AND RECYCLED MATERIALS

Eco-materials include products that are made from recycled components or materials. They often feature colours and textures that are natural and that suggest an ecologically sustainable manufacture. Often, eco-products are packaged in recycled substrates such as unbleached card or paper. Eco-products tend to lack the glossy surfaces that traditional products may favour. In rendering eco-products. it is advisable to use a muted palette of browns and greens, and focus on representing matte surfaces with little reflective qualities.

Mark Wilken

The rendering of eco designs generally focuses on the recycled nature of the materials, suggesting natural or fibrous textures rather than polished, shiny surfaces.

COMPOSITES

Composites are the combination of two or more materials, which together produce a new material. Composites are often created for their strength and durability. Examples of composite materials are concrete, fibreglass, carbon fibre and plywood.

Mark Wilken

▶ Wood composites include those created with plastics. Although they look like wood, they are usually more durable and weatherproof. In rendering composite wood products, it is feasible to feature some of the more reflective qualities of plastic as well as wood grain.

Although composites may appear to have the characteristics of a natural material, there may be slight visible differences. Invariably, as composite technologies develop, it becomes harder to tell the differences between natural products such as wood and wood-looking products made with plastics.

Concrete can be polished or left in a natural state, so rendering of concrete products will vary according to the design. A polished surface will have reflective qualities.
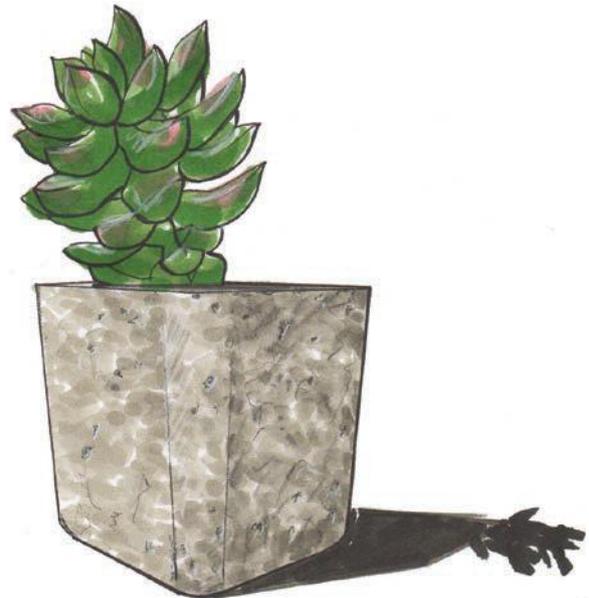
Mark Wilken

Fibre products, such as carbon fibre, can present with both matte and reflective surfaces, so their rendering needs to reflect the characteristics of the design product. The use of some highlight areas can achieve this.

Mark Wilken

▶ Carbon fibre briefcase

Mark Wilken

▶ Items such as rubber thongs, with fabric features, offer combinations of textures but may have limited reflection. The challenge is to ensure that the forms appear three-dimensional and not flat.

CERAMICS

Ceramic products can be matte or gloss in texture. The surface qualities of ceramic designs are affected by the glaze and surface detail that is applied. Glazes include gloss, satin and matte but the object may also be left unglazed and in a natural state. Similar to plastics, gloss- and satin-glazed ceramics reflect some of their environment. Highlights assist in emphasising the areas that are reflective, while the light source is key to emphasising form. Matte and unglazed ceramic products do not reflect, and require thoughtful application of light and dark tones, along with textural details to appear three-dimensional.

Mark Wilken

▶ Terracotta teapot with matte finish
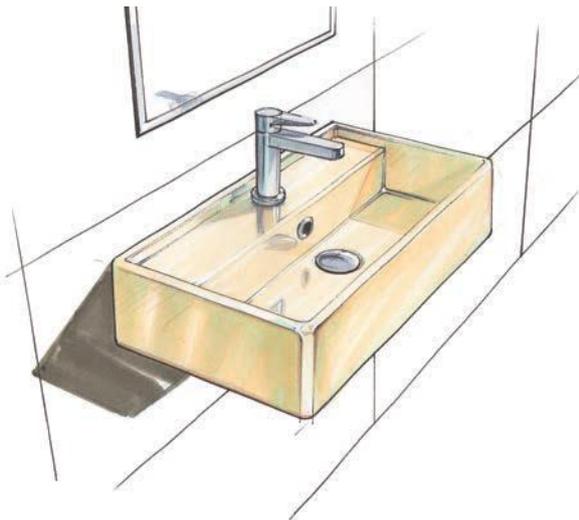
Mark Wilken

▶ Porcelain sink with high gloss texture

Mark Wilken

▶ Decorated stoneware pots with a satin or semi-gloss texture

VIDEO DEMO: RENDERING

To learn how to render objects to represent different textures and materials, watch the videos on Nelson MindTap.

▶ Rendering (Various)

- Rendering texture (wood)
- Rendering texture (metal)
- Rendering texture (metal/plastic)
- Rendering texture (glass/leather/metal)
- Rendering texture (rubber/fabric)
- Rendering texture (fabric)
- Rendering texture (cardboard)
- Rendering texture (composite/ carbon fibre)
- Rendering texture (composite/ carbon fibre)
- Rendering texture (plastic)
- Rendering texture (kitchen)
- Rendering texture (glass)
- Rendering texture (plastic – the 'Keep Cup')
- Rendering texture (ceramics).

CHAPTER REVIEW

1   Render the following shapes using tones in reference to the direction of the given light source.
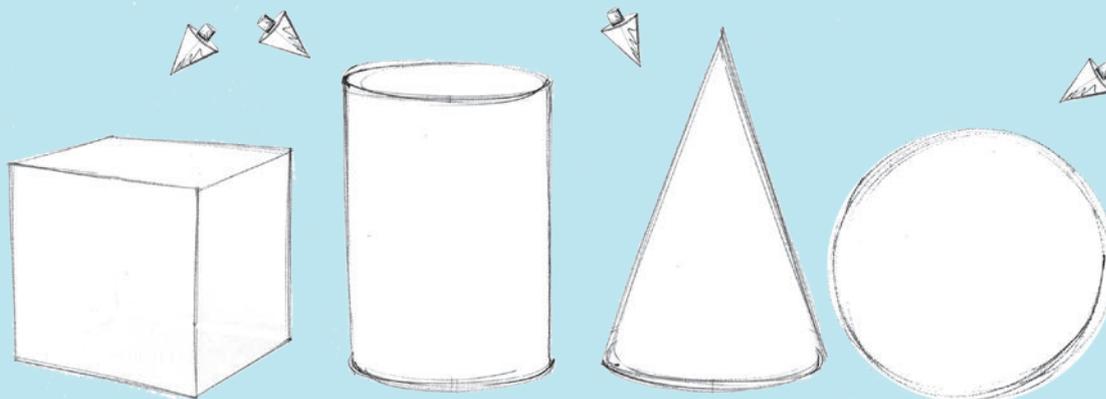
2   Render these complex shapes using tones in reference to the direction of the given light source.
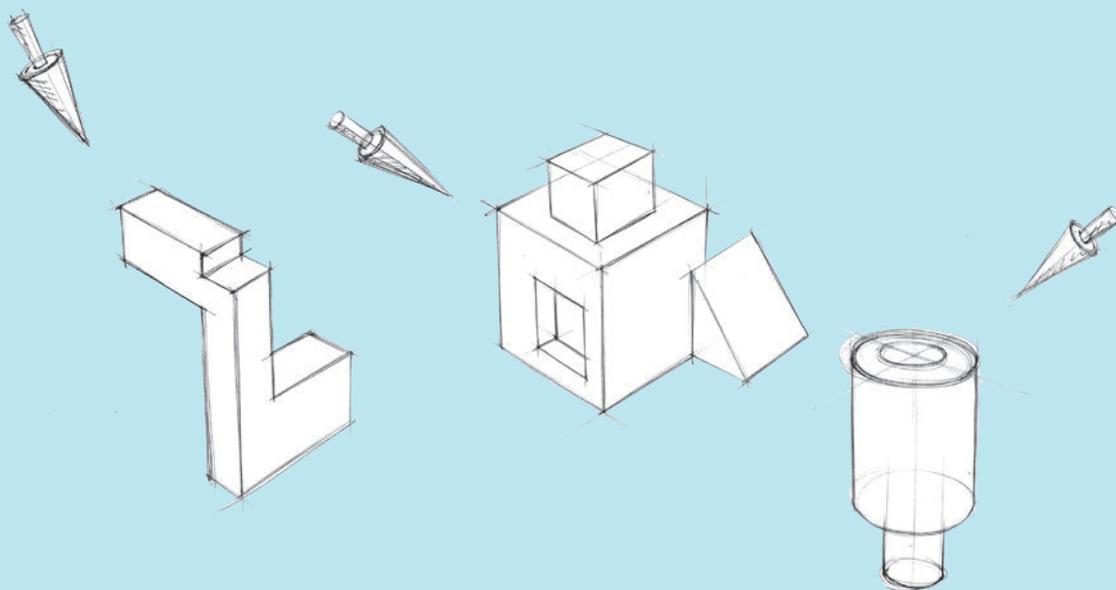
3   Apply colour, texture and tone to render the following objects. Add detail to clearly show the indicated texture and materials.
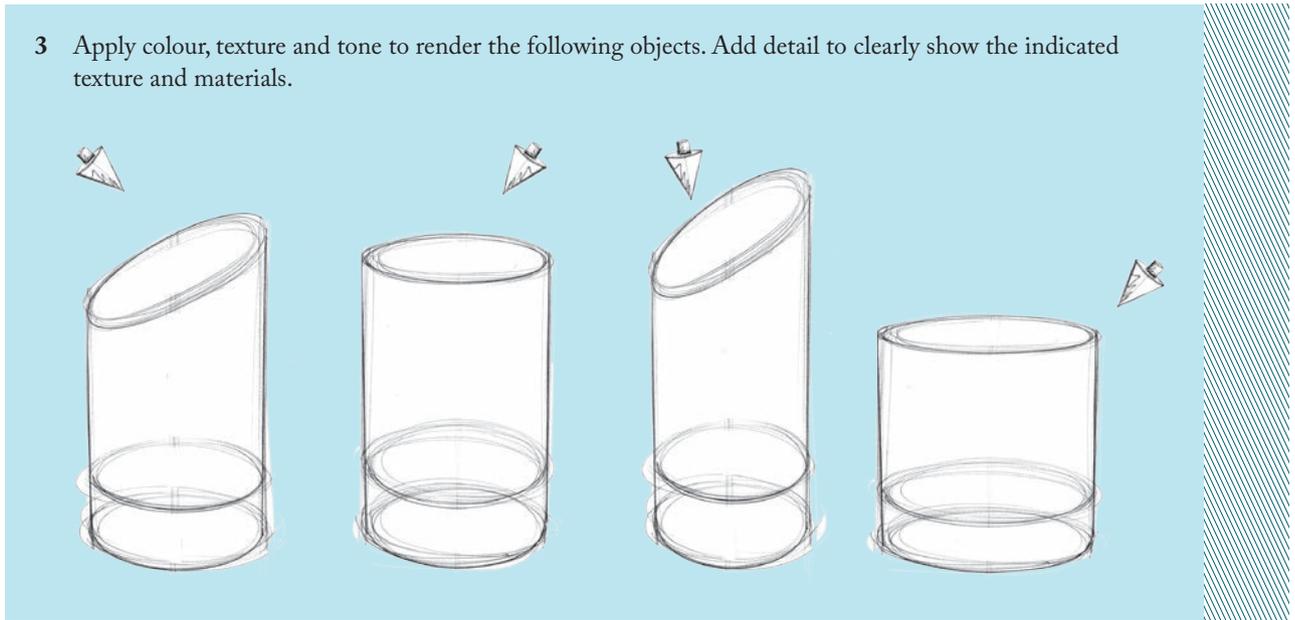
PROTOTYPING

Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan.

Eliel Saarinen

In this chapter:

Learn the language:

+ 3D digital model
+ acrylic
+ appearance model
+ augmented reality
+ balsa wood
+ digital low-fi prototype
+ dots per inch (DPI)
+ foamcore
+ form study
+ information graphic
+ interface wireframe
+ junk model
+ low-fi prototype
+ maquette
+ massing model
+ medium-density fibreboard (MDF)
+ mock-up
+ model
+ motion graphics
+ offset printing
+ pixels per inch (PPI)
+ polypropylene
+ polystyrene
+ print resolution
+ proof of concept
+ prototype
+ raster image
+ scale
+ sculpture
+ test rig
+ toile
+ vector image
+ virtual reality

▶   American architect Frank Gehry famously uses cardboard and other materials to conceptualise his architectural ideas.

The word 'prototype' means an early physical model or version of a thing used to test a process or concept. Traditionally a prototype would be functional in some way to allow practical testing. Recently the word has been used to encompass a wide range of making, and the earliest versions of a concept prototype are qualified by the phrase 'low-fi' (low fidelity) to distinguish from late-stage, more realistic and functional high-fidelity prototypes.

The most important thing to keep in mind is that prototyping isn't confined exclusively to the *end* of the design process (the Deliver phase) but can be applied *throughout* the Develop phase, too. Conceptually a 3D physical prototype is no different from a rough pencil sketch on paper – both allow the designer to simulate a design concept and evaluate it. The exciting thing about a physical prototype, however crude, is its tactility – you can literally come to grips with your idea and, in the process, learn so much.

Some designers find low-fi prototyping so valuable that they may begin their ideation in a physical 3D medium with a lump of clay, cardboard or foam to aid their design process.

In this chapter we'll look first at physical low-fi prototyping – tools used by architects, landscape architects, interior designers, fashion designers, and industrial designers – to simulate and test their concepts. Then we'll look at digital low-fi prototyping – tools used by many designers, but especially digital media designers, to simulate and test digital media designs.

⚫⚫⚫   For more on drawing, see Chapter 7.

⚫⚫⚫   For more on generating and developing designs, see Chapter 5.

9.1 PHYSICAL LOW-FI PROTOTYPING

Physical low-fi prototyping involves the production of drafts, models or prints that provide a tangible insight into the appearance and functionality of a design. In industrial design, the use of 3D models is commonplace and enables designers and stakeholders to see and feel the form of a product. From small domestic items to large motor vehicles, all products are evaluated before going into mass production. Made from a range of low-cost materials, including foam, card, paper, cotton textile, wood, plastic and clay, these models create opportunities for testing with users. Effective use of 3D materials can lead to the production of models that communicate the form, ergonomic features and surface details of an object more clearly than a drawing or diagram.

EXAMPLES OF LOW-FI PROTOTYPES

Junk model

Made from available materials (including junk), a junk model is a 'quick and dirty' physical model to capture the functional features and fundamental operating principles of a product. The purpose of a functional model is to test ideas related to how a product works. It rarely represents the appearance of the design and may only exist to test electronic, moveable or mechanical components.

Form study

Also known as a sketch model, a form study is a relatively low-definition, three-dimensional model that suggests the key characteristics of an object's form. Usually carved from foam or clay, the form study offers an informal view of the scale and proportions of the design.
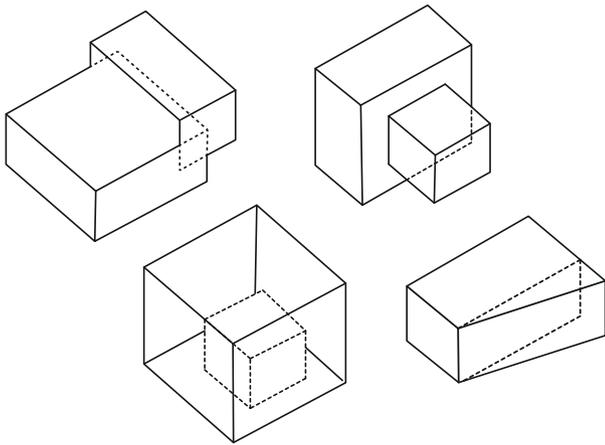

▶ Form study designs by Blond, a London-based industrial design studio

Massing model

A massing model is a spatial tool used in architecture that defines both interior and exterior space. Architects and interior architects may begin a design concept by massing through additive techniques or subtractive techniques.

▶ Additive massing: architects design spaces by adding, stacking, repeating, splitting and expanding masses.
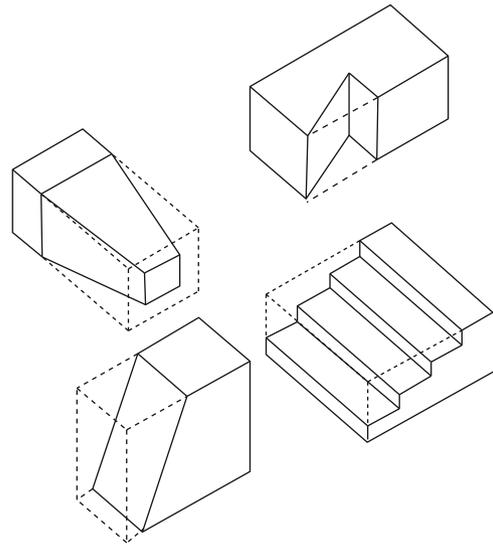
▶ Subtractive massing: architects design spaces by extracting, removing, tapering, repeating, splitting and reducing masses.

Proof of concept

Sometimes, during the creative design process, it is necessary to present stakeholders with a suggested direction and design idea, or check on progress. A proof provides all parties with a preview of the design and a clear indication of potential directions. Proof of concept may be a three-dimensional model or a printed presentation. It may feature information about the whole of a design, sketches and ideas or a detail of the proposed design direction.

The relatively informal style of concept sketches and models is important – it conveys clearly to the viewer (specifically, the client) that the design isn't finished. The looseness of the sketch or model communicates that the design is still evolving, suggestions for improvement are welcome, and, importantly, there may be flaws in the idea that have not yet been discovered. Showing the client a prematurely polished model of a concept is risky – they may fall in love with a design that, later, turns out to be infeasible, which can leave the designer in an embarrassing position of needing to backtrack.
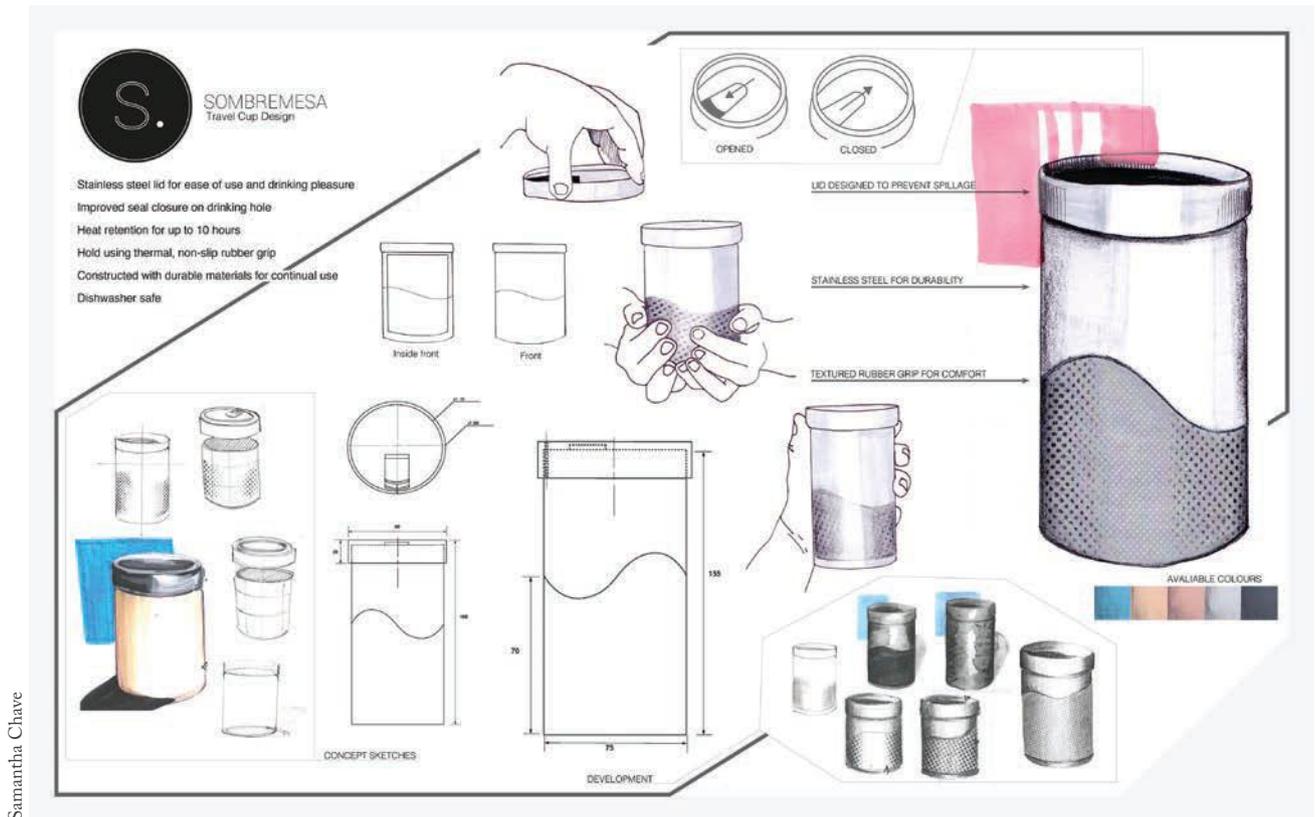
Samantha Chave

▶ Concept board showing the design of a travel cup

Sculptures and maquettes

Appropriated from a visual art context, sculptures (both representative and abstract) and maquettes (scale models of sculptures) are used for a range of creative purposes in design. Sculptural forms that aid aesthetics serve to elevate designs beyond function alone. Examples include signage systems, interior design elements, and decorative forms in architecture.

Sailko

▶ This is an architectural maquette of the Schröderhuis (1924), designed by Gerrit Reitveld.

Scale model

A scale model represents the details and appearance of an object, a product or an environment in miniature. Scale models are common in architectural and product design and allow for a tangible representation of form, which is often very valuable for communicating complex designs to people, such as the client, who are inexperienced at interpreting two-dimensional drawings. Set and theatre designers regularly create models of sets, which enable others involved in a production to visualise the use of props, lighting and the position of actors before the actual set is constructed.

Mock-ups

'Mock-up' is a term that encompasses a range of low-fidelity prototyping methods, but it is commonly used in communication design in reference to the rough draft of a layout. Mock-ups may be created to show a packaging design with surface graphics applied, a draft-quality, printed poster or other print product. Combining text and imagery, the mock-up provides a realistic presentation of the likely final design.

SCALE

In principle, all prototypes beyond the earliest junk or massing models should be made 'to scale', which is to say that all components share the same scale and are therefore in proportion. Moreover, it's good practice to use an *approved* scale rather than a random ratio. To some degree, choosing a scale for a drawing or model is less important than it used to be, since so much design documentation and rapid prototyping is done digitally, and choosing the scale of drawings for output can be done late in the process.

This table lists scales commonly used in landscape architecture, architecture, interior design and industrial design, and may help you choose a scale for your drawings and prototypes.

Scale	Built environment uses	Industrial design uses
1:5000	Location plans	
1:1000		
1:500	Site plans	
1:200		
1:100	Floor plans	
1:50		
1:20	Room plans, interior elevations	'Human-scale' objects such as vehicles, furniture and large appliances
1:10	Joinery, component and construction details	
1:5	Construction details	
1:2	'Half-size', construction details	'Hand-scale' objects and components
1:1	'Full size', construction details	
2:1		Small component details

Nick Rose

▶ This student used annotation to explain and evaluate his design thinking. At every stage of the process, he posed questions about the direction of his ideas and evaluated the most appropriate materials, functions and graphical representations for his design. The final production was a 1:15 scale model and display.

Sienna Scott

▶   Mock-up of a printed, multi-fold booklet and presentation box

Test rig

Used specifically in engineering and product design, a test rig is a structure designed to replicate the mechanical and electrical functions of a new product. It may take readings and data from the product to inform designers and engineers about capabilities and power. Information from the test rig is used in the development of the product.

Jim.henderson

▶   This test rig bounces a bag of sand on baby equipment for hours to simulate the use that a baby would have on a high-chair design.

Appearance model

An appearance model provides an accurate physical representation of the appearance of a design. Sometimes referred to as a block model, the appearance model usually has no moving parts and exists for evaluation of appearance and aesthetics. Appearance models are often the final prototypes made in university-student industrial-design projects and represent a significant time investment to simulate the appearance of a product. An appearance model may be used in product photography for preliminary marketing of a product.

Rawpixel.com/Shutterstock.com

▶   These appearance models of skincare packaging can be used to test ergonomics and user response using the models.

Toile

Used in fashion design, a toile is a version of a final garment design created in cheap textiles, such as calico. The toile enables the designer and fabricator to examine the fit, function and overall form of a garment. It is often created to fit a live model for assessment and evaluation.

Reeldeal Images/Alamy Stock Photo

▶   Toile is a test garment made using cheap fabric

METHODS OF LOW-FIDELITY PROTOTYPES

Acrylic

Some models can be made using laser-cut acrylic, if you are fortunate enough to have access to a laser cutter. Acrylic sheet comes in a range of thicknesses and colours and can be cut to create interlocking forms or glued together; it can also be engraved. Due to its properties, it can also be heated and bent to create curved forms. Acrylic is sometimes called 'Perspex', which is the name of a commercial manufacturer.

Hand modelling

Hand modelling of objects is a quick way of creating three-dimensional forms. Clay, or commercial modelling or sculpting media, including Sculpey and Fimo, can be used to create small forms by hand or with pottery tools. Modelling media come in a range of colours and are often used for character designs for animation and as prototypes for products with a predominantly organic form.

Paper and card

Papers and lightweight card can be used to construct packaging and small-scale models. There are many packaging templates or flat plans available in books and online to assist with the construction of common and complex packaging designs. Like a fabric pattern, these templates indicate folds and outlines.

Pasteboard, which is available in a range of thicknesses, is ideal for the representation of packaging concepts.

Other cheap and readily available materials such as strawboard (which is commonly used as a base in architectural models) and lightweight corrugated cardboard can be used to construct models of buildings. The properties of lighter, flexible cardboards allow for the depiction of contours, curves and details such as ground surfaces, roofs and walls. Scoring the card (by cutting grooves into the material without severing the fibres completely) also allows for effective folds and angles.

Foamcore

Foamcore is a versatile product that is used in both model making and two-dimensional presentations. It consists of a lightweight foam centre encased on two sides by a paper surface. The foam centre can be brittle if cut incorrectly and should be sliced with a very sharp blade. Use blades only under supervision.

Foamcore is available in several thicknesses and is ideal for models, structures and buildings that require solid modelling. Foamcore is also useful for mounting a presentation board.

Polypropylene

Polypropylene is a firm plastic material that lends itself to packaging. It is available in transparent and translucent colours and is often used in the construction of gift boxes and packaging where visible contents are required. Polypropylene can be scored and folded like card.

Polystyrene foam

Polystyrene is a polymer that can be made into sheets or injection moulded (model aeroplane kits are usually made from polystyrene) but can also be expanded to form a lightweight foam. Polystyrene foam is often used for packaging and as insulation. It's useful to designers because it's easily cut with a knife, bandsaw or hot-wire cutter.

There are two types of polystyrene foam used by designers:
+ Expanded polystyrene (styrofoam) has a low-density, coarse texture and appears to be made of closely packed foam bubbles or balls. It demands more work to achieve a fine surface finish so tends to be more useful for massing models and rough low-fi prototyping.
+ Extruded polystyrene has a much finer, denser texture. This makes it easier to achieve a good-quality, smooth surface finish suitable for appearance models.

A smooth, coloured finish can be achieved on polystyrene with the application of water-based spray paint. Avoid the use of solvent-based paints, such as spray enamels, which melt polystyrene – as many design students have discovered to their great dismay.

Wood

Wood is more robust than cardboard or foams and correspondingly requires more time and effort to work with (depending on the form of your design). Your school may have good facilities for working wood, which may make it an attractive material for your purposes. Remember, however, that as with any visualisation tool, be sure that the investment of time and effort the material demands corresponds to the stage of the design process and proven value of the design concept.

Balsa wood

Commonly used in model making, balsa wood is a soft, lightweight material with a fine texture and neutral colour. Flat, square and cylindrical rods of balsa are available and can be sanded, carved or glued to form a variety of shapes.

Balsa can be bent slightly and steamed to form lightly curved shapes. Balsa wood can be brittle, so it may need to be combined with a more flexible product such as card. Like many other woods, balsa can be sanded and painted repeatedly to give the appearance of another material such as metal or plastic.

Medium-density fibreboard

Medium-density fibreboard (MDF) is made from tightly compressed wood fibres that are bonded into sheets of varying thicknesses. MDF is relatively soft, flexible and does not split; it can be easily shaped with hand tools or machinery. A high-gloss finish that simulates the appearance of moulded plastic is achievable through a laborious but effective process of repeatedly sanding the MDF model and painting it with gloss or automotive enamel.

Casting

Models that are required to show the form of an object alone can be created by simple casting techniques. After carefully and smoothly forming an object in clay or similar modelling material, a plaster cast can be made and used as the mould for objects to be made with resin, latex or plaster.

Prue Edmunds

▶ This student documented the development of a scale model with photography. Each stage of the construction process was annotated, and illustrated the evaluation process at every step.

Moulding

Vacuum-moulding facilities are not common in schools, but they offer great opportunities for the development of effective scale models. In vacuum moulding, also known as vacforming, a sheet of acrylic plastic is heated to a high temperature, stretched onto a mould, and held against the mould by applying a vacuum between the mould surface and the sheet. This provides a lightweight hollow form. Vacuum moulding is a technique widely used in the manufacturing of plastic products.

Injection moulding is a technique where plastics are injected into a mould to form a product. The moulds used for injection moulding, known as 'tooling', are very costly to manufacture because they must withstand the high temperatures and pressures required by the process. (The tooling for a single-piece plastic chair, for example, may cost several million dollars to create.) This makes injection moulding useful for large-scale manufacturing but infeasible for small-scale production and school use (a niche better addressed by 3D printing).

Inkjet printing

Inkjet printers are the most popular means of printing colour images for school and home users. They range from small A4 printers to very large format printers. It is possible to obtain high-quality prints without the expense of professional printing processes. Inkjet printers generally use four or more colour cartridges, one for each of the CMYK colours (cyan, magenta, yellow and black), or hue variations of these colours (e.g. light magenta and light yellow). Different percentages of each of the four colours can produce seemingly endless variations in colour. As your computer screen operates in RGB mode, it is helpful to have access to a colour swatch so that you can more closely identify the printed colour. Some swatches contain the CMYK percentages for each colour to assist in generating the appropriate colour in your chosen software package.

Colours you see on the screen are often different when printed. Colour always appears brighter on the screen. Commercial products that calibrate your monitor are available to ensure greater parity between your screen and the printed page. These are placed on the monitor itself and ensure that your colours remain true. A less expensive alternative is to test print your colours as you go, or use a colour palette swatch.

When using an inkjet printer, the variables that may affect your work are print resolution and paper quality.

Print resolution

The number of dots per inch, or dpi value, of an inkjet printer will affect the clarity of the print. This value refers to the number of dots of ink placed on the paper within each inch of image space. A printer that produces 1440 × 720 dpi will print a higher quality image than a printer that prints 300 × 300 dpi.

Laser printing

Laser printers can also vary in quality and you will find that some printers produce a clearer image than others. Often, laser printers do not produce the subtle tonal variations that can be seen in inkjet prints, and colour laser prints can appear flat. However, for reproduction of single-colour letterform, logos and developmental work, the laser printer is quite suitable.

Paper quality

Paper is also known as 'stock' and refers to the surface an image is applied to. Paper stock can vary widely and is measured in terms of grams per square metre or gsm. The higher the value, the heavier and generally thicker the paper. Standard printer paper is usually around 80 gsm.

THE DIFFERENCE BETWEEN PPI AND DPI

FYI

The abbreviation ppi (pixels per inch) refers to pixels within an image and is related to screen resolution. For example, a 300 ppi image contains 300 pixels in each inch of image size. It is the preferred term when referring to the quality of an image. Note that images created at a low resolution, such as 72 ppi, cannot have pixels 'added' later to create a higher resolution image, as the 'extra' digital data doesn't exist. This is why it is important to establish the purpose and, subsequently, the resolution required of your images before you start.

The abbreviation dpi (dots per inch) is related to the printing of images using a printer. Generally, a printer uses four or more coloured inks to recreate images. Each pixel of the screen image is created by a vseries of tiny ink dots. A 1200 dpi printer, for example, will print 1200 dots of ink per inch of image. The higher the dpi, the better the print quality; however, the printer will use more ink and the print will take longer to execute.

This table shows some common weights of paper stock and their uses.

Weight	Paper	Use
80–90 gsm	Standard paper	General printing, flyers, brochures, photocopies
120–190 gsm	Heavyweight paper	Photo prints, folded cards, posters and brochures
200–250 gsm	Extra heavyweight paper	Photo prints, artwork and packaging
300–400+ gsm	Card	Cards and covers; some specialist packaging may use heavyweight card

There are many specialty papers available for printing. Domestic and business printers have a limit to the weight of paper that can be printed. Heavier stock, such as card, is usually printed by commercial printers using the offset process.

To produce high-quality results, specialty laser and inkjet papers are treated with a vivid white coating, preventing ink from bleeding into the fibres of the paper and preserving the integrity of ink colour. When traditional 90 gsm papers such as photocopy paper are used, the ink is absorbed into the surface fibre, which reduces not only the sharpness of the print but also the intensity of the colour.

Special coated papers are available in different surface types, similar to photographic papers, including gloss, satin and matte. It is also possible to print onto iron-on transfers, transparency sheets and adhesive films. Paper coating will affect how much ink or toner is applied to a print, affecting the colour.

Laser printers use toner rather than ink, which does not bleed, although it can smudge in heavily toned areas. Specialty papers are also available for laser printers and include transparencies, varnished papers (gloss, matte and satin) and some recycled and textured varieties in a range of colours.

The choice of paper will be determined by the purpose of the print and the suitability of the surface type for the task.

DON'T JUDGE A DESIGN BEFORE IT'S PRINTED

When you are designing for print, make sure you check your colours on a printed copy and not on the screen. The print will always be darker than the screen and some colours may print very differently from what you expect. For the most accurate representation of colour on the screen, use calibration tools or a colour swatch.

Offset printing

Offset printing is a process used by professional printers. A digital file is converted to a series of plates, which are coated with ink. The plates travel through a complex printing press, which transfers the inked image on the plate to the chosen substrate or printing surface. Offset printing originates with digital files that have been prepared in line with the printer's specifications. A professional printer will indicate what is required in a printable file. Generally, the specifications include the colour mode (usually CMYK), the need for outlined type (to ensure type looks as intended), bleed (to extend colour, image or type to the printed edge) and trim marks (where the paper, card or other stock is cut) as well as the stock on which the product will be printed.

The professional printer can also coat the printed stock with a varnish to create a matte or gloss appearance and provide binding of books and magazines. The complexity of offset printing means that clear communication between designer and printer is essential to ensure a successful outcome.

3D printing

Three-dimensional printing, also known as 'rapid prototyping', has become an affordable option for professional designers and students. 3D printers range in scale from small printers created from kits for home or school use to very large printers used in university and commercial settings.

Known as 'additive' printing, 3D printers work by turning a digital model of a design, created in CAD, into a succession of very thin layers of a material (a fibre composite, plastic filament or powder) built up slowly to form a three-dimensional object. Often used for prototyping and the construction of models, 3D printing is developing rapidly into a useful manufacturing process for products made in small quantities or where high levels of customisation are required (e.g. prosthetic limbs). Clothing, footwear, artworks and products with working parts can be created with 3D printing.

3D printers create forms using an STL (stereolithography) file that describes the surface geometry of an object created using CAD software. To create the print, the printer builds cross-sections of the object, which correspond to cross-sections in the original STL file.

Because of the time needed to create the CAD file, rapid prototyping must be used wisely during the design process. Using it prematurely on unvalidated concepts can lead to 'design fixation'.
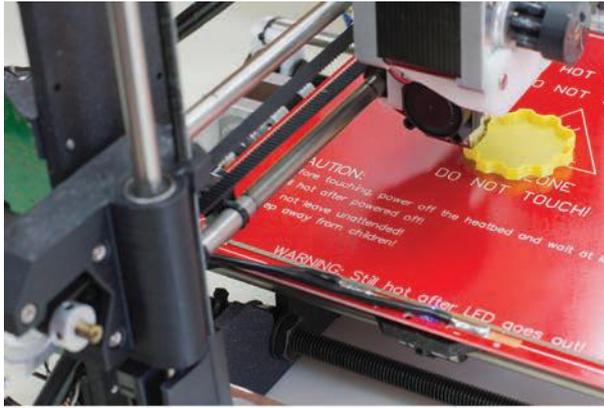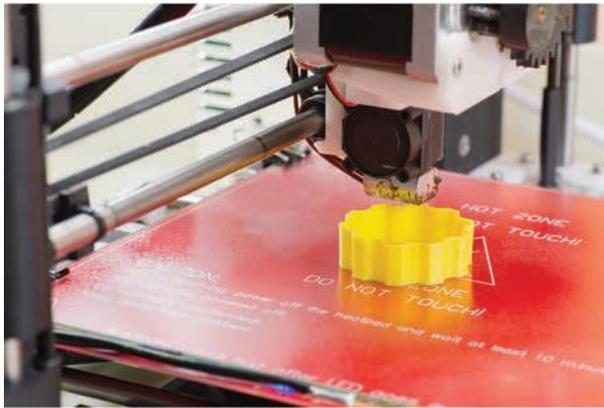
3D printers create objects through the layering of plastic filament. The printer converts digital information supplied by a CAD program and layers multiple strands of materials to build up a 3D form.

As in 2D printing, the thickness of layers in a 3D print is described in terms of dots per inch (dpi). Typical layer thicknesses are approximately 250 dpi but vary according to the capabilities of the printer. Because of the complexity of the 3D printing process, printing can take a long time, ranging from a few hours to a few days.

9.2 DIGITAL LOW-FI PROTOTYPING

Digital low-fi prototyping involves the creation of interactive, immersive or sequential experiences in design. The use of varied software to generate two-dimensional and three-dimensional design outcomes enables designers and stakeholders to view design concepts without physical production. Digital prototyping methods enable complex ideas to be represented without the expense of construction and production. For example, a digital 'fly through' or augmented reality experience of a residential design allows the potential end user to experience the spatial details and flow of a non-existent structure.

EXAMPLES OF DIGITAL LOW-FI PROTOTYPES

Animation and animated information graphics

Used in all design areas and sometimes referred to as 'motion graphics', an animation combines a series of images (either two- or three-dimensional) to create a sequence that displays motion. Animations may include sound and even offer some level of interactivity. Animations may show the workings of a product part, how to use an object, or instruction on the functionality of a design. Animation is also used in graphic design when print formats are not suitable for the communication of a message.
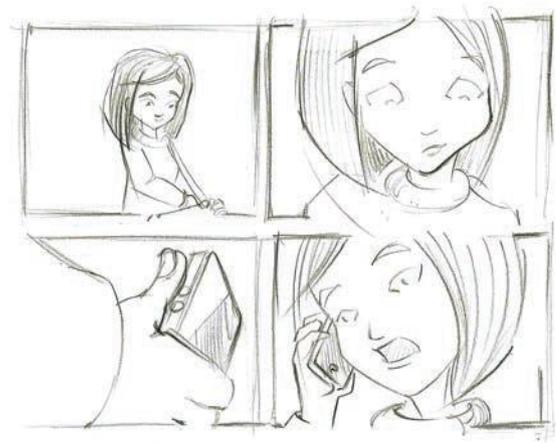
Storyboard for animated graphics that may be used for an online advertisement.

Interface wireframe

A user directly interacts with a website or app via its interface. Interface wireframes are skeletal outlines that show each component of an interface design as an outlined or filled shape. Usually monochromatic and lacking content such as type, images and logos, the wireframe enables designers to resolve layouts for usability and functionality.


REDPIXEL.PL/Shutterstock.com

Website and app simulations

Simulations are designed to provide the viewer with an experience of a design. A simulation allows the user to engage with the design in a way that provides a 'virtual' experience of an environment. The ability to observe how users respond to a website or app that is in a 'dummy' form can provide important testing information and identify concerns about compatibility with the target user.

Virtual and augmented reality

Virtual reality (VR) encompasses a variety of rapidly evolving technologies for displaying, experiencing and manipulating virtual objects and environments through the use of headsets that project stereoscopic images to the wearer. Augmented reality (or mixed reality) is used when the wearer can see virtual elements superimposed within the real world around them, whereas VR implies completely virtual views. Both techniques are applied in the design of spaces and products, allowing the user or designer to engage with the design in an immersive and convincing manner. Interior designers may use VR to help their clients understand and experience design proposals. Industrial designers may use VR to explore design concepts without the time-consuming overhead of CAD, and refine ergonomic details by experiencing the product virtually at full scale to assess reach and clearance.
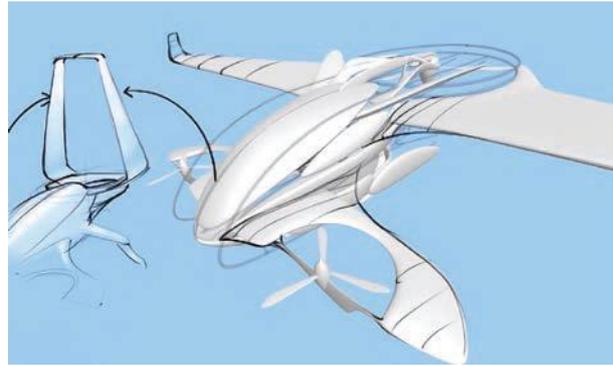
Magnus Schultz

▶ A digital development sketch over an image exported from Gravity Sketch VR model. This university-student industrial-design project explored autonomous air ambulance designs for use by the Royal Flying Doctors. Gravity Sketch software is available for many VR headsets at no cost.

3D digital modelling

Sometimes it is most efficient to create a digital model of a product or environment. There are many 3D-modelling software packages available, including many free ones, that enable designers to create the realistic appearance of a design without the effort or expense of construction.

The use of 3D modelling has the capability of using pixels to create the illusion of depth and can reproduce a high degree of realism with as much detail as a live action film. In 3D-graphics software, the forms of figures, structures and landscapes are created through complex combinations of shapes formed into a wireframe base. Increasing the number of shapes used to form the wireframe increases the complexity and size of the image. To enhance the realism of the surface of the 3D image, lighting effects, textures and perspective are applied. As in manual rendering, colour and tone are applied to an object to enhance a sense of solidity; the creation of shadow can give objects weight and reinforce the illusion of belonging to a 3D world.

Like other raster programs, 3D-graphics software often requires the application of an anti-alias function in order to smooth curved areas. Once a wireframe has been created, the program renders the object, modelling the form in a manner that is realistic. With the addition of complex commands that create subtle blurring of movements and realistic reflections and shadows, 3D-animation packages can create a sense of fluid motion that emulates rather than exaggerates the natural movements we recognise. In architectural contexts, three-dimensional models are often used to allow viewers to 'fly through' an environment that has not yet been constructed.

MAKING A COMPUTER GENERATED 3D MODEL:
(GOOGLE SKETCH UP SCREEN SHOTS)

I BEGAN WITH THIS AS THE BODY, WHICH WAS ALTERED TO FIT MY DESIGN

AS THIS WAS MY FIRST TIME USING THIS PROGRAM, IT TOOK MANY ATTEMPTS TO GET TO THIS POINT

A GLIMPSE OF THE INTERIOR. NOT PERFECT, BUT MOSTLY FOR THE BENEFIT OF THE VIEW FROM OUTSIDE THROUGH THE WINDOWS.

EVEN THE ADDITION OF THE EDGINGS MAKES A DRAMATIC EFFECT ON THE FORM. IT BEGINS TO TRULY SHOW THE DESIGN.

EVEN WITHOUT THE DETAILS AND WINDOWS, THE FORM IS VERY AESTHETICALLY PLEASING YET SIMPLE.

I CAN REALLY 'SEE' THE TRUE FORM OF MY DESIGN WITH DEPTH. IT IS A GREAT TO SEE IT SUCCESSFULLY TRANSLATED FROM PAPER.

THE STAIRS WERE A DIFFICULT ADDITION TO PERFECT.

THIS WIDTH WAS TO SLEEP A PERSON. (SELF-BUILDER TO SHOULDER.)

THE PROGRAM ALLOWED CONSTANT ALTERATIONS TO THE SHAPE AND IT WAS EASY TO MAKE THE SCALE AND PROPORTIONS RIGHT.

INTERIOR SHOW THE SPACE COMING TO LIFE. ESURES THAT MY FLOOR PLAN WOULD WORK.

I ADDED INDENTATION HERE TO SHOW THAT THIS IS A RETRACTABLE "POP"-OUT SECTION. IT IS SUBTLE, BUT MAKES A DIFFERENCE.

THE INTERIOR IS A BIT ROUGH BUT IT DOESN'T MATTER GREATLY AS YOU ONLY CAN SEE A LITTLE WHEN LOOKING IN (WINDOWS).

I WAS ABLE TO CREATE A CONTINUOUS LINE SO ALL THE WINDOWS WERE LEVEL.

TRULY ENCAPSULATES AND PROJECTS THE FORM AND SPACE OF MY UNIT. I WASN'T IMAGINING IT, OR OVER ESTIMATING THE FUNCTIONALITY OF THE DESIGN. IT WORKS!

Prue Edmunds

...CONTINUED:

NOW THAT THE FORM IS (ROUGHLY) FINISHED, I BEGAN TO ADD COLOUR.

THE BLUE TINTED WINDOWS LOOK COOL. REFLECTS THE SKY. TOO STRONG?

I LEFT THE STRUCTURE OF THE STAIRS TILL LAST, AS IT IS AN ANGLED SHAPE AND I AM A BEGINNER!

THE HANDLE WAS VERY DIFFICULT TO MODEL. THE COLOUR IS JUST GREY, AS THE PRESET METAL RENDER ISN'T PRETTY. REFLECTION CAN BE ADDED LATER.

I REALLY LIKE THE BLACK EDGING THAT CONTRASTS THE WOOD.

AGAIN, LOOKING ON FROM THE OUTSIDE, IT IS NOT CRUCIAL TO PERFECT THE INTERIOR, BUT TO HAVE ITS GENERAL SHAPE. BECAUSE THE WINDOWS ARE SLIGHTLY OPAQUE.

A COMPUTER GENERATED IMAGE IS MORE ACCURATE AND I HAVE THE ABILITY TO CHANGE AND PERFECT THE DESIGN. I HAVE A 3D VIEW OF MY UNIT AND CAN VISUALISE ITS FUNCTION BETTER THAN I COULD WITH JUST THE DRAWINGS I PREVIOUSLY EXCLUSIVLY HAD.

I ADDED MY OWN MATERIAL, WOOD (AN IMAGE) AND I ALTERED THE SIZE TO BE APPROPRIATE FOR THIS MODEL.

Prue Edmunds

▶ This student depicted the steps involved in devising a computer-generated three-dimensional model of her design.

Prue Edmunds

▶ A computer rendering presented as part of final design deliverables. The design brief required the design of a demountable housing option for homeless people in urban areas.

DIGITAL PRESENTATION

There are so many different varieties and versions of digital imaging software available that it isn't possible to discuss the functions of all of them in this book.

The two main types of digital design software you are most likely to use are vector-based and raster-based. Many bitmap and vector-based programs can be used together to create documents and presentations using both image methods. Examples are Illustrator (vector) and Photoshop (raster).

Image types

Vector images

Vector images are mathematically defined images that consist of lines and curves. Formed in programs such as Adobe Illustrator, CorelDRAW and Affinity Designer, vector images are sometimes known as object-oriented images. This is due to the ability to move and manipulate entire lines, shapes and curves independently of other image elements. Vector images are not affected by resolution and can be resized with minimal loss of image quality. Common uses for vector images are logos, symbols, illustrations and diagrams.

▶ This vector illustration of an apple renders smoothly at any size. No pixelation is evident even at large sizes or when zoomed in.

Raster images

Raster images (also known as bitmap images) use a grid (or raster) of small squares of data known as pixels to create images. The term 'pixel' is based on the words 'picture' and 'element', and refers to the smallest element of visual information on a computer monitor. Unlike the shapes, lines and curves of vector images, bitmap images can be edited pixel by pixel, or in groups of pixels. The most popular pixel-based editing program is Adobe Photoshop. Many bitmap and vector-based programs can be used together to create documents and presentations using both image methods. Software such as Adobe InDesign and Affinity Publisher can be used to create compositions made up of raster and vector images as well as text. InDesign also has vector capabilities.
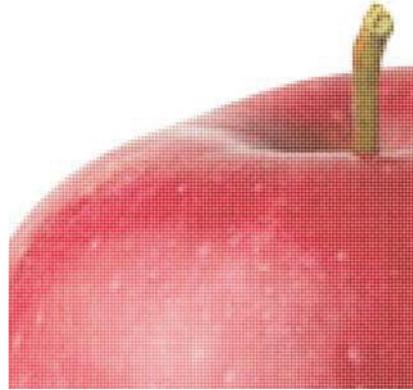
▶ This raster image uses pixels that create the image of an apple. At the right scale, images appear realistic but pixelation is evident when zoomed in.

MAKING THE RIGHT CHOICES

It is important to know the context in which your digital work will be used, so that you can plan ahead. You don't want to spend hours on an image, only to find that the resolution is not good enough to print or that your colour mode is incorrect.

Be aware of image sizes when downloading images from the internet to use in your design work. Make sure they are large enough to print them if you wish to. It is possible to adjust your image search to 'large' to find images of better quality. When downloading images, remember to attribute the source of your images (see Chapter 21 for information about copyright).

This table shows technical requirements for different types of printing.

Planned use*	Suggested resolution	Suggested colour mode	Suggested file format
Artwork for full-colour printing	300+ ppi	CMYK or PMS/ Spot colours	TIFF, EPS or PDF (or large, high-quality JPEG)
Black and white for printing	150+ ppi	Greyscale	TIFF, EPS or PDF (or large, high-quality JPEG)
Simple online graphics, such as icons and buttons	72–75 ppi	Indexed colour or RGB	GIF or PNG
Detailed, photo-realistic graphics, such as large images for use online	72–75 ppi	RGB	JPEG or PNG
Graphics for digital presentations, such as PowerPoint and Prezi	72 ppi	RGB	JPEG

*If you plan to have your design commercially printed, check with the printer or read their guidelines for artwork, to be sure of the appropriate file type.

Video

As with digital images, there are many software programs that assist with video editing, from simple editing tools on smartphones to complex and sophisticated tools for high-quality results. Video filming and editing is a large realm with extensive traditions and techniques well beyond the scope of this book, but designers still find it useful for a variety of purposes, including research gathering and communicating designs.

Often, the choice of software comes down to availability and price. There are many free apps and software options that provide tools for basic and effective motion graphics, animation and short-film production.

When editing video, key considerations are space for your files, software and accessories. However, as with any image production, beginning a project with good-quality footage is important as it reduces the need for post-production editing and effects. These are some useful rules of thumb for working with video:

+ Take as much footage as you can – it's easier to cut footage than re-shoot more later. Extra footage may enhance your narrative or extend the timeline of your film or animation.
+ If possible, use a tripod for stable filming. Handheld footage can be appropriate under some circumstances, but excessive movement can be unpleasant for the viewer.
+ Panning (turning while recording) and zooming (in or out) should be either slow and steady or quite rapid but not in-between. In general, it's better to move the camera slowly.

+ Wide shots are useful for establishing the scene – helping the viewer understand where they are and what they're looking at. Close and medium shots are effective at maintaining viewer interest, revealing action and detail.
+ Consider an appropriate soundtrack and ensure that it enhances the imagery.

▶ Screen capture from *Nelson Visual Communication Design* instructional video. Features such as text, lighting and sound adjustments can be added in post-production, after the video has been shot.

Guidelines for video

When creating video content, it is useful to understand some terminology. A frame of video is composed of lines. The more lines per video frame, the higher the image resolution. In digital video, the line is processed into pixels (known as samples or sample rate). The more pixels there are, the higher the quality of video (resolution) and the larger the file size.

In planning your video footage, it helps to have an idea of what you will be using the footage for. Adjustments to the quality and resolution of the footage can be made on the recording device.

Motion graphics

Motion graphics is a term commonly used in visual/graphic communication and digital design. It refers to short animations or videos that convey information such as a logo, title sequence or advertisement. Eye-catching and dynamic motion graphics are often created using the effects available in video editing software such as Adobe After Effects and Apple Motion. Software for 3D-modelling, such as Autodesk Maya, 3ds Max or Blender, is sometimes used for the creation of motion graphics to allow sophisticated movement through a virtual three-dimensional space and create two-dimensional imagery. Motion graphics are created from combining movement with sound effects, music, typography, shapes and patterns. Layers of video footage, combined with text and animation, are also features of motion graphics.

The table below shows guidelines for different types of video.

Planned use	Approx. file size of a 60-second clip	Pixel size (resolution)	Abbreviation
Large screen, high definition	128MB	1920 × 1080	Full HD
Large screen, high definition	90MB	1280 × 720	HD
Standard definition	26MB	640 × 480	SD
Hand-held device	7MB	160 × 120	QVGA

Kianna Davis

▶ A motion graphic (gif) of the identity for this podcast was created for an email promotion. Simple motion graphics can be embedded in a range of media and enable communications to be animated and eye-catching.

CHAPTER REVIEW

Complete the following tables in response to the design problems presented. An example has been provided for you below.

Example of physical low-fi prototyping	How might it be applied to the design process for a **primary-school sun hat** design?
Paper and card used to model the form of the hat	Depending on the scale it could be worn by students. You could shine a light on it to see the shadow cast. Opinion poll
Example of digital low-fi prototyping	How might it be applied to the design process for a **primary-school sun hat** design?
Use of a generative Ai fashion garment tool. img2img perhaps including school logo.	Opinion poll and feedback. Potential for quick refinement and further back-and-forth with client

1 In the design of a science wing for a secondary school, suggest how low-fi prototyping may be used in the design process.

Example of physical low-fi prototyping	How might it be applied to the design process for a **specialist science building** design?
Example of digital low-fi prototyping	How might it be applied to the design process for a **specialist science building** design?

2 In the design of a theft-proof travel backpack, suggest how low-fi prototyping could be applied during the design process.

Example of physical low-fi prototyping	How might it be applied to the design process for a **theft-proof travel backpack** design?
Example of digital low-fi prototyping	How might it be applied to the design process for a **theft-proof travel backpack** design?

3 In the design of an app for a fitness tracking device, suggest how low-fi prototyping might be applied during the design process.

Example of physical low-fi prototyping	How might it be applied to the design process for the design of an **app for a fitness tracking device**?
Example of digital low-fi prototyping	How might it be applied to the design process for the design of an **app for a fitness tracking device**?

STAKEHOLDER-CENTRED DESIGN

THE DESIGN PROFESSION

The role of the designer is that of a good, thoughtful host anticipating the needs of his guests.

Charles Eames, designer

In this chapter:

Learn the language:

+ architects
+ digital media
+ designers
+ fashion designers
+ graphic designers
+ industrial designers
+ interior designers
+ landscape architects

10.1 DESIGN INDUSTRY DYNAMICS

The breadth of the design profession, spanning architecture, digital media, fashion, graphic design, industrial design, interior design and landscape design, is characterised by distinct languages, traditions and influences. Design professionals, navigating various disciplines, adhere to best-practice processes to optimise their time, skills and resources.

Design is a dynamic and ever-changing field where professionals may find themselves working independently or collaboratively within cross-disciplinary teams. Some designers seamlessly blend disciplines, merging product and interior design, architectural and landscape design, as well as graphic and multimedia design. New design roles and job descriptions emerge with new technologies and social trends; for example, interaction design is a very new field.

DESIGN PROFESSIONALS

Freelance designers

Freelancers operate independently, often as one-person firms, acquiring work through direct client contact or short-term contracts with agencies or design firms. While relishing autonomy, freelancers manage not only their creative output but also the administrative aspects of their business.

▶   Freelance designers often work independently.

Design studios

Design studios vary in size and consist of house designers within collaborative teams led by a creative director or project manager. This structure fosters a creative network for idea flow, feedback and evaluation. Unlike freelancers, studio designers benefit from administrative support, allowing them to focus solely on the creative aspects of design.

▶   Fashion designers at work in their studio

In-house designers

Large organisations employ in-house designers, integral to the company's design tasks. Regardless of the organisation's primary focus, designers are crucial for material production, from promotional materials to employee training and shareholder information. While some projects are outsourced, in-house designers manage ongoing identity application and produce organisation-specific materials.

Despite diverse approaches, professional designers share commonalities in how they navigate key aspects of the design process.
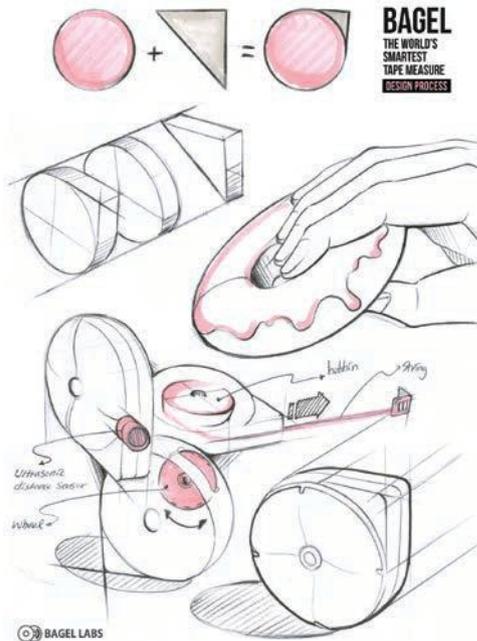

▶   In-house design team at Dyson reviewing a new prototype of a vacuum cleaner

Entrepreneur designers

Entrepreneur designers are a unique breed within the design realm, distinguishing themselves by taking on both the creative and financial aspects of their projects. Unlike traditional designers who may work for others or offer consulting services, entrepreneur designers not only conceive innovative designs, but also invest their own resources or secure funding to bring those designs to the market independently.

CASE STUDY ~ BAGEL LABS

Kickstarter-funded products enable investors to see the design process involved in a product design. Once fully funded, designers keep members up-to-date with progress on the development and manufacture of the product. The Bagel Labs is an example of a Kickstarter success. Based on their level of investment, Kickstarter investors were offered early access to the finished product on its release.

BAGEL
THE WORLD'S
SMARTEST
TAPE MEASURE
DESIGN PROCESS

BAGEL LABS

Organize Measurements
Speech to text for your tags

38.4 in
31.4 in
40.7 in

Analyze Size Data
Keep track of body size changes.

Timeline

June, 2015
Idea Formation
Design Phase

July, 2015
Sensor Development

October, 2015
First Prototype, First App

December, 2015
Second Prototype

January, 2016
Design Upgrade

February, 2016
MWC 2016 Debut

March, 2016
Third Prototype
Sensor Upgrade

April, 2016
Prototype & App Testing
Feature Additions

June, 2016
Final Prototype

KICKSTARTER

July, 2016
Small Batch Manufacturing
Second App, Certification

August, 2016
Mass Production
Final App

November, 2016
Delivery Complete !

Remote Mode
1" - 16' 4" // 0.3m - 5m

34.7

● **Built-in Laser Pointer**
Guides your remote distance measurements.

● **Standing Supports**
Helps you measure perfectly horizontal and vertical distances.

String Mode
0 - 9' 10" // 0 - 3m

12.5

● **Strong, Flexible String**
Made of Dyneema string that can withstand up to 112lb.

● **Safe for Everyone**
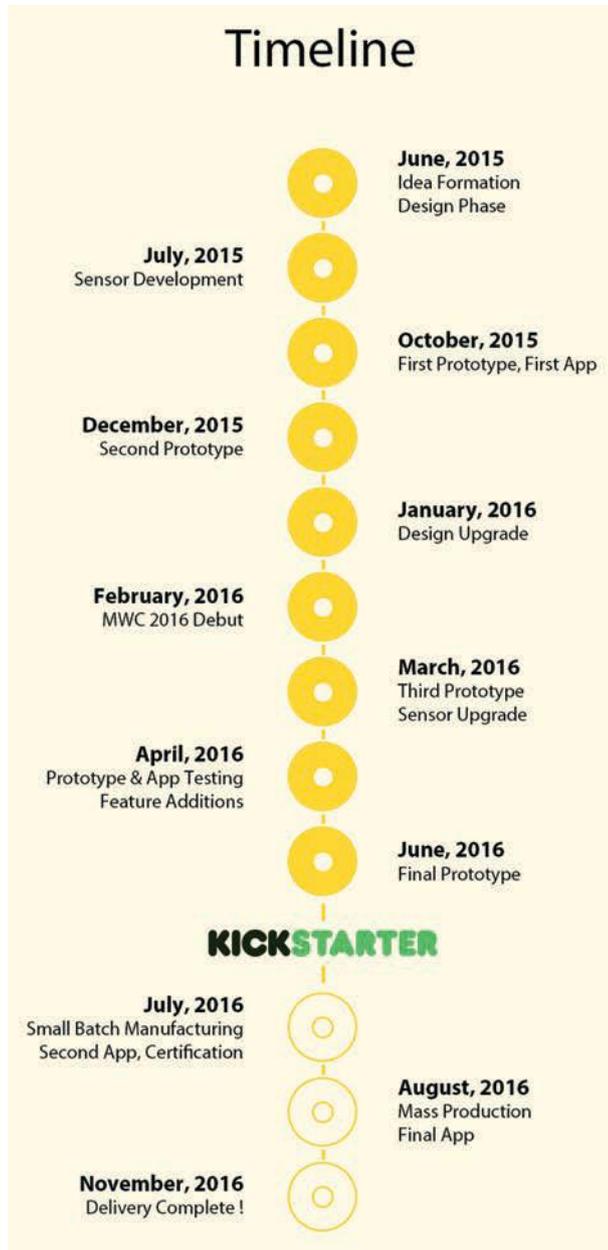No more cutting your fingers on metal tape edges.

Wheel Mode
0 - 32' 9" // 0 - 10m

● **Measure with One Hand**
Quickest way to measure length or distance.

● **Rolls on Any Type of Surface**
Great for measuring odd-shaped objects.

Bagel Labs, with permission

In the realm of entrepreneur designers, innovation is not only about aesthetics and functionality, but also about the sustainability and success of their ventures. Entrepeneur designers must be willing to embrace uncertainty, seek funding, and navigate the intricacies of the business landscape. The stories of entrepreneur designers often reflect a passion for their creations coupled with a determination to see their designs come to life in the marketplace.

CROWDFUNDING   **FYI**

Crowdfunding is a method of acquiring funds (venture capital) for the development of a product, idea or cause. Using small donations from multiple people, crowdfunding enables designers, inventors, entrepreneurs and social activists to pay for the time, labour and technology required to produce a proposed product. Kickstarter and Pozible are just two of many sites that enable designers to post concepts seeking financial support. Not all concepts are successful, while others far exceed their initial fundraising target. Supporters who donate are usually offered incentives, including discounted products, credit or acknowledgement of their donation.

PROFESSIONALISM AND ETHICS

Professional associations for designers, both in Australia and internationally, serve as entities dedicated to promoting and advocating for design. These organisations play a vital role in establishing codes of ethics, fostering networking opportunities, and offering support to designers throughout their professional journeys.

Organisations such as the Australian Institute of Architects, the Design Institute of Australia, and the Australian Graphic Design Association are instrumental in providing designers with valuable information, advocacy and guidance. Members of these professional associations adhere to a mutually agreed-upon code of ethics, typically encompassing professional behaviour, good business practices, and relationships with stakeholders.

For an in-depth exploration of these ethical standards, refer to Chapter 21.

10.2 TYPES OF PROFESSIONAL DESIGNERS

ARCHITECTS

Jodie Johnson/Shutterstock.com

▶   An architect-designed, contemporary Australian house

Creating comfortable living spaces has a rich history, dating back to ancient civilisations. Architectural and environmental design has evolved over time, reflecting cultural shifts and historical changes. Grand religious structures, castles and modern skyscrapers, for instance, symbolise the influence of religion, power and corporate success in different eras.

We still draw inspiration from ancient designs, such as domes and arches pioneered by ancient Greece and Rome, later refined during the Renaissance. Today, architects shape our environment, responding to client needs, locations and climates. Technological advancements and new materials continually influence the form and function of structures.

Designing environments involves ongoing innovation and experimentation, with designers navigating changing materials, styles and urban-planning priorities. The public nature of this field means designers often face scrutiny not only from clients, but also from the broader public.

The professional body for architects is the Australian Institute of Architects. In addition, membership of a state-based architecture board, such as the Board of Architects of Queensland, is a legal requirement for the use of the term 'architect'.

'Building designers', also known as 'drafters' or 'draftsmen', also design buildings but are not required to have qualifications in most states and may not refer to themselves as 'architects'.

Architects, scope of work

Architects balance form and function, designing diverse structures from homes to skyscrapers. Focused on sustainability and innovation, they use elements, materials and design principles to create visually stunning and functional spaces. As conceptual thinkers, architects tackle design challenges practically and creatively, guiding projects from start to finish.

Skill sets of architects

In university, architects learn about materials, the environment and design principles. Hands-on studies, including sketching, are crucial. Early design ideas are visualised through drawing before embracing digital tools. Graduates may specialise in residential, commercial or public-space design (civil). Effective communication with clients and collaboration with specialists enhance architects' success. Many university courses run for seven years (comprising undergraduate and masters degrees) with opportunities to gain industry practice.

▶ Brisbane's Southbank hosts many examples of architecturally designed public spaces.

Whom do architects work with?

Architects collaborate with various specialists to ensure their designs work well and look good. Cooperation with structural engineers is essential, while interior designers contribute to aesthetics. In urban projects, architects work with landscape designers to blend indoor and outdoor spaces seamlessly.

What resources do architects use?

Architects use tools from traditional sketching and advanced design software. They leverage technology for plans and visualisations, including 2D and 3D printing. Staying informed about materials, technologies and design trends is crucial through conferences, seminars and online resources. Familiarity with building standards and regulations is essential, and continuous research is vital for understanding human-centric factors and emerging architectural trends.

▶ An architectural computer rendering of a building design

Significant architects

Antoni Gaudí, Frank Lloyd Wright, Mies Van der Rohe, Eero Saarinen, Frank Gehry, Sir Norman Foster, Renzo Piano

DIGITAL MEDIA DESIGNERS

▶ Digital media designers use various computer programs to create their work.

Digital media design is a dynamic and evolving field that encompasses the creation of visual content for digital platforms. Digital media designers employ a combination of artistic and technical skills to craft engaging and interactive experiences, spanning graphic design, web development, interaction design, user interface (UI) design, user experience (UX) design, video game design and multimedia design. They use various software tools and technologies to convey messages, tell stories and enhance user interactions in the digital realm. With a focus on both aesthetics and functionality, digital media designers play a crucial role in shaping the visual landscape of websites, applications and other digital interfaces.

Digital media designers may choose to join the Design Institute of Australia or the Australian Graphic Design Association.

▶ Interactive maps in shopping centres are the work of digital media designers.

Digital media designers' scope of work

Digital media designers craft engaging digital and physical experiences across various platforms. They focus on creating visually appealing and user-friendly content, including websites, apps, graphics, and interactive and multimedia elements. Emphasising innovation and functionality, they use digital tools to communicate effectively and enhance user interactions. As creative thinkers, digital media designers address design challenges with a blend of practicality and imagination, ensuring their work aligns with contemporary trends.

Skill sets of digital media designers

In their university training, digital media designers develop expertise in graphic design, UI and UX design, animation and multimedia production. They engage in hands-on projects, employing sketching and digital tools for creative expression. Early design concepts are visualised through storyboarding and prototyping before transitioning to digital platforms. Graduates may specialise in web design, interactive media or motion graphics. Effective communication with clients and collaboration with developers and content creators are vital skills for success in this field.

Whom do digital media designers work with?

Collaborating with a diverse range of specialists, digital media designers ensure the seamless integration of their work into various projects. Interaction with developers, content creators and marketing professionals is common to achieve cohesive digital solutions.

Resources used by digital media designers

Digital media designers employ an array of tools, from traditional sketching materials to advanced design software, including Figma, Motion and After Effects. They utilise technologies for creating prototypes and visualisations, including 2D and 3D rendering. Staying abreast of technological advancements, they attend conferences, explore online resources, and engage in continuous learning to remain at the forefront of industry trends.

Significant digital media designers

William Beachy, Adelle Charles, Don Norman, Kevin Systrom, Laura Klein

FASHION DESIGNERS

▶ Australian designer, Bondi Born, showing their collection during the Australian Fashion Week in Sydney, 2023

Fashion design, a dynamic field heavily influenced by culture and aesthetics, goes beyond meeting basic human needs. It serves as a potent social tool, shaping identity, cultural background, age and gender. Creating clothes is not just about providing coverage and comfort; it sets trends, influencing preferences in colour, texture, styling and appearance. The extensive history of fashion reflects societal norms, religious and cultural influences, and practical needs.

Fashion design is a blend of material practice and a catalyst for social change. Historically, garments conveyed social standing and gender, with richly coloured fabrics denoting wealth. Women's fashion evolved with societal expectations, from restrictive corseted garments to the freedom of trousers during the suffragette movement.

Social and cultural expectations still influence attire choices, while individualism is expressed through fashion choices, defining wearers as belonging to a group, such as punks, goths or hippies. In a postmodern context, avant-garde and experimental fashions challenge traditional norms.

The professional body for fashion designers is the Design Institute of Australia.

▶ Fashion design team working on a prototype of a new design

Fashion designers' scope of work

Fashion designers bring garments and accessories to life, considering fabrics, structure, form and trends to create appealing products. High-profile designers showcase their work at seasonal fashion shows, while most designers work for retail-focused brands, designing for a broad audience. The demand for new designs has led to the rise of fast fashion, raising concerns about sustainability and consumerism.

Some designers work freelance or participate in the maker movement, creating and selling designs at markets and online. In addition to clothing, fashion designers may also create jewellery, headwear, footwear and accessories like wraps, scarves and undergarments.

Skill sets of fashion designers

Designers in fashion and textiles possess a diverse set of skills, and they come from all sorts of backgrounds. In these areas, fashion and textiles often blend, with many fashion designers creating their own fabrics, and textile designers making garments and wearable art.

Textile designers use both physical and digital skills to craft fabrics. They employ various methods like felting,

weaving, dyeing, knitting, tapestry, embroidery and printing (screen printing, wood- or linocut printing, and digital printing). Vector software like Adobe Illustrator is commonly used to create patterns, allowing designers to use tools in the program or scan images, artworks or textures.

Fashion designers, on the other hand, use different techniques to bring their designs to life. These techniques range from traditional machine sewing to embroidery, patchwork and even 3D printing. Fashion ideas often start with drawings, where designers use loosely executed lines, shapes and textures to convey movement and structure. While fashion illustrations capture the idea of a garment, fashion flat drawings are more practical, used for pattern making and manufacturing. These are straightforward drawings that show the detailing and structure of a garment in two dimensions. Designers can create these images using Illustrator or seek help from a specialist.

▶ Fashion designers use many techniques in their work, including digital programs.

Whom do fashion designers work with?

In creating garments and textiles, designers team up with various specialists. When designing garments, they collaborate with pattern makers to turn a sketched design into a pattern ready for cutting and sewing. Sample garments are stitched, or a toile is created to assess a design, usually by a sewing professional. High-fashion (haute couture) garments are often hand-sewn, sporting a hefty price tag. Most garments, however, are made in specialised factories, and designers build relationships with manufacturers who produce the final pieces.

To showcase their work for marketing and social media, designers may team up with photographers and stylists. Lookbooks, digital or printed presentations displaying current designs, are often professionally styled, photographed and printed. While designers may have a direct connection

with retailers, they are commonly represented by a fashion agency promoting various designers to retailers across Australia and internationally. Some designers also collaborate with social media influencers who, for a small fee or free products, spotlight designs to their followers.

WHAT IS A LOOKBOOK?

A lookbook is a curated collection of photographs showcasing a designer's latest creations or a specific fashion line. It serves as a visual portfolio that captures the essence, style and details of the clothing or accessories, presenting them in a cohesive and aesthetically pleasing manner. Lookbooks are often used for promotional and marketing purposes, providing a glimpse into the designer's vision and helping to convey the overall mood, inspiration and narrative behind the showcased designs.

▶ Fashion designers are sometimes highly involved in physically creating their designs as well.

Resources used by fashion designers

Fashion and textile designs are a bit like artworks: they draw from broad influences, shaped by individual designers and the production techniques they use. Designers depend on inspiration and imagination to ignite creative ideas for textiles and garments. Often, fashion designs explore past trends, adapting and transforming features from garments of decades past. Seasons play a role, influencing fabric choices and clothing styles.

Designers can be inspired by various sources, including trends, social change, street culture and contemporary issues. Some draw ideas from urban youth culture, spotting shifts in the cultural landscape and interpreting creative concepts sparked by music and social

media. The resources for inspiration are vast and may involve observation, trend forecasting and an analysis of popular culture.

Significant fashion designers

Yohji Yamamoto, Comme des Garcons, Martin Grant, Vivienne Westwood, Georgia Chapman, Spacecraft, Missoni, Jean-Paul Gaultier, Romance Was Born, Akira Isogawa

GRAPHIC DESIGNERS

The roots of graphic design, also known as communication design, can be traced back to the advancements in typography in 15th-century Europe. The invention of the printing press and movable type facilitated mass production of printed materials, revolutionising the distribution of written content.

However, the formal recognition of graphic design as a distinct practice emerged in the early 20th century. During this period, there was a growing emphasis on the composition and layout of books, posters and other printed materials. The professional standing of graphic design took a significant step in the 1950s when the design principles of the International Style influenced corporate logos, film posters and publication designs.

Esteemed designers like Saul Bass, Paul Rand and Milton Glaser, considered pioneers in modern graphic design, played a crucial role in establishing foundational elements and design principles. Their work, which included the incorporation of Swiss typefaces like Helvetica, utilisation of white space, and adherence to grid systems, continues to influence contemporary design practices.

There are two professional bodies of graphic designers, the Design Institute of Australia (DIA) and the Australian Graphic Design Association (AGDA).

▶ A graphic designer at work using a range of tools

Graphic designers' scope of work

Graphic designers specialise in manipulating type and images to craft a variety of graphical products for both print and digital media. Their projects encompass a broad spectrum, ranging from logos and corporate branding to packaging, posters, signage/wayfinding systems, publication design, website design and interactive multimedia.

Operating across business, government and not-for-profit sectors, graphic designers cater to a diverse clientele. Their work is inherently varied, presenting opportunities for innovative and creative design solutions. Notably, advertising and corporate branding stand out as key areas within the realm of communication design. Some design studios focus on branding, providing businesses and organisations with comprehensive design solutions tailored to their specific needs.

Skill sets of graphic designers

Tertiary institutions provide qualifications in graphic design and visual communication. These programs cover a range of subjects, including traditional print and digital media, typography, branding and identity design, 2D and 3D design, motion graphics, illustration and photography. Students have the opportunity to delve into design theory and analysis while acquiring practical skills.

Graphic designers often possess a diverse skill set, which they use in their professional careers. This includes proficiency in drawing, illustration, digital media and design software such as Adobe Illustrator, InDesign and Photoshop, along with expertise in motion graphics programs. Additionally, effective communication with clients and collaboration with other design professionals are valued skills in the field.

Whom do graphic designers work with?

While many graphic designers specialise in specific design areas, such as print or digital media, collaboration with specialist practitioners is common. They may function within cross-disciplinary teams or enlist the expertise of specialists to finalise design products. Collaborators may include printers, exhibition and display designers, multimedia specialists, website designers, game and animation designers, illustrators, photographers, sign writers, industrial designers and advertising art directors.

Many graphic designers have a close relationship with interactive and digital media design and often overlap into this area.

Resources used by graphic designers

Contemporary graphic designers heavily rely on computers for their design work. Although drawing remains integral, particularly during the early stages of visualisation and ideation, the primary tools include design software packages.

Designers frequently use tablets for digital input and editing of design ideas. Two-dimensional printing technologies play a crucial role in proofing final artwork. Additional resources found in a graphic designer's toolkit include Pantone colour swatches for precise colour selection, cameras for research collection, and a library of books and magazines documenting contemporary trends in global design.

▶ Graphic designers use Pantone colour swatches to ensure the colour accuracy of their designs.

Significant graphic designers

Milton Glaser, Deborah Sussman, Saul Bass, Paula Scher, Stefan Sagmeister, Vince Frost, April Greiman, Michael C Place (Build), Katherine McCoy, Von Glitschka, Stephen Banham

INDUSTRIAL DESIGNERS

Industrial design (also known as product design) is an area of design established in the mid-19th century during the latter part of the Industrial Revolution. As a design discipline, industrial design can be traced back to the influential design movements of the early 20th century in Europe, including the Deutscher Werkbund and the Bauhaus. Members of both movements recognised that a formal visual language of function was overtaking the decorative designs of previous art and design movements (such as art nouveau). In the chaos of the First World War and its aftermath, designers identified a need for accessible, standardised, simple forms, and avoided the highly decorative and hand-built in favour of a streamlined machine aesthetic.

The alumni of the Bauhaus influenced design around the world and led to the development of the highly influential International Style, seen as most typical of the clean lines of modernist design. The characteristics of modernism still influence many contemporary industrial designs: the focus on function, the application of clean, clear forms and the innovative use of materials.

▶ The Eames chair designed by Ray and Charles Eames in 1956 is considered a design classic.

Architect and designer Dieter Rams, as chief of design at German company Braun, was highly influential in the design of consumer products. His modernist designs for shavers, audiovisual equipment and small domestic appliances were highly influential, and many are still in production today. Most famously, Rams defined 10 Principles of Good Design, which are celebrated as defining effective modern industrial design.

Industrial designers' scope of work

Industrial designers, concerned with both form and function, engage in creating diverse consumer and industrial products. This includes, but is not limited to, motor vehicles, consumer electronics, lighting, furniture, medical equipment, toys, recreational products, industrial machinery and watercraft. Prioritising sustainability and efficiency, industrial designers leverage innovative technologies, materials, and design principles to craft aesthetically appealing products. They are conceptual thinkers, adept at responding to design challenges in practical and creative ways.

The professional body for industrial designers is the Design Institute of Australia (DIA).
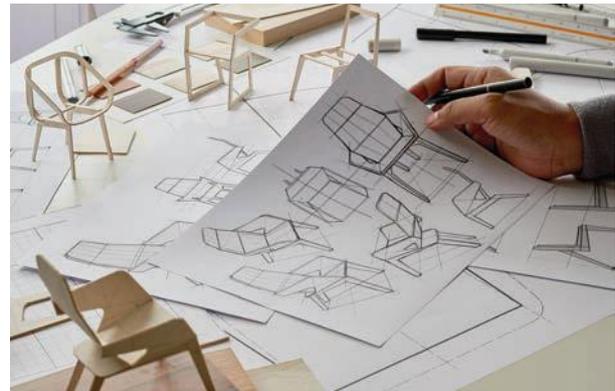
▶ An industrial designer using sketches and prototypes to design a chair

Skill sets of industrial designers

During university training, industrial designers acquire expertise in specialist materials, manufacturing processes, ergonomics and engineering. They engage in 3D design and drawing studies, using design sketching as a crucial part of their creative process. Visualising early design ideas through pictorial drawing methods, such as freehand perspective drawing, precedes the transition to digital media. Graduates may specialise in areas like automotive design, furniture design or lighting design. Generalists, on the other hand, possess the flexibility to design a wide array of products, from household appliances to gymnasium equipment. Communication with clients and collaboration with specialists are additional skills essential for an industrial designer's success.

Whom do industrial designers work with?

Industrial designers collaborate with a diverse range of specialists. While they possess a comprehensive

understanding of product functionality, they often seek expertise from others to ensure safety, functionality, durability and reliability. For instance, when working on a small domestic appliance like a blender, collaboration with electrical or systems engineers may be necessary to create an interactive interface. In industries like automotive design, engineers and industrial designers work in close partnership.

For professional projects, industrial designers may involve model makers to create prototypes, crucial for testing before the manufacturing process begins. In certain cases, 3D digital modellers contribute by creating digital representations of the final design.

What resources do industrial designers use?

Industrial designers employ a wide range of design technologies, including traditional tools like pencils, pens and markers for sketching, as well as sophisticated computer-aided design (CAD) software such as SolidWorks, Fusion360 and Rhinocerous 3D, and even virtual-reality conceptualisation tools such as Gravity Sketch. They use a wide variety of modelling materials and techniques, such as foam, wood and clay, as well as digital rapid prototyping technologies to explore and test design concepts.

Industrial designers must stay informed about innovations in materials and technologies to enhance the durability, sustainability and functionality of products. Accessing sample materials, attending conferences and seminars, and utilising online resources and magazines helps designers stay up-to-date on changes and trends. Familiarity with manufacturing standards, both Australian and international, is essential. Research is a vital component in understanding user-related factors such as ergonomics, interface design and aesthetic preferences.

Significant industrial designers

Eileen Grey, Raymond Loewy, Dieter Rams, Ray and Charles Eames, Marc Newson, Philippe Starck, Karim Rashid, Jonathan Ive, IDEO, Smart Design, Hilary Cottam

INTERIOR DESIGNERS

Interior design is a creative discipline that revolves around the strategic enhancement of interior spaces to meet both aesthetic and functional objectives. Interior designers possess a unique skill set, combining an eye

for design with a keen understanding of spatial planning and human behaviour. Their work spans residential and commercial environments, where they conceptualise, plan and execute designs that optimise the use of space, materials and decor. Interior designers work collaboratively with clients, architects, contractors and other specialists to create harmonious and purposeful interiors. Interior design is sometimes confused with interior decoration, which has a much narrower domestic scope, rather than commercial scope, and does not require a tertiary degree.

The professional body for interior designers is the Design Institute of Australia (DIA).

Pinkystock/Shutterstock.com

▶ Interior designers combine an eye for design with a keen understanding of spatial planning and human behaviour to create spaces.

Interior designers' scope of work

Interior designers engage in a multifaceted scope of work, encompassing the conceptualisation and execution of interior spaces. This includes residential homes, commercial offices, retail establishments and hospitality venues. They assess clients' needs, preferences and functional requirements to develop design concepts that enhance the aesthetic appeal and functionality of interior spaces.

Skill sets of interior designers

Interior designers develop a diverse skill set that includes proficiency in spatial planning, colour theory, materials selection and knowledge of design software. They engage in hands-on studies, employing sketching as a vital part of their creative process. Visualisation of early design ideas through drawing methods precedes the transition to digital media. Graduates may specialise in residential, commercial or public space design.

▶ Interior designers often use sketching methods first, before moving to digital tools.

Whom do interior designers work with?

Interior designers collaborate with a variety of specialists to ensure the seamless integration of design elements. They work closely with architects to align interior spaces with the overall architectural vision. Collaboration with contractors, furniture suppliers and craftsmen is essential during the implementation phase. Effective communication with clients is paramount to understanding and translating their vision into a well-executed design.

Resources used by interior designers

Using a mix of traditional and digital tools, interior designers employ sketching materials and design software, such as AutoCAD and Revit, for visualising and communicating design concepts. Some interior designers employ virtual-reality tools to help their clients visualise design concepts. They stay abreast of design trends, materials and technologies through attendance at conferences and seminars, and the exploration of online resources and magazines. Familiarity with building codes and regulations is pertinent, and ongoing research is vital for incorporating emerging trends into their designs.

Significant interior designers

Elsie de Wolfe, Kelly Wearstler, Philippe Starck

LANDSCAPE ARCHITECTS

Landscape architecture stands as a distinctive field, weaving together art, science and nature to shape outdoor environments. It's essential to differentiate between landscape architecture and landscape design. While both share a commitment to enhancing outdoor spaces, landscape architecture has a broader scope. Landscape architects engage in the strategic planning, design and management of extensive outdoor areas, including urban planning and ecological considerations. On the other hand, landscape design typically involves smaller-scale projects and focuses more on the aesthetics and functionality of residential gardens or specific outdoor spaces.

The professional body for landscape architectures is the Australian Institute of Landscape Architecture (AILA).

▶ Landscape architects use traditional sketching equipment alongside sophisticated design software.

Landscape architects' scope of work

Landscape architects, blending both form and function, engage in crafting diverse outdoor spaces. Their work spans residential gardens, public parks, urban spaces and more. Prioritising sustainability and innovation, they use various elements, such as plants, materials and design principles, to create aesthetically pleasing landscapes. Landscape architects address design challenges practically and creatively. From initial research to the final implementation, they aim for effective and visually appealing outdoor environments.

Skill sets of landscape architects

During university training, landscape architects acquire expertise in plants, materials, environmental considerations and design principles. They engage in hands-on studies, using sketching as a vital part of their creative process. Visualising early design ideas through drawing methods precedes the transition to digital media.

Graduates may specialise in residential, commercial or public space design. Communication with clients and collaboration with specialists, such as horticulturists or irrigation experts, are additional skills essential for a landscape designer's success.

Whom do landscape architects work with?

Landscape architects collaborate with a diverse range of specialists, seeking expertise to ensure the functionality and aesthetics of outdoor spaces. For instance, collaboration with horticulturists or environmental experts may be necessary for the selection of plantings. In urban design projects, collaboration with architects or civil engineers may be essential to integrate outdoor spaces seamlessly into the overall design.

What resources do landscape architects use?

Landscape architects employ a range of tools, from traditional sketching materials to sophisticated design software. They use various technologies for creating plans and visualisations, including 2D and 3D printing. Staying informed about innovations in plants, materials and technologies is crucial, and is achieved through attending conferences and seminars, and researching online resources and magazines. Familiarity with environmental standards and regulations is essential, and ongoing research is vital for understanding human-centred factors and emerging trends.

Significant landscape architects

André Le Nôtre, Lancelot Brown, Gertrude Jekyll, Thomas Church, Michel Corajoud

David Wall/Alamy Stock Photo

▶   The Cairns foreshore redevelopment: landscape architecture has a huge impact on the nature and quality of the outdoor lifestyle that Australians love.

CHAPTER REVIEW

1   Find an example of a significant designer for each design area listed in the table below. Collect an image that depicts the style and characteristics of their work. Describe the skills, specialists, materials, legal considerations etc. that each designer may have been required to address during their design process.

Design area	Designer	Design example (include source)	What professional skills has the designer applied in the design process?	What specialist practitioners or colleagues might the designer have worked with?	What legal or ethical considerations might have affected the designer?
Architect					
Digital media designer					
Fashion designer					
Graphic designer					
Industrial designer					
Interior designer					
Landscape architect					

2   Consider all of the types of designers and create a list or a mind map that describes the common skill sets they all use to be successful.

3   Jobs such as web designer and interaction designer have emerged only recently. Can you think of design jobs that may emerge in the future?

DESIGN PROCESS MODELS

There is nothing more marvellous than thinking of a new idea.

Edward de Bono, *Serious Creativity How to Be Creative under Pressure and Turn Ideas into Action*, Random House 2015

In this chapter:

Learn the language:

+ deliverables
+ design brief
+ design problem
+ design thinking
+ empathise
+ experiment
+ ideate
+ problem frame
+ systems
+ test
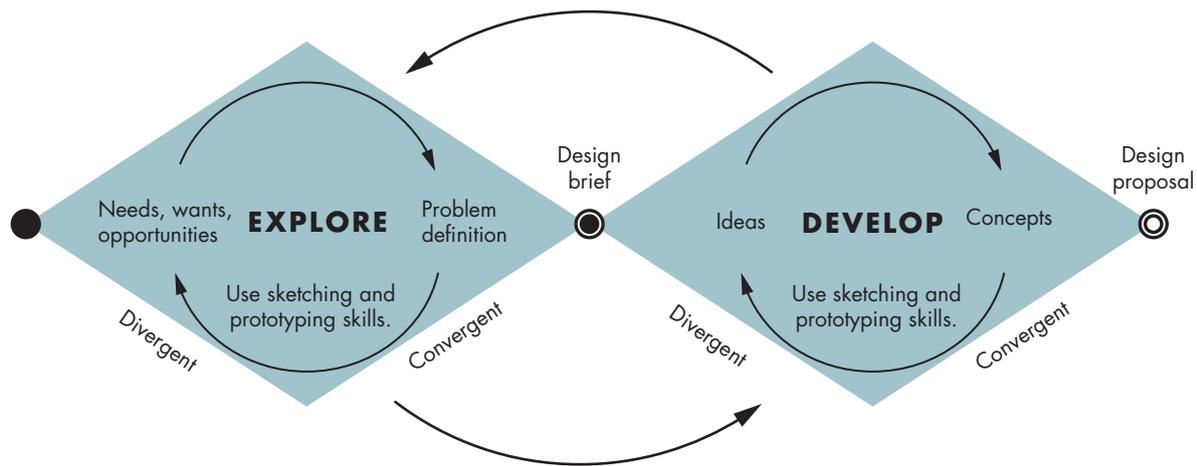
Design 2025 v1.1 General Senior Syllabus, p. 12. Design 2025 v1.1 General Senior Syllabus © Queensland Curriculum and Assessment Authority (QCAA).

▶ The QCAA design process features two distinct phases and is based on the Design Council Double Diamond model (2015).

A design process is like a creative roadmap that helps solve problems in an imaginative way. It's not a straight line; it's more like a cycle that repeats. It starts by figuring out what needs to be designed, either from research or talking with stakeholders about their needs and wants.

As you go through this cycle, you gather information about what the client wants, what the end user needs, and the purpose of the design, considering any limits or rules. This information shapes the direction of your design thinking.

Different design processes exist, but they all have similar steps. They use various phases to come up with, develop and create products or solutions.

11.1 THE DOUBLE DIAMOND

The design process used in the QCAA Design Syllabus is represented by a 'double diamond' and is based on a process established by the UK Design Council (2015). It is an iterative and cyclical process, rather than a linear or straight path.

The framework has two main parts: Explore and Develop. Thinking skills are used throughout to help come up with ideas and make decisions.

Imagine each part of the process like a diamond shape. The narrow parts of the diamond show where we focus on specific ideas and information (convergent). The wider part shows where we explore lots of different, big ideas and concepts (divergent).

On the Double Diamond model, you'll see arrows above and below the diamonds. These show how the two parts are connected. As you use this process, you'll see it's like a cycle.

The Explore and Develop parts work together, and you'll go back and forth between them. Remember, the design process isn't a straight line. It needs research, careful choices and creative flexibility.

EXPLORE PHASE

The Explore phase involves:
+ identifying stakeholders or design opportunities
+ analysing existing designs, needs and wants of stakeholders or design opportunities to identify aesthetic, cultural, economic, social and technical influences
+ defining design problems
+ using sketching and low-fidelity prototyping skills to represent information.

In the Explore phase, designers define what problem they need to solve. Sometimes, a client comes with a clear need, and designers use this phase to understand and identify what the client wants (or what they think they want). But not all stakeholders can explain their needs and wants well, so designers must interpret and analyse information to gain understanding. Designers may also see a problem or need that a client hasn't identified and develop innovative ideas on their own.

Our initial understanding of the design problem can be hindered by assumptions and prior experience. This can prevent us from seeing new, innovative solutions, so an important part of the Explore phase is questioning assumptions – ours, the clients and the users. This ability to see a design problem from a fresh perspective is very valuable. Often clients and users are too close to do this, conditioned by familiar ways of thinking and operating.
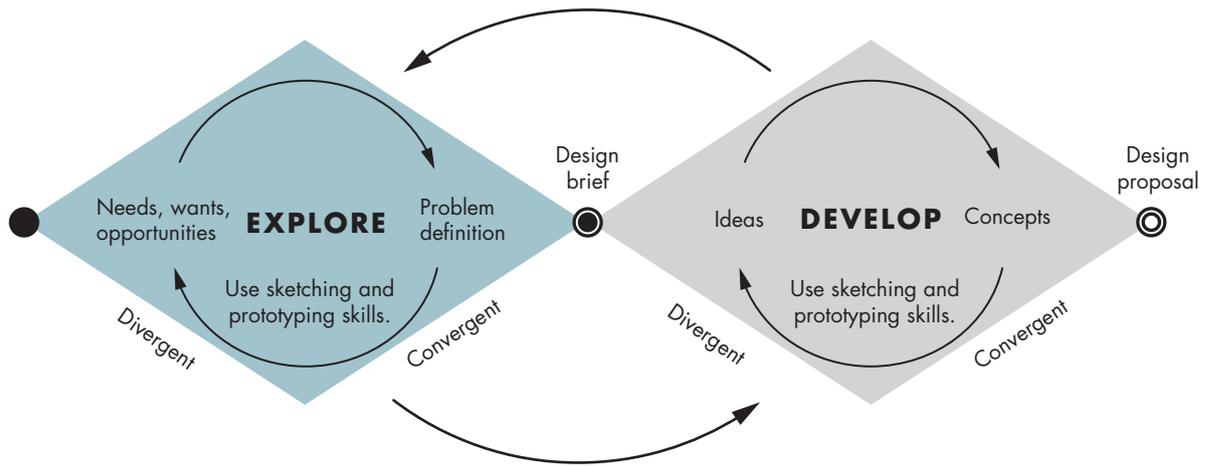
In the Design course, you might get a clear assignment that skips some parts of the Explore phase. But there will be times when you will find and explain design problems yourself. The Explore framework, with its investigative, creative and analytical approach, helps you do that effectively.

DESIGN BRIEF

The ultimate purpose of the Explore phase is to produce a clear articulation of the design problem, its high-level goals, objectives and constraints in the form of the design brief. The process of doing this is known as framing the problem. An analogy to this is a photographer composing a photograph – what they include and what they leave out has a great bearing on the outcome. What the designer includes within the problem frame limits the possible range of solutions they may explore. This makes for a careful balancing: frame the problem too wide and there might be too much to explore; frame the problem too tightly and innovative solutions might be excluded.

FRAME THE PROBLEM

An important part of the teacher's role in guiding design students is helping them find a suitable way to frame design problems for the given circumstances (available time being one of the most important).

Remember to unpack assignment tasks and question everything of interest on task sheets.

Design problems can range in scale from the small, such as a brochure design for a gourmet grocery store, to the very, very large, such as the design of an Olympic stadium or hospital precinct comprising many buildings. Using the knowledge gathered in the Explore phase, the design brief should offer an insightful and clear understanding of the design need and identify the key stakeholders.
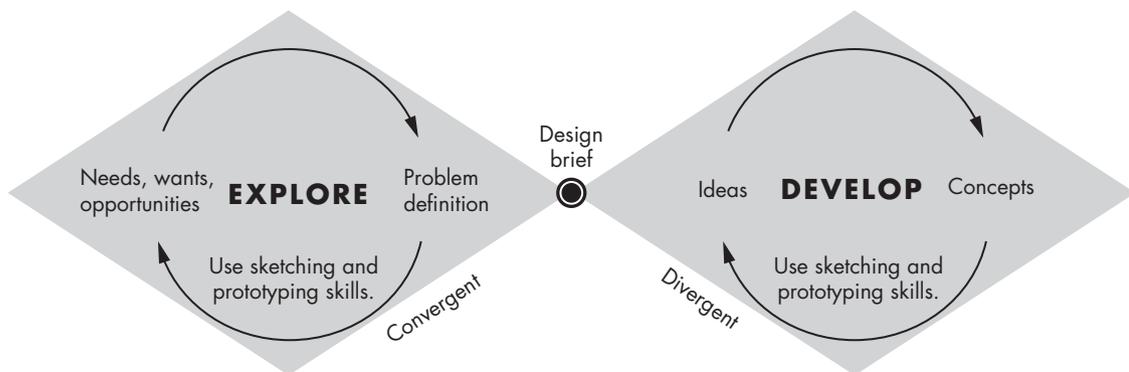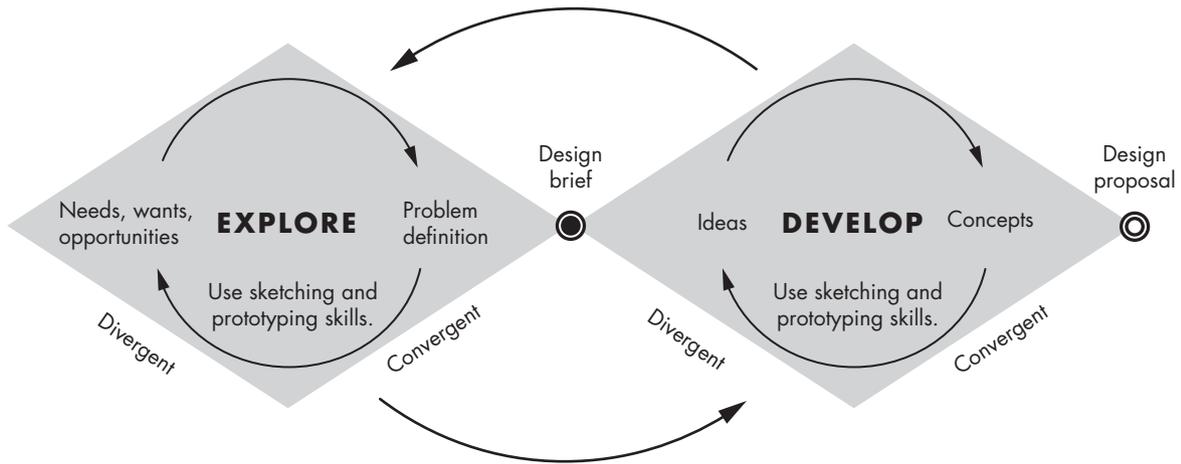
A design brief will usually include:

+ a design problem that relates to real-world needs, wants and opportunities
+ open-ended language that does not specify solutions at this early stage
+ the identification of stakeholders
+ information about aesthetic, cultural, economic, social and technical features
+ constraints
+ specific design criteria
    – related to quality of design ideas and concepts
    – relevant to meeting stakeholder requirements
   – in reference to principles of good design
+ a written format.

> For detailed information about the content of a design brief and techniques for writing an effective design brief, see Chapter 14.

DEVELOP PHASE

The Develop phase involves much of the creative initiation and exploration of ideas. Using the information gathered during the Explore phase, including research and stakeholder information, various ideas are proposed under the label of development. An experimental approach followed by informed and thoughtful decision-making propels creative ideas towards suitable design solutions.

The Develop phase involves:

+ devising ideas using sketching, low-fidelity prototyping skills and divergent thinking in response to the design problem
+ using convergent thinking to make refinements based on evaluation of ideas against the design criteria
+ proposing a design concept that best meets the design criteria.
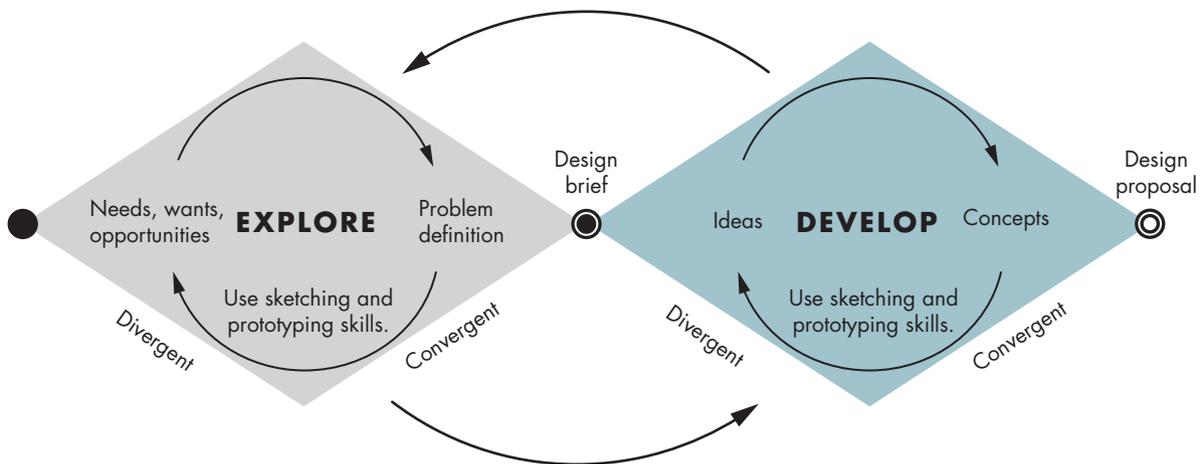
DESIGN PROPOSAL

The design proposal is the culmination of the Double Diamond design process. It is the opportunity to convey the findings and solution(s) that best meet the needs identified after the Explore phase. Using visual means to convey the attributes and features of the design, the proposal is supported with written or verbal presentations that communicate how the final concept meets the original design need(s).

The design proposal:

+ shows evidence-based decision-making about the most appropriate design solution

+ is presented in the visual form that most effectively communicates the design
+ is suited to the needs of the stakeholders, including client and target audience/end user
+ may include drawing/illustration and prototypes
+ is supported with written and/or spoken information.

> ● ● ● For a more detailed examination of the design proposal and possible formats for presentation, see Chapter 6.

ENGAGEMENT

Connecting the dots and building relationships between different citizens, stakeholders and partners

DESIGN PRINCIPLES

1. Be People Centered
2. Communicate (Visually & Inclusively)
3. Collaborate & Co-Create
4. Iterate, Iterate, Iterate

CHALLENGE

Discover   Define   Develop   Deliver

OUTCOME

METHODS BANK

Explore, Shape, Build

Creating the conditions that allow innovation, including culture change, skills and mindset

LEADERSHIP

11.2 DESIGN THINKING FOR EDUCATORS

Variations on the design process exist in many professional and educational contexts. Increasingly, versions of the process are used by organisations and corporations to encourage innovation and creativity. The phases of the design process lend themselves to problem-solving in a wide range of circumstances, and in varying professions. Understanding how others apply the design process can assist you in seeing the power and potential of the framework. Getting to know alternative visual representations of the process and the language used to describe each phase will support your understanding of the iterative nature of best design practices.

IDEO

One of the leaders in the application of a design process to solve diverse problems is IDEO. A prominent design firm based in the United States, IDEO was at the forefront of the expansion of design thinking into education and into non-design-related industries and organisations. Renowned for their innovative design solutions for many recognisable brands, IDEO also facilitates collaborative, global design initiative (OpenIDEO) and focuses on design thinking. One of the most successful design-thinking/design-process models supported by IDEO is contained within 'Design Thinking for Educators' created by Tim Brown; it is commonly used in schools and organisations.

The IDEO process is notable for its visual representation of the breadth of each design stage. The diagram on page 161 shows how each step helps guide users along divergent and convergent paths. The process encourages broad and open thinking during two of the significant phases. It also illustrates how each phase blends into the next.

The stages of the IDEO design process

Discovery

This stage relates to the identification of a design problem or need. It involves verbalising the challenge ahead and documenting constraints that will affect the design. Research during this phase develops a deep understanding of the end user and their needs.

Interpretation

While the Discovery phase involves gathering information, the Interpretation phase is focused on organising that information. Using techniques such as affinity diagrams and questioning, possible starting points for ideation are established.

Ideation

Ideation involves brainstorming and generating diverse and unfiltered ideas.

Experimentation

This phase is directly linked to the Ideation phase. Experimentation challenges the designer to prototype and test ideas. Feedback gained during this phase helps to define the final direction of the design.

Evolution

This phase sees the strongest design idea introduced to stakeholders and developed into a refined concept. A pitch is used to finalise the idea and move towards production or implementation.

> **IDEO**
>
> Visit IDEO's website to read case studies where their design-process model has been applied. Their website contains detail on the application of design thinking to a range of identified problems.

11.3 *THE FIELD GUIDE TO HUMAN-CENTRED DESIGN*

In 2009, IDEO created a resource called the *HCD Toolkit*, showing how human-centred design can make a big impact on social issues. It quickly became popular with designers, entrepreneurs and social innovators.

In April 2015, IDEO took things a step further with an exciting update called *The Field Guide to Human-Centered Design*. This guide is the newest addition to IDEO's tools, aiming to share the power of human-centred design with the social sector.

The field guide is a book featuring 57 design methods, essential mindsets that shape how IDEO believes design can change lives, useful worksheets, and real-life case studies. It was made possible by the support of over 1300 backers in a Kickstarter campaign that exceeded its goal almost threefold.

The work of the field guide on human centred-design is an extension of the IDEO design process and focuses upon ways to connect to human needs and wants, continuing the focus to enhance the lives of impoverished and vulnerable communities through design.

11.4 STANFORD D.SCHOOL

Established in 2005 at Stanford University in California, the Hasso Plattner Institute of Design was originally part of the university's school of engineering. It is more commonly known as the 'd.school'. Its function is to encourage innovation and ideas outside the constraints of traditional academic structures. The d.school curriculum is based on the design-thinking process. As the d.school fact sheet explains, the design thinking process:

> draws on methods from engineering and design, and combines them with ideas from the arts, tools from the social sciences, and insights from the business world. The process provides a glue that brings teammates together around a common goal: make the lives of the people they're designing for better. Design thinking is best learned by doing, and our classes immerse students in an experiential learning environment. Students cycle rapidly through a series of steps:

> observe, brainstorm, synthesize, prototype, and implement; repeating as necessary. We focus on the design process because we seek to equip our students with a methodology for producing reliably innovative results in any field. Our focus is on creating innovators rather than any particular innovation.

> Source: the d.school: The Hasso Plattner Institute of Design at Stanford – Fact sheet 2012.

The Stanford d.school model for design thinking follows similar frameworks, but offers explicit opportunities for deep thinking, collaborative practices and decision-making.

The notable difference between the Stanford model and other design-process visualisations is that it does not convey the breadth of each phase. However, the model is designed to work in unison with prompts and guidelines provided by the school.

STANFORD D.SCHOOL

Visit the Stanford d.school website for more information and to download helpful documents for applying the design-thinking process. Download the helpful 'Bootcamp' document and 'method' cards to help build your repertoire of design-thinking tools.

Weblink
Stanford d.school

The components of the d.school model are divided as follows:

+ *Empathise:* This phase relates to understanding the user of the design. One of the main areas of exploration by d.school is user-centred design.
+ *Define:* Using the information gathered from the Empathise phase, the Define mode is where the design problem is explicitly identified.
+ *Ideate:* This is the divergent phase of the d.school model, where ideas are generated and innovative, unfiltered and creative ideas are devised. This is described as 'going wide'.
+ *Prototype:* Still in the creative space, prototyping enables others to see the results of the ideation phase. Whether presented as brainstorms, models or printed concepts, prototyping brings ideas into the physical world.
+ *Test:* The test mode of the d.school model allows for evaluation. Feedback is encouraged to prompt changes and refinements that move a concept closer to a resolved solution.

11.5 DESIGN MINDS

Developed through research by the State Library of Queensland, Queensland University of Technology and Queensland Government Arts Queensland, Design Minds is an online platform created to support the growth of design education in Queensland schools. The Design Minds model offers a flexible set of prompts rather than a distinct framework, which differentiates it from other process-focused and linear models of the design process.

+ *Inquire:* This mode encourages research, the identification of a problem, the development of background understanding of stakeholders, and setting objectives.
+ *Ideate:* This is related to brainstorming, generating ideas and devising various solutions to a problem. This mode encourages experimentation, risk taking and play.
+ *Implement:* This mode is related to testing ideas, prototyping and communicating a result.

Design Minds is a 2018 Good Design Award® Winner in the Digital Design category.

State Library of Queensland
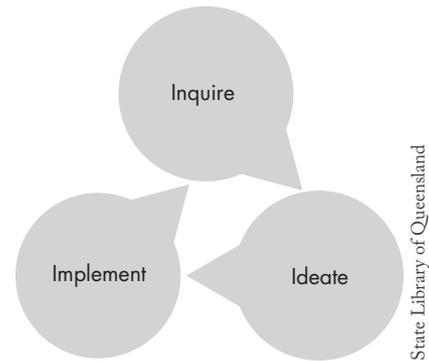
▶ Design Minds design-thinking model

DESIGN MINDS

More information can be found at the Design Minds website, including applications within the classroom and collaborative links with the Smithsonian Cooper Hewitt Design Museum in New York.

Weblink
Design Minds

CHAPTER REVIEW

1   Create a simple diagram, illustration or cartoon that explains clearly the difference between divergent and convergent thinking.
2   Using the table provided, explain in your own words the application of thinking, drawing and prototyping that occurs at stages of the listed design processes.

Process	Phase	What thinking techniques might be applied during this phase?	What drawing techniques (where applicable) might be applied during this phase?	What prototyping techniques (where applicable) might be applied during this phase?
Double Diamond	Explore			
	Design brief			
	Develop			
IDEO design process	Discovery			
	Interpretation			
	Ideation			
	Experimentation			
	Evolution			
Stanford d.school	Empathise			
	Define			
	Ideate			
	Prototype			
	Test			
Design Minds	Inquire			
	Ideate			
	Implement			

3   Choose a design problem and create your own design process that would work best for that design problem. Use words and diagrams to communicate convergent and divergent thinking within your process.

DESIGN FEATURES

CHAPTER 12

Design is a plan for arranging elements in such a way as best to accomplish a particular purpose.

Charles Eames

In this chapter:

Learn the language:

+ appropriation
+ aesthetic–usability effect
+ cultural awareness
+ economic
+ function
+ technical

Design features, in simple terms, are aspects that should be considered when designing a solution. Different terms are used to describe design features – this term is a taken from the senior design syllabus. Considerations vary in importance across different design projects. For example, the economics of a disposable cup may be far more important than its visual (aesthetic) appeal, whereas the reverse may be true for a fashionable ball gown.

The features in this chapter are not a complete list for each design, but you may find benefit in considering them in your assessment responses. The word 'features' can also be used to mean a distinctive attribute of something. ('This smartphone *features* a wide-angle lens').

DESIGN FEATURES

In this chapter the term 'design features' is used when thinking about aspects that affect the success of a design. In the QCAA Design Syllabus, the term 'design factors' is used in the same way as 'design features' in the designing of an object ('What cultural factors are important in this design brief?'). If you're struggling to understand the 'factors' in the context of a design assignment, try substituting another word such as considerations, facets, aspects, criteria or influences.
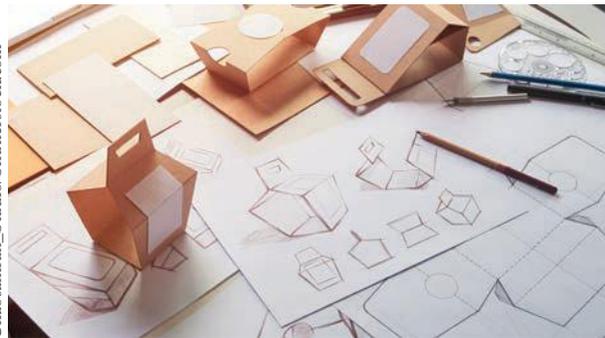
▶ This design for packaging includes a handle, which could be described as a design feature.

12.1 AESTHETIC

The experience of products, objects, visual messages and environments heavily feature in user decisions. Aesthetic preference is a major factor when choosing designs. Aesthetics is the impact a design has on the senses, a well-designed object using principles like harmony and balance is naturally more appealing. Aesthetic factors are crucial to successful design and it's more than just how something looks – aesthetics consider how a design impacts on all of the senses. For example, the experience of walking through a magnificent cathedral includes not just the visual grandeur of the architecture, but also the echo of your footsteps, the smell of incense and candles and many other things you might not even be aware of. According to author and researcher Don Norman *(The Design of Everyday Things),* truly good design balances beauty and functionality. Emotion plays a significant role in design, triggering either a negative or positive effect. Positive effects are steeped in emotion, creating an intuitive response. These findings underscore the importance of good human-centred design practices, especially in stressful tasks. Minimising distractions, bottlenecks and irritations is crucial. In pleasant situations, people tend to be more tolerant of minor difficulties, emphasising the need for a balance between aesthetics and usability in design.

Aesthetics are important in design. Adhering to the 10 Principles of Good Design, as articulated by Dieter Rams, is a good place to start (refer to Chapter 15). Although users may not be aware of aesthetic adjustments made by designers, it is important to make smart aesthetic decisions to ensure the effectiveness of a design product.

▶ The aesthetic–usability effect. Products that users find visually attractive are often perceived to be more functional. Positive feelings about a product can lead to patience, affection and loyalty towards a brand.

TRENDS

Trends strongly affect various social groups, shaping our preferences and choices. Designers, through platforms like social media and magazines, establish fashions and trends that influence what we buy and when. The lifestyle associations of products guide our purchasing decisions, influencing what we wear, drive and use. Alluring and desirable images presented in design can direct consumer choices. Recognising and responding to design trends is a significant aspect of the business. Users often seek the newest designs, leading the market to swiftly meet their demands.

Many design areas, like fashion, textiles and interiors, experience rapid seasonal shifts in colour, styling and theme. These cycles can change quickly, making last month's fashion lose its appeal next month. Social media, especially blogging, has a visual impact on what's considered fashionable. Designers stay updated through reading, expos, conferences and observing cultural shifts. Innovative designers often set trends in motion. Though trends emerge more slowly in architectural design, changing preferences affect material applications, colours and textures.

FASHIONABLE COLOUR!   **FYI**

Colour forecasting is big business. Professionals working in fashion, interior design, product design and manufacturing often begin the design of a concept many months – and even years – in advance. Predicting colour trends is therefore very important to ensure that a design is relevant and marketable in the future. Companies such as Pantone, Edelkoort and Fashion Forecast Services provide clients with reports that analyse trends in fashion, accessories, textiles, paint colours and furniture.

12.2 CULTURAL

In the global market, cultural differences have a significant impact on design decisions. Designs that work well in one culture may not be suitable in another because of varying cultural or religious sensitivities. For instance, the meaning of symbols like the 'thumbs up' gesture can differ between Western countries and some Middle Eastern societies. Even if designers are unaware of where their design will be used, it's their responsibility to ensure that it respects

Retro AdArchives/Alamy Stock Photo

▶ Well-known Australian actor Chris Hemsworth endorses a Hugo Boss fragrance. This advertisement and products are successful through the aesthetic appeal of the bottle, clothes and an aesthetically appealing model. In the history of the Hugo Boss clothing range, aesthetics has played a large contribution to design, as with much of the fashion design industry.

diverse cultures and does not cause confusion or offence. This highlights the importance of designers having a solid understanding of the end user. The appropriateness of culturally sensitive imagery is often determined by the location and audience of a design. Sensitivity to cultural factors, such as the symbolism of colours in different cultures or the use of religious and cultural symbols, is a crucial trait for designers to develop. The goal is to create designs that resonate positively across various cultural contexts, fostering inclusivity and avoiding unintended misunderstandings.

PANTONE® and other Pantone trademarks are the property of Pantone LLC. PANTONE Colors may not match PANTONE-identified standards. Consult current PANTONE Fashion, Home + Interiors Publications for the accurate color.

▶ Pantone releases a 'Colour of the Year' that reflects current trends in design, fashion and interior architecture. This illustration shows all Pantone colours of the year from Cerulean in 2000 (bottom right) to Ultra Violet in 2018 (top left).

APPROPRIATION OF IMAGERY

Cultures change over time, partly through learning from other cultures. For example, in Chapter 14 we discuss styles that were influenced by various cultures. However, the use of imagery and cultural symbols in design is a growing concern for creative professionals. In design, borrowing visual elements from other cultures and transforming them into something new can lead to exciting new approaches. However, wholesale copying or duplication without regard to cultural sensitivities, often for superficial or commercial purposes, is often highly problematic and is known as 'cultural appropriation'. Insensitive appropriation of elements, blind to their meanings and importance to another culture, may be offensive and lead to backlash. The most effective designs recognise cultural shifts, avoiding outdated and counterproductive stereotypes. Respectful representation of cultural, gendered and social imagery is an ethical consideration, particularly with educated and aware consumers.

In Australia, appropriation of Aboriginal and Torres Strait Islander cultural imagery lacks respect in some retail environments. Unattributed use of textiles, patterns and artworks persists despite legal protection. Specific cultural protocols govern the use of Indigenous images, with some material considered sacred and gender-specific. Designers must consult and research cultural constraints to use Indigenous imagery appropriately.

CASE STUDY ~ TRACY WISE

Walking along Laverton Creek [in Victoria] one day, Tracy Wise, a proud Barkindji Ngiyampaa Maligundidj woman, saw an eel, it was not in the creek, but high above her in the sky – what looked to be an image of an eel as the clouds. It was slowly floating there for a while, then it eventually melted away, and it put her in mind of using her creative talents to make something eel-related, such as an eel-trap. 'It got me wondering about the traditional people who may have lived along the creek and caught eels for their meals,'

Tracy says. 'So, I went on a whole new journey of learning about the eel and the traditional people of this Country.' Tracy's explorations with creativity in recent years have been rich and rewarding, with a strong spiritual foundation underpinning her interests and connecting her to nature and Country, walking along the lands of the Boon Wurrung people (as Tracy later discovered), where she usually goes for the bird life. 'I am a real cloud person,' says Tracy, 'they mimic the ocean … the swirls are like rip curls, they are connected in that sense to the sea with its circular currents; and clouds, of course, produce water.'

Embarking on Blak Design, she pursued the eel theme with great curiosity, with her other desire being to make jewellery – something she'd always wanted to do. She went into it with great passion, continuing to see eels in clouds, as well as in road signage and on roads, and in stencilled artworks on the road along Flinders Lane [Melbourne] to warn motorists of a hump and to slow down. 'As a spiritual person I observe everything through my travels, so I was very open to what was appearing before me,' she says. 'There was a lot of trial and error when I got started but the concept sat in the space of knowing and creating and using the skills being learnt. Then, my creative flow was unlocked thanks to the talented co Blak Designer Lorraine Brigdale, who shared her knowledge with me; there and then I started weaving an eel trap with natural grass material found on the campus and wire. I'm a natural wire weaver.' The act of weaving, she says, is a spiritual practice that brings deep connection.

Tracy's work reflects the cycle of an eel's life. This entails the creature moving between the sea, estuaries and freshwater. It starts at the egg stage, with spawning happening in the sea, then progressing to larvae, to

Jahgany by Tracy Wise (Barkindji Ngiyampaa Maligundidj)

'glass' eel (baby) and elver stages, to juvenile and adult eels making their habitat in freshwater. Freshwater eels can live from 25 to 35 years, with the female living longer than the male. Tracy's work includes small swivels, doubling as eggs, larvae forms and more mature eel shapes. She has interwoven brass wire with natural grass, and the necklace incorporates an eel-trap shape that can be adjusted to trap the neighbouring eel inside. Many components were made with the lost-wax process, casting wax-modelled shapes into sterling silver. Tracy's research for the pieces was underpinned by reading stories about eel-related practices among various groups. The Wurundjeri and Boon Wurrung people, for example, have traditionally gathered along the Birrarung (Yarra River) to mark the Iuk (eel) season, while the Gunditjmara World Heritage–listed Budj Bim Cultural Landscape includes the famous eel trap system at Tae Rak (Lake Condah) for trapping, storing and harvesting kooyang (eel), a practice that has been dated back thousands of years. And the Bundjalung people have a creation story of the giant eel Jahgany, who created three islands along the Clarence River. A highlight for Tracy was when N'arweet Carolyn Briggs AM visited the Blak Design workshop and, looking at Tracy's work, explained how the eel was part of her own Boon Wurrung culture; Tracy encouraged her to try on the eel jewellery, which she did. 'I had been worried and concerned about being culturally inappropriate by using the eel and when I found there was a Dreamtime story, it made me feel better that I could do the eel trap; then Aunty Carolyn came along and it all made sense. It was meant to be.'

Source: *Layers of Blak* catalogue, Koorie Heritage Trust, 2022, pp. 132–3.

12.3 ECONOMIC

Economic considerations play a pivotal role in shaping design decisions and outcomes. Economic design features encompass various factors tied to financial considerations that significantly influence the design process. These factors include budget constraints, cost-effective material choices, production efficiency, and market trends affecting pricing and demand. Designers must navigate these economic aspects to create design solutions that are not only aesthetically pleasing but also feasible within budgetary constraints and economically viable for both production and consumption. Understanding and integrating economic design features are essential skills for designers seeking to balance creativity with practicality in a world where financial considerations often shape the success of a design.

Design is deeply influenced by the society it serves. Economic downturns, like the Great Depression in the 1930s, affected industries and jobs, leading some manufacturers to embrace streamlined designs to attract consumers with limited spending power. During wartime, governments prioritise essential production, redirecting factories and materials. In the Second World War, designers adapted to scarcity by developing designs using alternative materials, later influencing postwar domestic products. The postwar boom saw the emergence of new materials like bakelite, a precursor to plastic, enabling innovative, cost-effective designs and contributing to the evolution of design processes.

The latter half of the 20th century witnessed a rapid surge in material development, driven by lower production

Mode Images/Alamy Stock Photo

▶ A range of legislation now exists within Australia relating to the use and distribution of disposable plastics. This is not unique to Australia and shows a change in the economic value of our planet changing over time.

costs and heightened consumer demand. Plastics, synthetics and automated manufacturing made products more affordable. The emergence of manufacturing giants like China has further amplified production at reduced costs, flooding the market with designed goods. Booming economies, higher incomes and consumer cravings for new products fuel the demand for swift design and manufacturing. However, the abundance of inexpensive products in the 21st century raises concerns about consumer waste and environmental impact. The retail landscape now offers an unprecedented variety of products, posing a challenge for designers to navigate market responses and business implications.

12.4 SOCIAL ISSUES IN DESIGN

Designers play a vital role in responding to the evolving needs and wants of society. They navigate the complex landscape of cultural sensitivities, ensuring that their creations align with the values and expectations of diverse communities. By understanding and embracing social diversity, designers can make informed decisions that contribute positively to societal development. Whether it's addressing pressing social issues, promoting inclusivity or challenging outdated norms, designers can effect change and shape a more responsive and culturally aware society.

When considering social influences within design, looking at the human drive to connect to one another and how that can relate to design choices plays a part in the success of designs.
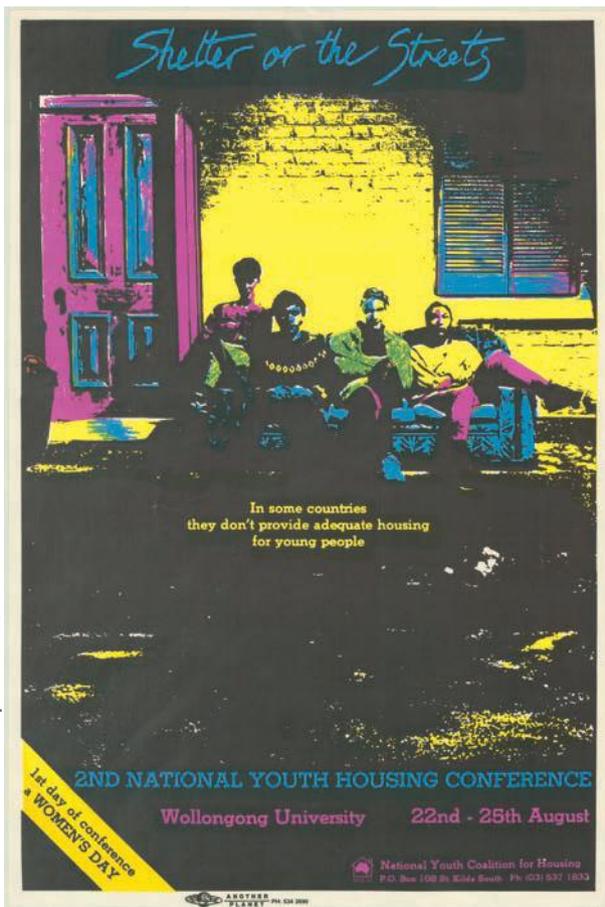
Shelter or the Streets: 2nd National Youth Housing Conference – poster by Julie Shiels for Another Planet Posters 1985. Source: State Library of Victoria, Accession no. H90.95/21

▶ Poster design and social issues have a long history. Used for promotion or protest, the most enduring poster designs that communicate social issues, dissent and opinion have traditionally been handmade. This poster for a youth housing conference in 1985 used photographic screen printing.

Societies are always evolving due to various factors impacting individuals, communities and the world. Design, as a reflection of society, can either embody or challenge social norms. Advertising, architecture, packaging and fashion often push boundaries, embracing what might be unacceptable in one context but embraced in another. Design shapes and reflects social values, and it can spark social change. However, cultural differences play a crucial role: what's acceptable socially in one country may not be acceptable elsewhere.

SOCIAL MEDIA

Social media has transformed the way we engage with designs. Platforms like design blogs provide immediate access to emerging trends and innovative designs, fostering a rapid exchange of ideas through shared images and links. The convenience of online shopping allows consumers to make purchases without physically interacting with products beforehand, expanding the reach and impact of design choices.

This shift in consumer behaviour has influenced designers in several ways. First, the accessibility of design trends on social media has increased the demand for unique and handmade products. Designers, in response to this trend, have shown a growing interest in creating items that highlight craftsmanship and a 'handmade' aesthetic. The appeal of these crafted designs, often showcased through online platforms, has contributed to the rise of a new design ethos known as 'new craft' or the 'maker's movement.'

Social media platforms have become spaces for designers to showcase their work, providing exposure to a global audience. This increased visibility encourages designers to experiment with diverse styles, techniques and materials. The instant feedback and engagement from online communities also play a role in shaping design decisions, as designers can gauge the preferences and responses of their audience in real time.

SOCIAL HOUSING

In design, architects often address social challenges like affordable housing and homelessness. Issues like emergency shelters, movable homes, and eco-friendly dwellings are tackled by designers. Those in environmental design deal with complex social problems like urban expansion, population growth and ageing housing. Balancing historic preservation with urban development can lead to legal and ethical challenges. Designs may need adjustments to meet planning rules, preserving heritage or blending seamlessly into historical locations.

▶ 'Future Shack' by architect Sean Godsell used a shipping container to create an adaptable emergency shelter that can be easily deployed to areas of need. Telescopic legs allow for rough terrain while the standard shipping container form enables rapid use and ease of storage.

12.5 TECHNICAL

This design feature in simple terms is about the way things work and how designs contribute to usefulness. If no consideration is given to the technical needs of a design, we can lose the purpose of a design as it provides little more purpose than an ornament.

Improvements in manufacturing, materials and design technology significantly influence the way things are created and how they serve a purpose. Technology's impact spans the entire design process, from the initial stages to the final product.

In the late 1940s and the 1950s, progress in materials technology, influenced by wartime advancements, extended into everyday life. Lightweight and durable materials like plastics became more accessible, allowing for the enhancement of various products. Lightweight materials transformed domestic appliances, making them more portable, affordable and user-friendly.

Industries make use of innovation and technological progress to boost output and efficiency. Manufacturing processes such as vacuum moulding and injection moulding have transformed product design, affecting everything from small appliances to automotive components. Electronic advances have replaced outdated production methods, with fibre optics, integrated circuits and silicon chips enabling the creation of smaller, more efficient products.

The application of digital technology, particularly computer-aided design, has revolutionised design development. What once took weeks to accomplish by hand can now be completed in a matter of hours or less using computer-aided design systems, allowing for swift and efficient concept creation, design and production.

▶ Wearable technology is an example of the rapid miniaturisation of powerful computers.

Constant technological advancements, from 'smart' fabrics to smaller processors, affect all aspects of design. These changes in technology influence how designs are crafted, driven by consumer demands for novelty and innovation.

Technology not only shapes design but also defines entire design disciplines. Motion graphics, animation and website design, for instance, have emerged from technological developments. The increased understanding of technology usage has given rise to professionals specialising in 'user-centred design', focusing on effective user interfaces and digital experiences. As technologies advance, new design disciplines may gain prominence.

Designers face significant challenges in this rapidly evolving technical landscape. Those who work in the public domain may find it challenging to control their creations globally on the internet. The emergence of 'citizen designers' – untrained users of design software – means that virtually anyone with a computer and internet access can create and share graphic products. Social media amplifies the rapid and potent spread of both good and bad design.

FUNCTION

Design's functionality, or how things work and serve a purpose, is a critical technical consideration. Functionality ensures that designs meet user needs and fulfil their intended purpose effectively. Designers focus on the practical aspects, focusing on user-centred design for effective interfaces and experiences, ensuring the functionality of a design remains key.

ajt/Shutterstock.com

▶ This egg beater has a specific purpose. The function of beating eggs manually is the main design feature.

SUSTAINABILITY

Design's impact on the environment has become a significant concern in the last 30 to 40 years. The demand for products, housing and electronics has led to ecological degradation due to manufacturing. Since the Industrial Revolution, factory-based production has been linked to pollution and waste. The by-products of manufacturing, if not recycled, contribute to large landfills globally, while post-consumer waste can pollute land and water.

Designers in various fields face government regulations, consumer demands and ethical expectations to reduce their environmental impact. However, designers also rely on governments to provide affordable and sustainable alternatives. In environmental design, professionals aim for energy efficiency, which influences material choices, construction methods and design. The changing view of domestic and commercial buildings has led to the integration of solar energy, water storage and passive energy use.

picture alliance/Getty Images

▶ Harnessing the power of the sun through solar panels is a sustainable form of energy.

ERGONOMICS

Ergonomics is a vital technical consideration in design – it is the study of how well products fit with human capabilities and needs. It ensures that designs are comfortable and easy to use, and promote user wellbeing. Designers prioritise ergonomics to prevent discomfort and enhance the overall user experience, considering factors like posture, movement and human dimensions. Incorporating ergonomic principles leads to user-friendly designs that align with the natural abilities and limitations of people. Whether it's the shape of a chair or the layout of a website, thoughtful consideration of ergonomics improves functionality, contributing to successful and user-centric designs.

tomeqs/Shutterstock.com

▶ This wireless computer mouse has been designed with ergonomics in mind. It has a vertical fin to prevent wrist pain and strain.

CHAPTER REVIEW

1   Effects of technology on design: Select two examples of similar products designed in different time periods, such as a television set from 1960 and a contemporary television set, or a 1920s telephone and a mobile phone. Compare and contrast the use of materials, and discuss how developments in technology have changed the designs for each product. Present your information in written format or as a digital presentation. To enhance your presentation, use iconography and illustrations in keeping with the periods studied.

2   Effects on social change: Investigate the effects of social change on visual communications. Select a key event in history and explore the use of visual communications during that time. Explain how social events had an impact on the content and appearance of visual communications of the time. Prepare a poster that illustrates and describes your research. Use images or freehand illustrations to display your findings.

3   Political design: Investigate the use of design in the political spheres. Research the use of design by governments and political organisations in Australia and overseas. Observe the use of design to promote ideas, or focus on electoral or wartime events. To present your findings, design a poster in a style that is typically used for political propaganda.

4   Cultural connections: Focus on one aspect of design (e.g. fashion, product design, graphic design or interior architecture) and investigate the influence of cultural and attitudinal change over time. Study the influences of popular culture (such as music, cinema and television) on design. Establish links between key cultural changes (e.g. punk in England during the 1970s) and your focus area of design (e.g. Vivienne Westwood and innovations in fashion). Present your findings in diagrammatical format or as a digital presentation.

5   Protest and dissent: Investigate the application of graphic design in times of protest and dissent. Select key historical events and analyse the use of design to convey issues and opinions. Collect visual materials from the past (e.g. anti-nuclear protest images from the 1980s and mid-1990s, women's marches, student rallies). Also seek out contemporary protest graphics and compare the content and style with earlier examples. Present your findings in digital format with visual examples or in the form of a protest graphic.

6   Appropriation and culture: Find examples of the appropriation of cultures in design including Aboriginal and Torres Strait Islander traditions. Analyse how imagery and symbolism, design aesthetics and iconography have been 'borrowed' for application in other contexts. Investigate the impact cultural appropriation has on communities and how it can be addressed. Research guidelines for appropriate use of cultural imagery and create a visual reference to assist designers in understanding their ethical (and legal) obligations.

STAKEHOLDERS

Socrates said, 'Know thyself'. I say, 'Know thy users'.
And guess what? They don't think like you do.

Joshua Brewer

In this chapter:

Learn the language:

+ audience
+ client–designer relationship
+ data
+ demographics
+ design brief
+ design problem
+ investors
+ mindsets
+ needfinding
+ needs
+ observation
+ target market
+ user

13.1 IDENTIFYING USER NEEDS, WANTS AND OPPORTUNITIES FOR DESIGN

A design solution is effective when it meets the needs of the people it is designed for. Designers refer to these people as 'users' or 'end users' (or other terms in specific design disciplines, for example, 'occupants' of a building.) Discovering what is good for users is a vital part of the Discover phase of the design process. Designers ask themselves: what do people need, what do they want and what opportunities do these create for design solutions?

Needs, wants and opportunities initiate and then drive the design process. They can be presented to a designer by a client, they can emerge from studying the users of designs, or they can be identified by the designer before or even during the design process.

Needs are often identified as essentials for living. Famously identified by Abraham Maslow in the 1940s and further developed in the decades since, Maslow's Hierarchy of Needs offers a visual representation of fundamental human requirements for living. Usually represented as a pyramid, Maslow theorised that human beings require lower level needs to be fully (or partially) fulfilled before being

Rawpixel.com/Shutterstock.com

able to focus on higher level needs (the narrow areas of the pyramid). Used in sociology and psychology, the levels of the hierarchy are increasingly seen as interrelated. A major study in 2011 identified that universal human needs exist across all cultures, but the order of importance within the traditional hierarchy was not set.

Although the most basic needs might get the most attention when you don't have them, you don't need to fulfil them in order to get benefits [from the others]. Even when we are hungry, for instance, we can be happy with our friends. They're like vitamins; we need them all.

Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. *Journal of Personality and Social Psychology*, 101(2), 354–356.

Self-actualisation
desire to become the most that one can be

Esteem
respect, self-esteem, status, recognition, strength, freedom

Love and belonging
friendship, intimacy, family, sense of connection

Safety needs
personal security, employment, resources, health, property

Physiological needs
air, water, food, shelter, sleep, clothing, reproduction
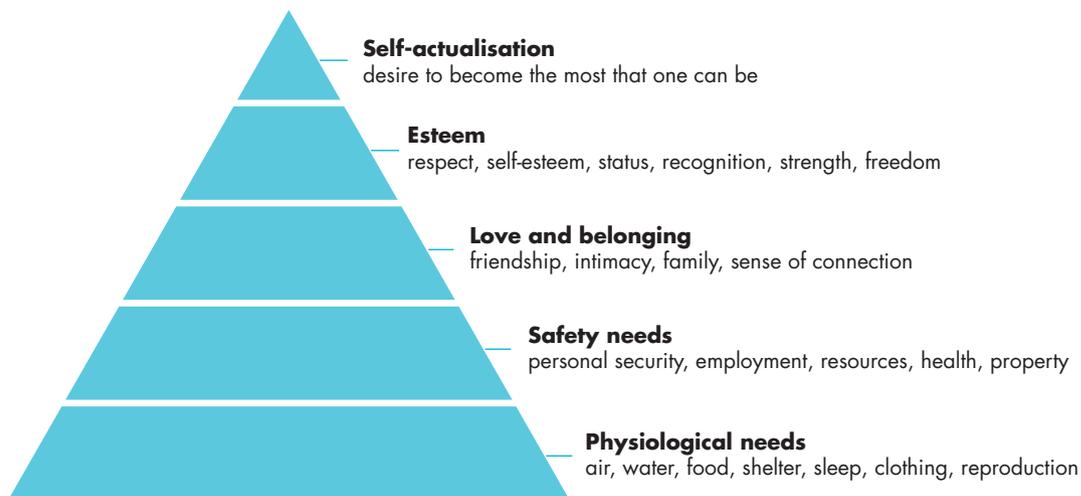
▶ Maslow's Hierarchy of Needs

STAKEHOLDER-CENTRED DESIGN

FYI

The Design Syllabus uses the term 'stakeholder-centred design' to encompass understanding the needs and wants of the people designers serve. If you're searching for more information on this philosophy, use the terms 'user-centred design' or 'human-centred design', which is explored in further depth in Unit 3.

NEEDFINDING

Designer Robert McKim from Stanford University established the concept of needfinding more than 30 years ago. He recognised that for designers to have the most impact on the development of a successful solution, they needed to be involved in the earliest stages of the design process (i.e. the definition of the design problem). He theorised that a designer's early involvement in identifying the need would assist in developing the most appropriate designs, because the designer would have a clear understanding of the end user's needs.

> Needfinding is the act of discovering people's explicit and implicit needs so that designers can create appropriate solutions.
>
> Dev Patnaik

In his significant book on needfinding, author Dev Patnaik provides example of users who were unaware of poorly met needs until they were provided with an alternative, more effective design. In these instances, the designer initiated the need because the audience or user was unaware of a better option. Patnaik sets out some guidelines for the effective identification of needs and suggests a range of thinking strategies that are familiar to designers and design students.

Observation of needs

The key to identifying a need is observation of the user or audience. When designers insert themselves into the environment inhabited by the user, they can gain a clear insight into how the user behaves and operates. Collecting data based on observation, which can later be added to brainstorming tools such as mind maps and affinity diagrams, means that information is relevant and authentic.

Needfinding enables a designer to devise concepts and responses using factual information rather than assumption.

Patnaik suggests six observational approaches to identify needs.

Watching Observe behaviours, interactions and responses.

Asking Ask relevant questions and listen carefully to answers.

Reflection Incorporate the data into design-thinking tools such as maps and diagrams.

Patnaik's six observations of need

Doing Participate in the actions of the user.

Reading Access data and statistics on the user.

Buying Use when the need is related to purchasing a product.

▶ Patnaik's six observations of need

Wants refer to the requirements or desires of a user/audience that do not qualify as essential but may still be seen as having high importance. The design of a luxury car, for instance, may fulfil the want of the target market who have high disposable income and a preference for the latest technology. Basic transportation may be a *need* but the user who *wants* a luxury car is influenced by a range of factors, including status, emotions, personal desire, personal reward and aspirational lifestyle goals. The wants of a client, user and audience are major drivers of the design industry. Consumption of goods and technology, and construction of housing and landscape are all important aspects of contemporary life in many countries and cultures. User wants have a major impact on the diversity of design, including:

+ preference for an appealing aesthetic
+ desire for latest technological advancements
+ an emotional response to a design
+ preference for the newest or latest trends, fashions and ideas
+ requirement for upgrading or enhancing existing products, constructions or technologies
+ preference for more efficient and sustainable designs
+ reliability and affordable/manageable maintenance of products, constructions and technologies.

Need

Access to fresh drinking water

↓

Want

Filtered water in portable containers, such as bottles. Preference for expensive, tall glass bottles, which are heavy.

↓

Opportunity

To design a water carrier that is appealing and stylish. Should offer a durable filtration system. lightweight, portable and visually sophisticated.
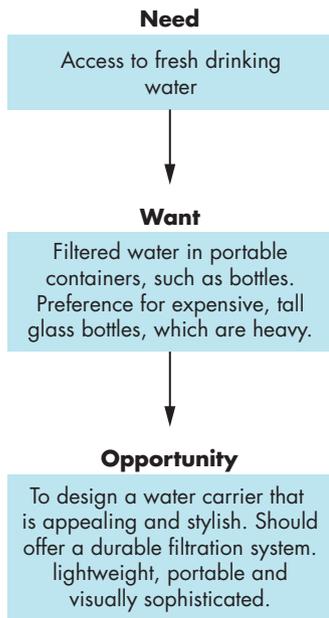
In understanding the end user and recognising the difference between needs and wants, designers discover opportunities. An opportunity may be a 'gap' in an existing market, a design that doesn't currently exist, or the redesign of a concept, product or construction.

ERGONOMICS

To learn more about OXO Good Grips and ergonomics, watch the video *Objectified: Smart Design OXO Good Grips Story* on the Smart Design channel on YouTube.

Weblink
Objectified: Smart Design OXO Good Grips Story

OXO Good Grips

▶ An example of needs and wants in combination, OXO Good Grips are a suite of domestic products originally designed for people with limited functionality in their hands, such as those living with arthritis who *needed* accessible kitchen tools. Interestingly, the success of the designs has been due to users of all abilities recognising the excellent ergonomic properties, which led to *wanting* a more comfortable product.

DESIGN MINDSETS

When designers seek opportunities for innovative design, they are often said to use a beginner's mindset. Mindsets are a design-thinking tool that encourage open-mindedness and help designers avoid preconceived ideas.

Examples of mindsets are shown below.

Apply a beginner's mindset	**Show, don't tell**	**Bias towards action**	**Embrace experimentation**
Approach a task with no prior knowledge.	Explore ideas through drawing.	Draw, make (prototype) and devise.	Be brave and unfiltered with ideas.
Forget what you think you know!	*Visualise instead of verbalise!*	*Don't just think. Do!*	*Apply SCAMPER etc. for creative risks.*

▶ Adapted from 'Design thinking bootleg', Hasso Plattner Institute of Design at Stanford University

13.2 STAKEHOLDERS

Stakeholders refer to individuals or groups who have an interest or concern in a particular product, service or environment. They can be directly or indirectly affected by the outcomes of the design and may include clients, employees, investors, customers, the community and others.

EXPLORE PHASE CONSIDERATIONS

Product, service or environment could easily be replaced with object, place or experience, or other terms that describe a design solution. Some terms create different meaning and expectation for different audiences. The Explore phase offers the freedom to consider a range of design disciplines.

In the context of design, a client is a specific type of stakeholder. The client is the individual or entity that initiates and funds the design project. They often have a direct interest in the project's success and are the ones commissioning the design work. While the client is a key stakeholder, other stakeholders may include end users, employees, regulatory bodies and the broader community.

The key difference lies in their roles: the client is the entity that commissions and funds the design, while stakeholders encompass a broader range of individuals or groups who are affected by or have an interest in the design outcomes. A successful design process involves considering and balancing the needs and expectations of various stakeholders, not just the client.

For many design projects, the client is not the end user, but this is not always the case. For example, when someone commissions an architect to design a family home for them, they (and their family) take the roles of both client and user (though the home may be sold and used by completely different people sometime in the future).

MANAGING STAKEHOLDER DEMANDS

There are usually conflicting demands between stakeholders – what may benefit one group may be a negative for another. For example, users of a smartphone may benefit from the most compact device possible, but this may make the device much harder for technicians to repair. A more obvious example is that a product with a high price may be more profitable for the client to manufacture and sell, but less attractive to potential purchasers. Designers know that finding ways of harmonising these conflicting demands is an important part of designing.

One example is to consider a school laptop program that offers students a laptop for a period of time and provides IT support to ensure that the laptop works effectively. The school provides learning resources for the laptop, and eventually sells the laptop to reduce the cost of the laptop to parents and students. Who are the stakeholders?
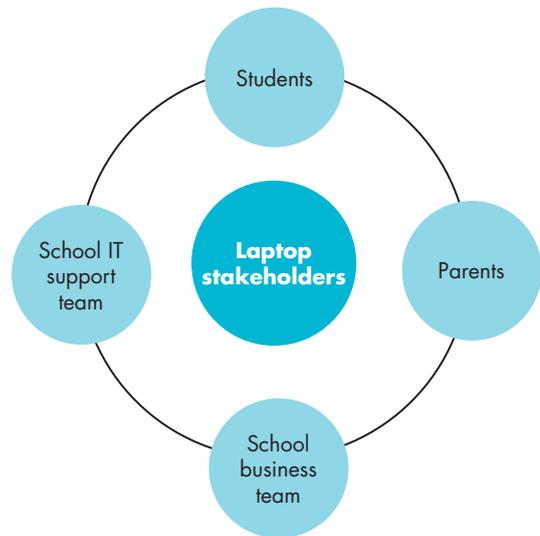
The most obvious stakeholders are the students who will use the laptop ('end users') and the school that will purchase them, and perhaps parents too, but there are other stakeholders as well. The school's IT department, who will distribute and service the machines on a daily basis, is also very important but there are many others who have a 'stake' in the design and qualities of the laptop, including the workers who will manufacturer and package, transport and distribute, and, eventually, collect and recycle the laptop.

We can (and must) go further and consider the biggest stakeholder of all – the sustainability of our planet. This is sometimes referred to as the 'triple bottom line' – people, profit, planet. Can we design something that is sustainable in all three areas?

FOCUS ON PRIMARY STAKEHOLDERS

It's important to note that the interrelated web of people, networks and resources is very complex and not something you need to worry about in your studies. Making informed design decisions about these factors is a task for teams of experienced professionals. As a design student, focus on the needs of your primary stakeholders, the people who will use your designs, but take a moment to ask yourself, 'Does the world need this new thing?'

13.3 THE CLIENT

The needs or wants of a client are often the initiator of the design process. In a professional design environment, a client may approach a designer or design firm with a design problem because they were recommended to the client, or because the client is interested in their previous work. Initial meetings take place to establish what the client sees as the design problem. At this stage, both client and designer can judge whether a suitable working relationship is likely. Some designers specialise in particular areas, so it is important to

determine at an early stage whether the client's requirements and the designer's expertise match.

Clients may have a limited knowledge of the design process, so the initial communication may facilitate discussions about cost, timing and possible design outcomes. At this point, a detailed written brief is developed. The brief identifies important details such as the audience or market, the design criteria, the function of the final design, any constraints – such as cost or timing – and the 'deliverables' or outcomes required of the final design.

Client input into the design process may vary, but generally, major interactions occur between client and designer at the start of the process and at key points, when feedback is required.

DESIGNING IN CLASS

FYI

Take your client's needs, wants and suggestions seriously, but also follow your teacher's advice. Your teacher will help you adjust the design brief as the project progresses to ensure it's manageable and relevant to your learning – neither too complex for you to complete in the time available, nor too simple to be challenging and interesting.
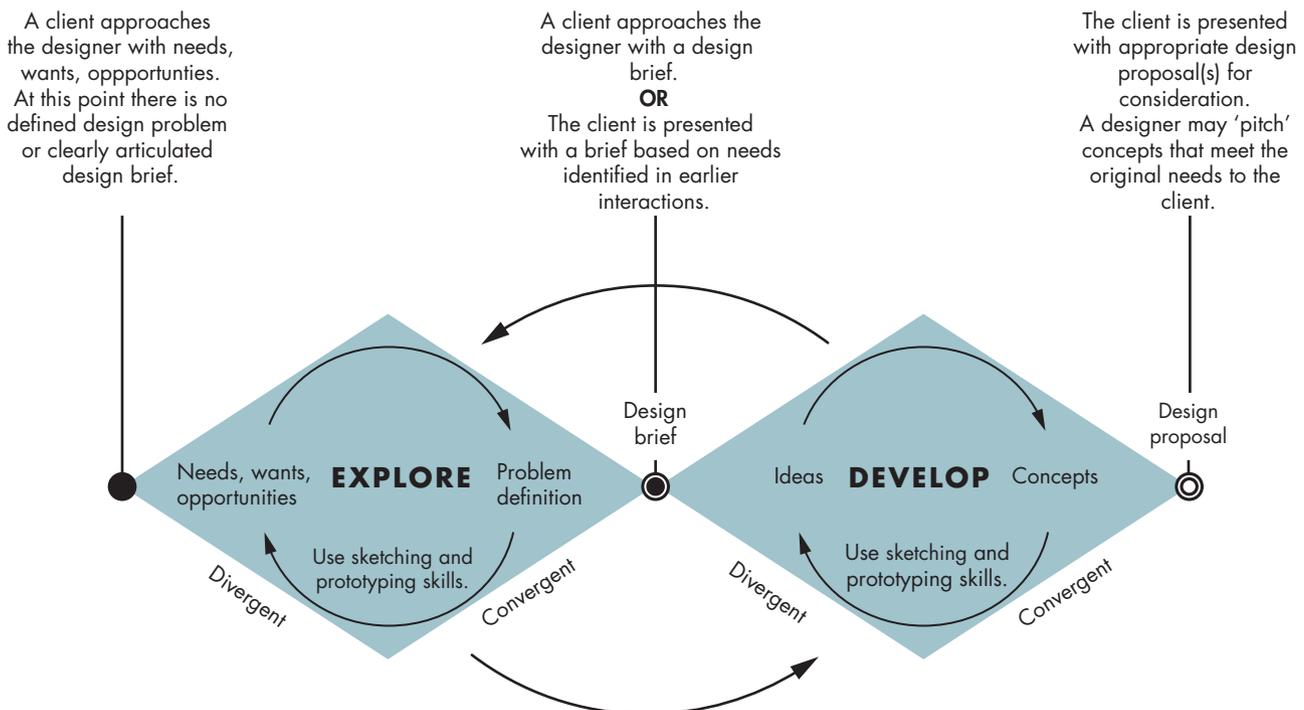
A client approaches the designer with needs, wants, opportunties. At this point there is no defined design problem or clearly articulated design brief.

A client approaches the designer with a design brief.
OR
The client is presented with a brief based on needs identified in earlier interactions.

The client is presented with appropriate design proposal(s) for consideration.
A designer may 'pitch' concepts that meet the original needs to the client.

Needs, wants, opportunities **EXPLORE** Problem definition   Design brief   Ideas **DEVELOP** Concepts   Design proposal

Use sketching and prototyping skills.

Divergent   Convergent   Divergent   Convergent

▶ Client–designer interaction mainly occurs at key points of the design process.

CLIENT–DESIGNER RELATIONSHIP: EXPLORE PHASE

Sometimes a client may approach a designer with only a vague idea or concept. An entrepreneur may have identified a need for an app design, an inventor may have a new product in mind, or a home owner may want to expand a residential living space. In these cases, the designer's role may be to assist the client in understanding the breadth of the design task. Key information about issues, including the viability of a new design product, its market appeal or affordability may be explored during the design phase. A research focus is central to this stage of the design process as the designer 'explores' the possibilities and design opportunities inherent in the original idea.

Designers and clients may discuss the feasibility of a project and use drawings and low-fidelity prototyping, such as rough paper models, to explain possible features and functions. The designer may also question the client on their vision for the design, their preferences in previous designs and investigate their design history. In the Explore phase, a research focus assists the designer to define the design problem and set the parameters of the design brief.

Increasingly, the designer may act as their own client, identifying a need and making use of crowdfunding or crowdsourcing technologies to fund the further development of the concept.

Key questions for client research

+ Who is the client?
+ What does the client do?
+ What is the size of the company or organisation?
+ What size is it perceived to be by the public?
+ What values is it perceived to hold?
+ What is the corporate culture perceived to be?

Designers will look at the design history of a company and establish the background of previous design work.

+ What are the existing graphical products used by the client?
+ Is there a corporate style?
+ What is the existing style or aesthetic?
+ How does the client feel about previous designs?
+ What other designs does the client like, both in and outside their field of interest?

CLIENT–DESIGNER RELATIONSHIP: DESIGN BRIEF

Client's seek design professionals because they need expert design help. Very rarely does a fully formed design brief originate from a client. However, a client such as an advertising firm or construction developer may be experienced in devising clear design briefs for various design areas. For example, communication designers who work in-house for organisations may be provided with a brief from another department to produce a publication or visual presentation.

For more detailed information about the content and construction of the design brief, see Chapter 14.

CLIENT–DESIGNER RELATIONSHIP: DEVELOP PHASE

There may be minimal contact with the client during the Develop phase of the design process as ideas and concepts are devised and tested by the designer or design team. When a clear design direction is identified, the client may be asked to provide feedback or indicate preference. Sometimes designers may present a client with several alternative ideas before advancing to the design-proposal stage. It is unusual for a client to have a hands-on experience of the design process, and results are often more effective when the designer can use skill and expertise to ideate and prototype the most appropriate design concepts. Throughout the Develop phase, the client voice remains constant via the design brief. The designer may refer to the brief at various times to ensure that development is within the boundaries of the original design parameters. Towards the end of the Develop phase and during the design-proposal stage, the designer may 'pitch' the design concepts to the client. A pitch provides an overview of the decisions made during the design process and identifies the connections between the original design brief and the final design proposal.

For more information on pitches, see Chapter 6.

CHAPTER REVIEW

1 Read the client description and design problems outlined in the table below and suggest what further information the designer would need before starting the design process.

Client need	Information needed by the designer
I am a plumber with a medium-sized and very successful business. I am looking to expand my business and set up a website that can be viewed on a range of devices, including mobiles/tablets etc. I want a uniform for the people working for me, signage on my trucks and branding of all of my promotional materials. My business is based in central Brisbane but we service other areas. We want to be highly visible.	
I am a business owner and I specialise in developing products for the home market. We sell a range of plastic products, including storage. We wholesale our products to large bricks-and-mortar retailers as well as popular online retailers. We want to develop a range of lunchboxes for families to use. We want to create storage options that can be interchangeable, and offer safe and secure storage for liquids and perishables as well as environmental sustainability.	
I am the mayor of the local shire and I am committed to encouraging the use of outdoor recreation areas and parklands in the region. I have established a committee to address issues around this and we require the design of a park/recreation area that incorporates activities and experiences for people of all ages to enjoy. There should be options for young children to play safely, but also for others to enjoy the environment. Some shelter should be included in the design.	

2 Define stakeholders for these situations.
   a   A sports facility supported by the local council that services the community but shares resources for both netball and tennis
   b   A pair of sunglasses for someone who is long-sighted
   c   A food court for a shopping centre
3 Consider whether these client requests for their designers are needs or wants.
   a   Single mother of two children: I'd like a house that provides an easy way to collect dirty clothes from everyone in the house.
   b   Car manufacturer: Design a car with the basic safety ratings to drive safely in the country where we sell the car.
   c   Chef: I'd like a can opener that can open cans in a range of sizes.
   d   Fashion model: It would be great to wear clothes on the catwalk that showed less of my body.

DEFINING A DESIGN PROBLEM

No design works unless it embodies ideas that are held common by the people for whom the object is intended.

Adrian Forty

In this chapter:

Learn the language

+ design criteria   + return brief

A basic brief including client and influences is provided for you.

▶   The Double Diamond design process

Design 2025 v1.1 General Senior Syllabus, p. 27. Design 2019 v1.1 General Senior Syllabus © Queensland Curriculum and Assessment Authority (QCAA).

14.1 DESIGN BRIEF

In relation to the Double Diamond design process, the design brief is created at the conclusion of the exploring process. Its purpose is to bring together the agreed-upon elements as a point of reference for the designer, so they have a clear direction before starting the Develop phase. This design brief, any constraints and design criteria can be reviewed with stakeholders, and confirm that the design project has a defined and mutually agreed purpose.

CONSTRUCTING A DESIGN BRIEF

It is only possible to create a good design when the design problem itself has been clearly articulated. Only after the identification of needs, wants and opportunities, and with comprehensive research material, can a design brief be fully formed. In most cases, the design brief is formed through discussions between stakeholders and the designer to establish the following details.

+   Client name
+   Explanation of reason for design requirement(s)
+   What are the design criteria for this brief?
+   Client's background and design history. List previous or existing designs.

+   List any non-negotiable inclusions, such as logo, corporate colours, branding and so on. These may also be listed as design criteria.
+   List any general client preferences for elements, such as colour, appearance, type and so on.
+   What are the client's expectations of deliverables?

To ensure that stakeholder (client) and designer have the same understanding of the design process and potential outcomes, many designers produce a return brief. Taking the information gathered from the client, the designer writes the brief as they interpret it and then asks the client for comment and agreement. This technique allows the designer to craft a brief from a design perspective; returning it to the client ensures that both parties have a clear understanding of the final design deliverables. At this stage, within industry, the brief may be signed and contracts exchanged, and the project formally commences.

CLARIFYING A DESIGN BRIEF

When you receive a design brief, it is important to 'unpack' the communication need, or needs, that you will be required to solve. Clarify the brief with a 'return brief' so that you, as the designer, have a clear understanding of the client's expectations.

return brief emma rickards

willoaks bed and breakfast
Lexie & Peter Rickards 31 Tetley's Lane Oxley Victoria 3678

Located at the gateway to North East Victoria's King Valley and close to the Milawa Gourmet Region, WillOaks Bed and Breakfast offers quality secluded ensuite accommodation with a beautiful vista to Mt Buffalo. Situated on the farming property of Peter and Lexie Rickards, two guest rooms are set in established gardens that surround the 1920's homestead, where gourmet breakfasts of local produce are served on the verandah during warmer months or by the open fire on cool mornings. Guests may choose to stay in either the Spa or Garden Room and are encouraged to sample the region's excellent array of food and wine establishments, including Brown Brother's Winery and Epicurean Centre, Pizzini's Winery, the Milawa Cheese Factory, Milawa Mustards, The Range Restaurant, Rinaldo's Restaurant, and the King River Café. WillOaks is located only minutes from the rural city of Wangaratta and is ideally situated for day trips to historic Beechworth, Glenrowan and Rutherglen, Paradise Falls, the picturesque town of Bright and the snowfields of Mt Buffalo, Mt Bullar and Mt Hotham.

Built around the original features of a small hut in which Peter slept as a boy, both guest rooms are tastefully decorated in warm tones and textures, with natural timber finishes and elegant colour palettes of green or blue complementing the rural landscape outside. Windows overlook the pond scattered with water lilies, the small vineyard or the surrounding paddocks where Angus cattle roam. Arrangements of fresh flowers from the garden and homemade biscuit selections provide sophisticated alternatives to the clichéd trappings of lace and doyleys often associated with bed and breakfast accommodation.

deliverables
> primary logo design
> final digital artwork for business card, 'with compliments' slip, and voucher
> final digital artwork for brochure incorporating text and imagery
> webpage design
> final digital artwork for signage displayed at property entrance

positioning
Visitors to WillOaks Bed and Breakfast seek to escape the busyness of every-day life and enjoy an accommodation experience that combines the warmth of rural hospitality with contemporary style and sophisticated flair. Peter and Lexie pride themselves on an ability to intuitively respond to the needs and desires of their guests, whether that be through the provision of plenty of privacy, or by accepting an invitation to join guests for a pre-dinner drink by the pond. Honeymooners, couples of all ages, groups of friends, small families, and those visiting the area on business regularly visit WillOaks, and often return again. Guests appreciate the secluded location, personal touches, warm greeting and fine food provided by Peter and Lexie, whose extensive knowledge of the region's food and wine offerings is valued by those with similar culinary interests.

WillOaks Bed and Breakfast requires an identity and selection of promo-tional design applications that communicate the nature of the business while expressing a warm sense of rural hospitality combined with sophisticated style.

specific responsibilities
Together with the provision of the outlined deliverables, I will also source or generate any required images in digital and/or hardcopy formats, source production quotations, communicate with suppliers, manage production and undertake a press-check if required. In order to ensure the quality of the finished designs, your responsibilities will consist of supplying any required copy or copyright images and proofreading the finished designs.

With permission from Emma Rickards

▶ An example of a return brief that specifies the agreement between designer Emma Rickards and her client

14.2 CONSTRAINTS

Constraints is a term that is used by designers to describe the restrictions that exist around the design problem. It can relate to a range of areas but describes the things that the design must deliver on. An example might be for a toy manufacturer looking to sell within Australia that has clear safety compliance standards for the toy to adhere to or the toy can't be sold in the country. Examples of design constraints:

+ An architect needs to design a building that fits within the physical size of the client's land (physical constraint).
+ A fashion designer needs to design a garment that suits next season's trends (aesthetic constraint).
+ An interaction designer must code an app in a specific coding language (technical constraint).
+ An industrial designer must design a product that conforms to Australian safety standards (legislative constraint).
+ A landscape architect must specify Australian native plants suitable for the site's flora and fauna profile (environmental constraint).

+ An interior designer needs to complete their design proposal by the client's deadline (time constraint).
+ A graphic designer must fit the client's printing budget for a poster design (economic constraint).

> A constraint is a proposition which enables us to distinguish between solutions and non-solutions to a given problem.
>
> Professor Tom Heath

Constraints can be categorised as 'reliable', which includes fundamental scientific and technological limits (such as the strength or weight of materials) that are unchangeable. Most constraints, though, are 'unreliable' – they are subject to change and include economic, moral, political and administrative constraints.

These can change *during* a design project. It's common for the design process to reveal new understandings that lead to refining the constraints, and thus the design brief, which is why the design process needs to be flexible, explorative and iterative. (This is illustrated in the Double Diamond diagram by the loops within and between the Explore and Develop phases.)

TIME CONSTRAINTS

This is a pressure all designers experience in some way and often have conflict with. The time we have to create and select a design can be crucial to its success, and designers have to work within the time frame to deliver the best possible outcome. Not all designs will finish with one version, and often they can have multiple developments over different stages of the design's life, each one with its own timeline.

Time constraints are 'unreliable' in that they are often negotiable or subject to change by external factors (pandemic supply chain problems are a good example of this). The contract between client and designer will agree to keep both parties aligned about project schedule. In the classroom, student projects will be constrained by assessment due dates (and possible extensions due to sickness and so on).

ECONOMIC CONSTRAINTS

Economic constraints include the budget for the design. In the design of a building, for example, this might encompass the cost of construction and fit-out. For a garment or product, it might be the eventual retail price to consumers. It also includes the cost of the design process itself.

Economic constraints are notoriously unreliable. Calculating construction or manufacturing costs is very complicated and requires significant knowledge and experience. The more novel the design problem and the more innovative the desired solution, the less predictable such costs will be. Even in the case of well-defined and well-understood design projects, it can be very difficult to accurately estimate final costs. Moreover, the design process may well reveal exciting possibilities that lead to a relaxing of economic constraints in exchange for initially unforeseen benefits.

Because economic constraints can be so challenging, it's frequently better to *exclude them entirely* from student design project concerns.

PHYSICAL CONSTRAINTS

Physical constraints can often relate to size and weight of a product or, in larger built environment spaces, the building spaces and zones available to the architect. Designers may be given a physical constraint that is known within a design brief as a 'design constraint' to meet the needs of the client.

▶ This point of sale display has a physical constraint to hold capacity for a number of products upon a counter.

14.3 DESIGN CRITERIA AND PURPOSE

Design criteria form the foundation for creating successful and purposeful designs. Unlike constraints that define limitations, criteria outline the needs, wants and expectations of stakeholders. Using simple sentence starters like 'It must', 'It should' and 'It could', designers can articulate specific requirements. 'It must' represents non-negotiable essentials, ensuring the design meets critical elements. 'It should' signifies important features that enhance the design's effectiveness. 'It could' allows for creative possibilities that, while not mandatory, may contribute additional value. By adhering to these criteria, designers align their work with stakeholder expectations, ensuring the end product not only meets functional requirements but also delights and satisfies those it serves.

Design criteria serve as dynamic goals that guide designers throughout the creative journey. They provide a

road map, outlining the essential aspects the design must fulfil. During the ideation and design development stages, these criteria become touchpoints, regularly revisited to ensure alignment with project objectives. As the design evolves, revisiting the criteria allows for adjustments and refinements, ensuring that the creative process remains purposeful and focused. This iterative approach ensures that the design not only meets the initial goals, but also adapts to changing needs, resulting in a thoughtful and responsive outcome.

Here are some examples of design briefs in a range of formats, and design criteria also collated in a range of formats.

SAMPLE DESIGN BRIEF ~ BOOK COVER

Design brief: Book cover

Design an engaging and visually stimulating children's picture book cover for children aged 4–8, titled *Wonderful Whimsy Adventures.* The book aims to foster creativity, curiosity and early literacy skills. The book crafts a captivating narrative that follows relatable characters on imaginative journeys, incorporating educational elements seamlessly.

Design criteria

What must the design do?
• Evoke the key theme of time through visual elements.
• Include the title and author's name in a legible font.
• Be adaptable to both print and digital formats.

What should the design do?
• Use a cohesive colour palette that complements the story's mood.
• Create a sense of intrigue and curiosity.

SAMPLE DESIGN BRIEF ~ APP

WHO? Smartphone users interested in mindfulness and wellbeing
WHAT? A meditation app named CalmSpace
WHY? To provide users with a user-friendly and visually soothing interface for guided meditation and relaxation
WHERE? Available on iOS and Android platforms

DESIGN CRITERIA
WHAT MUST THE DESIGN DO?

+ Prioritise a clean and intuitive user interface (UI).
+ Include features for personalised meditation sessions.
+ Reflect a calming colour scheme and imagery.

WHAT SHOULD THE DESIGN DO?

+ Implement interactive elements to enhance user engagement.
+ Ensure easy navigation between different meditation categories.

WHAT MUST THE DESIGN NOT DO?

+ Overcomplicate the navigation or user experience.
+ Use overly bright or harsh colour schemes.

SAMPLE DESIGN BRIEF ~ GARMENT

Create a contemporary unisex hoodie for active individuals seeking comfort without compromising style. The hoodie, part of the UrbanFlex line, should seamlessly blend urban aesthetics with functional design. Aimed at the 18–30 age group, this versatile garment should cater to various lifestyles, from casual outings to light workouts. It's destined for both online and physical retail spaces, requiring an appealing visual presence.

DESIGN CRITERIA
PRIMARY DESIGN CRITERIA

It must be comfortable with breathable and stretchable fabric, ensuring flexibility for diverse activities.

SECONDARY DESIGN CRITERIA

+ It should incorporate subtle branding and utilise a muted colour palette for urban sophistication.
+ The design should consider sustainable practices, emphasising ecofriendly materials and production processes.

OTHER DESIGN CRITERIA

+ Avoid overly complex patterns or embellishments.

SAMPLE DESIGN BRIEF ~ PRODUCT DESIGN

Design a flexible and multi-purpose desk that can be used for manual drawing tasks and digital tasks. The design should be accessible to users of varying heights and offer flexibility for those with a disability. The design should feature storage and work areas, and address issues of comfort and ergonomics.

DESIGN CRITERIA

+ Innovative: What aspects of the design show innovative and creative problem-solving?
+ Useful: How effectively does the design meet the functional requirements of the end user?
+ Aesthetic: In what way is the design appealing to the user? Do aesthetics encourage use?
+ Accessible: How can the user quickly access and understand the functions of the design?
+ Sustainable: How has the sustainability life cycle been addressed in the design?

SAMPLE DESIGN BRIEF ~ INTERIOR DESIGN

Revamp the interior of a cosy coffee shop, BeanHaven, to create a welcoming and eclectic atmosphere for diverse clientele. The design should capture the essence of a modern, urban coffee experience, combining comfort with an artistic touch. Targeting young professionals, students and coffee enthusiasts, the redesigned space should foster a sense of community. The interior will be showcased on social media and customer reviews.

DESIGN CRITERIA

The design must incorporate a mix of comfortable seating options, flexible lighting and warm tones to create a cosy ambience.

It should use locally sourced materials and showcase the coffee-making process as a visual focal point. The design should encourage social interactions without compromising individual workspaces. Avoid excessive use of cold or overly bright lighting, aiming for a balance between vibrancy and relaxation.

SAMPLE DESIGN BRIEF ~ LANDSCAPE ARCHITECTURE

Identify a local area and design a children's adventure playground. The design may be outdoors or indoors but should be focused on immersive, sensory experiences. Consider the inclusion of activities that stimulate learning and require interactivity. Senses may include touch, smell, sight or sound. The age of the main users range from infants to 12 years, with accompanying parents, carers and families. Structures should meet safety standards and the area should be fully accessible to mixed abilities. Supervision by parents should be considered, while allowing children to explore and play independently.

DESIGN CRITERIA

+ Innovative: How varied and inventive is the range of design concepts explored?
+ Useful: How does the design meet the need of an immersive and interactive experience for the user?
+ Aesthetic: In what way is the design pleasing and attractive to the user?
+ Accessible: How can the user quickly understand the function of the design features?
+ Sustainable: How has the sustainability life cycle been addressed in the design?

Create an innovative and affordable residential building concept tailored for first-time homebuyers, emphasising efficient use of small spaces while providing comfort and functionality. The residence should offer a modern living experience that maximises every square metre, catering to the needs and aspirations of young professionals and small families.

DESIGN CRITERIA
PRIMARY CRITERIA

Social: Foster a sense of community through shared spaces and amenities, encouraging interaction among residents.

Economical: Incorporate cost-effective materials and construction techniques to minimise overall project expenses.

Cultural: Celebrate local culture and heritage through architectural elements or community engagement initiatives.

SECONDARY CRITERIA

Social: Provide flexible living arrangements to accommodate diverse household compositions and lifestyles.

Economical: Incorporate multi-functional design solutions to maximise space utilisation and reduce long-term maintenance costs.

Cultural: Incorporate elements of inclusivity and diversity into the building's design, reflecting the values and aspirations of the local community.

USING DESIGN FEATURES TO DEFINE THE DESIGN BRIEF AND DESIGN CRITERIA

When contemplating the incorporation of evidence in your design portfolio corresponding to the previously identified design features – social, technical, economical, aesthetic and cultural – there is no one-size-fits-all approach. Designers, in the pursuit of developing their unique style, should not feel compelled to emulate specific methods or applications of a design stage. Each designer's journey is inherently distinctive, and the process of presenting evidence in a design folio should authentically reflect their individual approach and creativity. Embracing this diversity allows for a richer and more genuine representation of one's design prowess and ingenuity.

Situation: The Peregian Surf Club is looking for a way to establish and acquire a better community view and increase interactions within the club. Now the major problem is they don't have enough income coming into the club, so they are struggling to stay afloat and to function. The surf club's plan to target this problem is to add a restaurant/bar to boost people wanting to have meals and to hire out the function space, to increase their income.

Brief: My design will increase the income that is funnelled into the club and boost the interaction within the community and will get more people to participate within the club. A bar will be constructed with seating and tables inside the club house next to the existing kitchen area. The Peregian surf club, committee members and locals. The club needs some sort of way to increase their gross income which will then increase the community interaction because it will provide better facilities and events.

Design Criteria:

Primary:
DC1-It must boost the Income of the club to increase revenue so that they can grow the club
DC2-It must boost community interaction within the club to build a better community and to get more people coming to the club.
DC3-It must be comfortable and accessible for the stakeholders that will be using it so that they can enjoy and have the best time possible.
Secondary:
DC4-The cost should be considered so it doesn't deprive the club of money.
DC5-The design styles around the area should match inside the bar so there's connection throughout the community.
DC6-It should be aesthetically pleasing for the stakeholders.

▶ This design brief and criteria was formed by QCE Design student, Evie Modric, in response to the needs of a Surf Life Saving Club with a focus on offering more to the club members and other stakeholders connected to the club.

The examples are merely illustrative. They do not prescribe a mandatory or exemplary path that must be adhered to. It's essential to bear in mind that each project is a response to distinct identified needs and problems. The variations in challenges, goals and contexts demand diverse and adaptable approaches. Designers should view these examples as points of reference, drawing inspiration while maintaining the flexibility to tailor their methods according to the unique requirements of each project.

The design criteria define the requirements that must be included in a design proposal. Design criteria will vary according to the design problem. They provide a framework for assessment and enable a design idea to be evaluated against the needs of the stakeholder (client, end user/audience) or specific needs set by the teacher within a class task or examination. Design criteria may also be based on the principles of good design (see Chapter 15).

The target audience/user (if known) of the design

The audience is the market or target group to whom the design will be directed. The client may have a clear idea of the market but may be seeking to expand it or attract a new audience to a product or service. The designer's task is to identify the specific characteristics of the target group. Any special characteristics of this group will affect how the design is developed.

The context of the design (i.e. where it will be used/ seen/applied)

Where a design will be used has a major impact on the content, appearance, materials and format. The physical location will determine scale, materials and the design

elements and principles to be used. A billboard displayed at the edge of a freeway, for example, will be viewed by drivers and passengers passing by at 100 kilometres per hour. The content will be read from a distance, so a design that is heavily dependent on text and small detail would not be suitable.

Constraints such as cost, timeline, location, materials and technologies

Common constraints such as time and cost have a major impact on the design outcomes. A large project requires a longer time frame and usually needs a bigger budget, so a clear understanding of the cost and time frame must be established in the early stages of the client–designer relationship. The location of a design task can also provide challenges; in a global marketplace, many designers find themselves working in overseas locations, where language and cultural differences can affect the flow of the design process. The scale of a design task and the materials required may also be factors that determine the success of a final design. If a designer is unfamiliar with new materials, technologies and processes, then training and education must be addressed.

The deliverables

The design brief will specify the deliverables required by the client. A date will be specified and costs associated with changes will be communicated. Deliverables will vary according to the project but may include finished artwork, branding collateral (communication design), specifications for tooling and production (industrial/product design), plans, elevations, walk- or fly-throughs, models and building specifications (environment design).

CHAPTER REVIEW

1   Annotation provides written reflection on your design ideas; it involves thinking about your thinking. Good annotation is reflective, succinct and relevant. It conveys analysis and suggests possible directions for further development. These key concept questions will help you to make effective annotations:

+   Descriptive: What were you doing?
+   Predictive: Where might the idea lead?
+   Reflective: Is it a good idea?

See the example below.
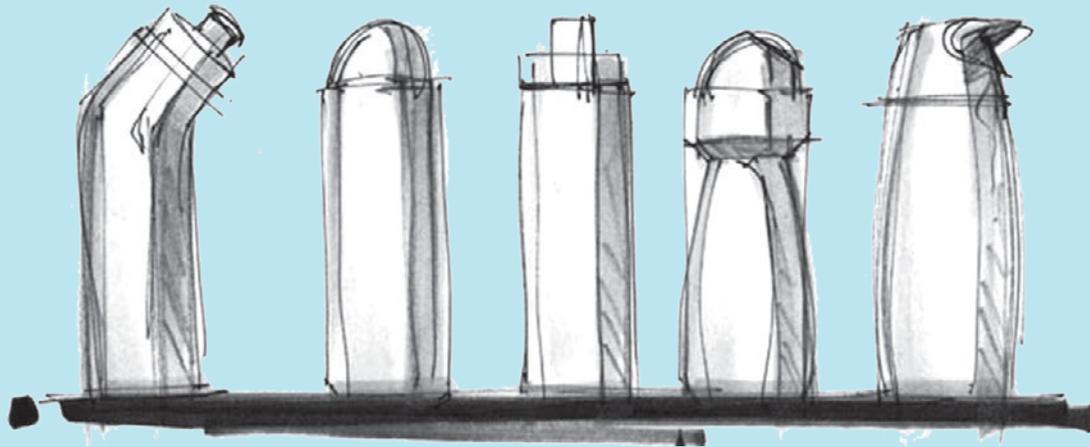
Mark Wilken

Descriptive: Generating a concept for a drink bottle
Predictive: Will explore more ideas using the half-sphere on the top
Reflective: Prefer rounded top – possibly more ergonomic. Might be comfortable to hold; important for the target audience.

Make annotations for the following designs.

a

Descriptive: _____

_____
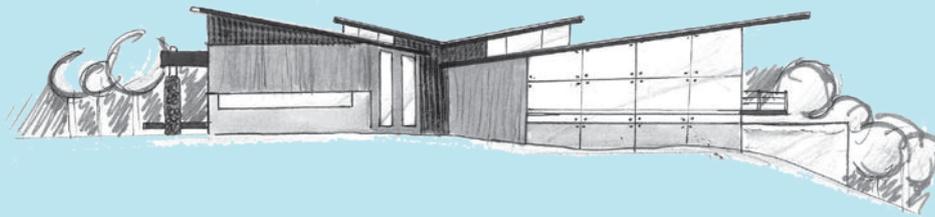
Predictive: _____

_____

Reflective: _____

_____

_____

_____

_____

b

Descriptive: _____

_____
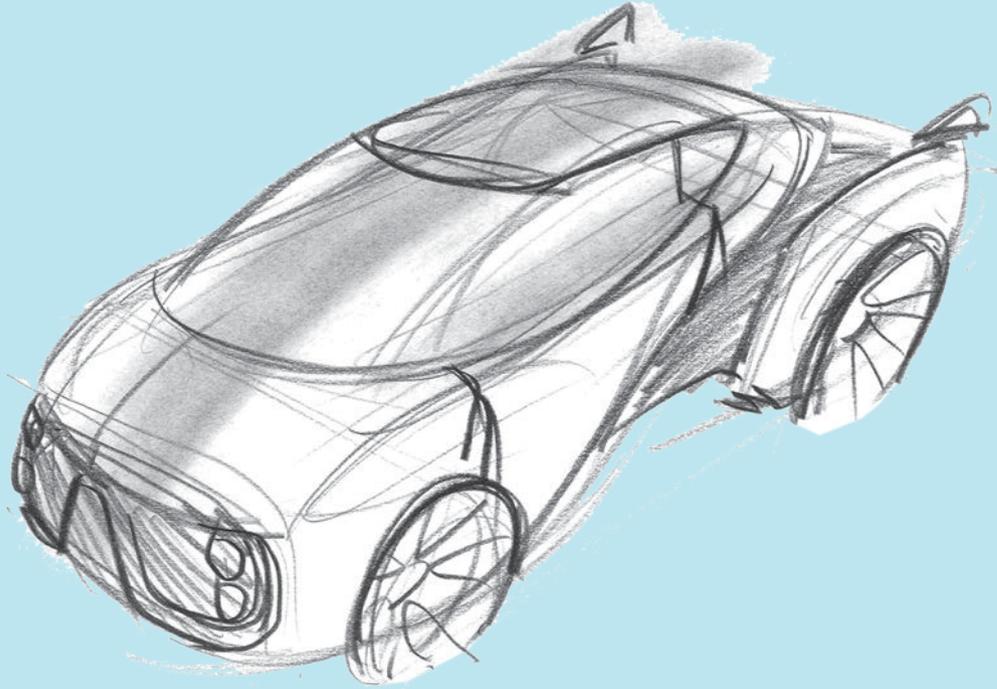
Predictive: _____

_____

Reflective: _____

_____

_____

_____

_____

_____

▶

2 Read the following design problems and identify possible constraints that may affect the design process. Suggest how the constraints may influence the decision-making of a designer.

Designer	Design need	Anticipated constraints	Decisions that may be made to address constraints
Fashion designer	To create a range of comfortable swimwear for toddlers and preschoolers that facilitates buoyancy without adding bulk. Many very young children do not like wearing a life vest so the swimwear should incorporate safety features that are comfortable for the wearer.		
Communication designer	To create a simple, illustrated first-aid booklet to be distributed to all junior primary school students in Queensland. The booklet will feature instructions about basic treatments for scratches, stings and minor injuries.		
Industrial designer	The design of an underwater camera casing for action cameras. The casing should suit a range of cameras on the market and allow for maximum functionality when underwater.		
Environment designer	The design of a new gymnasium and wellness centre to service a large urban population. The users will be of mixed age and mobility.		

3 Highlight the design criteria featured in the following design brief, including target audience/user, deliverables and constraints.

Circa 1602 Trading Co. is a boutique specialist spice, tea and herb trading company seeking a sophisticated, high-end identity design that reflects its ethos. The company is inspired by the Dutch East India Trading Company, which was founded in 1602 when the States-General of the Netherlands granted it a 21-year monopoly to carry out colonial activities in Asia; the name of the company, Circa 1602, stems from this significant historical date. The company is based in Brisbane and predominantly markets its products to specialist stockists such as providores and delicatessens, as well as online customers. Circa 1602 prides itself on providing high-quality spices, teas and herbs. Because of its quality ethos and artisan products, the company has strived to serve a high-end market, targeting a customer base with high disposable incomes. Circa 1602 requires the design of its corporate identity, its logo and accompanying stationary: business card, letterheads, etc.

The main purpose of the identity design is to promote and advertise Circa 1602 to gourmet and boutique stockists, restaurants and chefs, as well as individual customers of local boutique providores and gourmet produce stores. The target audience for the corporate identity of Circa 1602 is potential stockists: primarily owners of boutique providores and delicatessens, restaurant owners and chefs, and specialty hospitality industry suppliers, as well as customers of these stockists and suppliers. The corporate identity design must be cost-effective, as the budget is moderate due to general business set-up costs. The identity should feature the logo for Circa 1602, and will be applied to company signage, merchandise, business cards, webpages, shipping and freight packaging, etc. Therefore, the logo must be effective in both colour and black and white, and able to be applied to a range of visual carriers, work in various sizes/proportions, and be representative of Circa 1602's quality ethos and influences.

GOOD DESIGN

CHAPTER

15

I have always tended to steer well clear from this discussion about beauty and argued instead for a design that is as reduced, clear and user-oriented as possible.

Dieter Rams

In this chapter:

Learn the language:

+ aesthetics
+ beauty
+ innovation
+ meaning
+ simplicity
+ style
+ unobtrusive
+ useful
+ utility

Good design is not just in the eye of the beholder. From your studies, it will be clear that effective use of elements and principles, as well as design technologies, an understanding of the design process and an insight into successful designs both past and present, contribute to the perception of 'good' design.

In the past, designers have attempted to distil the key aspects of good design, and this chapter presents a range of recognised and valued approaches.

15.1 DIETER RAMS' 10 PRINCIPLES FOR GOOD DESIGN

Dieter Rams is a renowned industrial designer whose career has spanned more than 40 years at iconic companies such as Braun and Vitsoe. He is well known for his 10 Principles for Good Design, which he developed in the late 1970s to express his ideas about the need for well-executed, beautiful and long-lasting products. Rams maintained that a well-designed product, that also held strong aesthetic qualities, would endure, meeting user needs for functionality and quality as well as a global need for sustainability. His mantra throughout his design career has been 'Simplicity is the key to brilliance'. At the core of his designs is the belief that a beautiful and well-made object can improve surroundings as well as a sense of wellbeing; equally, it is only well-made objects that *can* be beautiful.

10 PRINCIPLES FOR GOOD DESIGN   **FYI**

The 10 Principles of Good Design were created with product design in mind, but they can be applied to products, services and environments. Not all 10 will be easy to apply to all design concepts, and selection should be based on which are most applicable. They can be used as prompts in many areas of the design process.

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In an interview with *Kinfolk* magazine in 2017, Rams identified beauty as a characteristic of good design that can ensure both appeal and durability. He argued that a beautiful object is more likely to be valued and, consequently, retained, which addresses ecological issues such as waste. In Rams'

definition, beautiful objects are not judged by aesthetics, but by a 'reduced, clear and user-oriented' design. Simplicity is a key aspect of Rams' own design works, which can be clearly seen throughout his principles. The ability to edit a design concept by minimising extraneous detail and maintaining simplicity is a challenge, yet it lies at the centre of Rams' principles.

10 PRINCIPLES FOR GOOD DESIGN

1 Good design is innovative.

The possibilities for progression are not, by any means, exhausted. Technological development is always offering new opportunities for innovative design. But innovative design always develops in tandem with innovative technology, and can never be an end in itself.

Interfoto/Alamy Stock Photo

▶ Record player, Braun, version TP 2, with integrated radio, 1958. Designer: Dieter Rams

Michael Dodge/Getty Images Sport/ Getty Images

▶ This example of innovative design shows combining GPS tracking technology with sport data analysis, which is now a common practice in many sports.

2 Good design makes a product useful.

A product is bought to be used. It has to satisfy certain criteria, not only functional, but also psychological and aesthetic. Good design emphasises the usefulness of a product while disregarding anything that could detract from it.
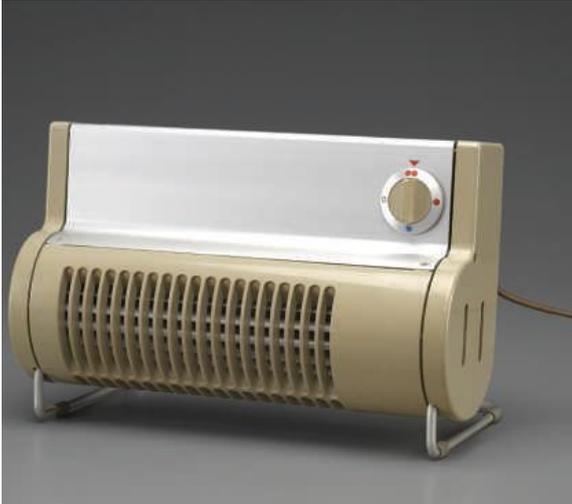
Indianapolis Museum of Art at Newfields/Getty Images

▶ H7 Heater, by German designers Dieter Rams and Reinhold Weiss (manufactured by Braun AG), 1967.

3 Good design is aesthetic.

The aesthetic quality of a product is integral to its usefulness because products are used every day and have an effect on people and their wellbeing. Only well-executed objects can be beautiful.

Interfoto/Alamy Stock Photo

▶ Broadcast, radio, radio set BraunRT 20, Germany, 1961.

Asanka Ratnayake/Getty Images Sport/ Getty Images

▶ These examples of hats worn at the Melbourne Cup show the importance of aesthetics for wearers, and provides an indicator of cultural wants and traditions.

4 Good design makes a product understandable.

Good design clarifies the product's structure. Better still, it can make the product 'talk'. At best, it is self-explanatory.
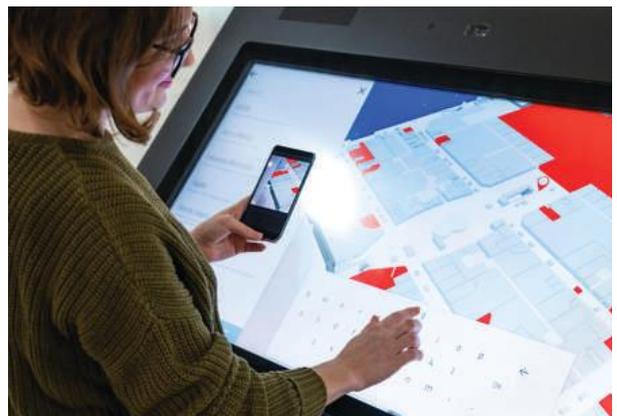
Scharfsinn/Alamy Stock Photo

▶ Digital media user interface touch-screen kiosks support shoppers with navigating retail spaces.

Interfoto/Alamy Stock Photo

▶ T 1000 world receiver, 1963, by Dieter Rams for Braun

▶ Instagram is an intuitive social media platform. From a design perspective, it offers a series of content that is easy to navigate and engage with.

5 Good design is unobtrusive.

Products fulfilling a purpose are like tools. They are neither decorative objects nor works of art. Their design should therefore be both neutral and restrained, to leave room for the user's self-expression.

▶ Cylindric T 2 lighter, 1968, by Dieter Rams for Braun.

▶ This outdoor kitchen developed by Australian company Tait provides an outdoor cooking space that is discreet when not in use. It has options for colours to allow it to blend into its surroundings.

6 Good design is honest.

Good design does not make a product appear more innovative, powerful or valuable than it really is. It does not attempt to manipulate the consumer with promises that cannot be kept.

▶ Braun SK 6 Phonosuper turntable record player, 1962, designed by Hans Gugelot and Dieter Rams.

▶ IKEA interiors and furniture was started in 1943 by Ingvar Kampard and sells around the world with the business slogan 'IKEA: Quality furniture at affordable prices'. The company's vision is 'to create a better everyday life for the many people'. It has a clear shared set of values in line with honesty.

7   Good design is long lasting.

Good design avoids being fashionable and therefore never appears antiquated. Unlike fashionable design, it lasts many years – even in today's throwaway society.

▶ 620 Chair Programme by Dieter Rams for Vitsoe

▶ The Queensland State Library's design by John Wardle Architects emphasises longevity and flexibility, with open-plan spaces and movable elements that adapt to changing public and staff needs. It incorporates adaptable technology, sustainable materials and eco-friendly technology, such as passive cooling and natural light, to support sustainability. The library fosters community engagement with spaces designed for diverse activities, maintaining its relevance as a public resource.

8 Good design is thorough down to the last detail.

Nothing must be arbitrary or left to chance. Care and accuracy in the design process show respect towards the user.

▶ ET44 calculator, by Dieter Rams and Dietrich Lubs, 1978.

▶ Shoe design has a great deal of detail that often is taken for granted. Material selection and knowledge, shape and form, textures and design features are some of the many considerations in well-designed shoes that meet the needs of those wearing them.

9 Good design is environmentally friendly.

Design makes an important contribution to the preservation of the environment. It conserves resources and minimises physical and visual pollution throughout the lifecycle of the product.

606 Universal Shelving System by Dieter Rams for Vitsoe (ID210) ©Vitsoe. With permission.

▶ Universal Shelving System by Dieter Rams for Vitsoe

Stephanie Jackson - Aust cities/ Alamy Stock Photo

▶ This house built on Queensland Architecture style principles is raised to allow air to flow under the property, and has rainwater tanks, large eaves, solar-powered living and a range of energy-saving methods to provide an off-grid living space.

10 Good design is as little design as possible.

Less, but better – because it concentrates on the essential aspects, and the products are not burdened with non-essentials. Back to purity, back to simplicity.

Interfoto/Alamy Stock Photo

▶ Radio set, T 41, design by Dieter Rams, 1961.
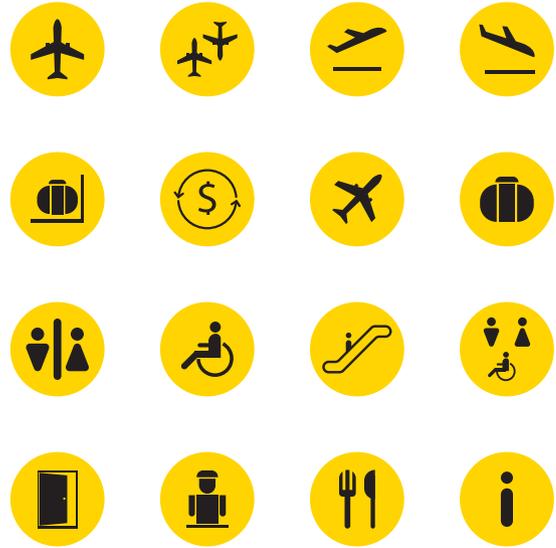
Syadda Images/Shutterstock.com

▶ Airport signage that functions without words or the need to translate

OTHER PERSPECTIVES ON GOOD DESIGN

Although the QCAA Design Syllabus encourages students to use Dieter Rams' 10 Principles of Good Design, they are not the only benchmark available to designers. Often different design disciplines have similar measures of success that are more widely used within those disciplines.

Architecture is one example. In the book *De architectura*, the Roman architect Vitruvius (c. 80–70 BCE to c. 15 CE) outlines three essential virtues of architecture:
+ firmitas (solidity, durability)
+ utilitas (utility, function)
+ venustas (beauty, delight).

Another example is the 7 Principles of Universal Design, which were developed by a group of architects, product designers, engineers and environmental designers at the Center for Universal Design at the University of North Carolina.

Principle 1: Equitable use
The design is useful for people with diverse abilities.
Principle 2: Flexibility in use
The design accommodates a wide range of individual preferences and abilities.
Principle 3: Simple and intuitive use
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.

Principle 4: Perceptible information
The design communicates necessary information effectively to the user regardless of the location's conditions or the user's sensory abilities.

Principle 5: Tolerance for error
The design minimises hazards and the adverse consequences of accidental or unintended use.

Principle 6: Low physical effort
The design can be efficiently and comfortably used with a minimum of fatigue.

Principle 7: Size and space for approach and use
Appropriate size and space are provided for approach, reach, manipulation and use – regardless of user's body size, posture or mobility.

Weblink
Principles of Universal Design

'7 Principles of Universal Design' from the Center for Universal Design at the University of North Carolina

15.2 GOOD DESIGN AUSTRALIA AWARDS

Good Design Australia is an advocacy organisation that runs the annual International Good Design Awards as well as design awards in Queensland, Victoria and South Australia. The aim of the Good Design Awards is to establish, maintain and promote high standards of design in a wide range of design disciplines, and to foster the understanding and appreciation of design on a global stage. The awards are positioned as an important benchmark for continual improvement and international best practice for design. Design-led innovation is the focus of the awards program, and a series of design criteria clearly articulate the requirements for entries. The detailed criteria provide a helpful map for designers and design students striving for best practice in varied design fields.

GOOD DESIGN AUSTRALIA AWARDS CATEGORIES

The awards cover a range of design categories, including:
+ Architectural design
+ Communication design
+ Design research
+ Design strategy
+ Digital design
+ Engineering design
+ Fashion impact
+ Next gen (student)
+ Product design
+ Service design
+ Social impact.

GOOD DESIGN AUSTRALIA AWARDS CRITERIA

All the award categories are evaluated using three criteria:
+ Criteria 1: Good design
+ Criteria 2: Design innovation
+ Criteria 3: Design impact

However, each criterion is interpreted through the design lens of the specific category. In other words, the criteria of 'good design' are applied differently when judging entries for architectural design and product design, for example. Although designers don't create designs just to get awards, this set of criteria can be valuable in helping to define the success of designs.

Beyond the criteria, which can be useful in adapting for different design projects, the awards provide examples of successful designs that can be analysed to support a project, often in the Explore phase.

GOOD DESIGN AWARDS

You can find out more about the criteria and subcategories, as well as explore previous years' category winners on the Good Design website.

Weblink
Good Design Awards

ANALYSING EXISTING DESIGNS

The advantage of collecting information about existing designs can help inform designers in the Develop phase of their design process, but it is particularly important during the Explore phase as we look to outline the problem that we intend to solve with our design.

We can learn so much from what is already available, including potential gaps in the market. Rarely do we have the original design criteria that was provided or developed when developing a particular design. As a result, designers will analyse using criteria such as the 10 Principles of Good Design or perhaps the Good Design Australia Awards.

Jeremy sutton-hibbert/Alamy Stock Photo

▶   In 2023, Australian designer Marc Newson was recognised for 'his ongoing contributions to Australian design' with the Australian Design Prize.

TIP

The social, technical, economic, aesthetic and cultural design influences can be great starting points for discussion about the success of designs.

You will find a design analysis template to guide you through this process on Nelson MindTap.

Resource: Design analysis guide

CHAPTER REVIEW

1   List Dieter Rams' 10 Principles for Good Design and find contemporary examples of designs (from the past 10–15 years) that reflect each principle. Annotate by describing your chosen examples (remember to identify sources).

2   Choose one design discipline or category included in the Good Design Awards Australia.

   a Research the specific criteria used to judge the design submissions in the category on the Good Design Australia website and write a summary of the key criteria.

   b Find a classmate who has researched the criteria for a different category and compare the criteria for the two design disciplines. Identify any similarities and differences using a Venn diagram. Present your findings to others.

3   Locate last year's award winners from the Good Design Awards Australia. Print an image of the winner from each category. Annotate each example with the following:

   a What were the selection criteria?

   b How does the design meet the selection criteria?

   c What makes the design innovative?

   d What makes the design sustainable?

4   Consider a design you are interested in or admire. What principles contribute to good design in that field? For example, what makes a particular fashion item a 'good' design?

DESIGN ELEMENTS AND PRINCIPLES

A designer knows he has achieved perfection not when there is nothing left to add, but when there is nothing left to take away.

Antoine de Saint-Exupéry

In this chapter:

Learn the language:

+ alignment
+ balance
+ colour
+ contrast
+ form
+ harmony
+ hierarchy
+ line
+ proportion
+ proximity
+ repetition
+ shape
+ space
+ texture
+ tone

The elements and principles of design, although similar in name to Dieter Rams' 10 Principles for Good Design, are common components by which to create design, also often applied within art subjects.

Design elements are the building blocks of design solutions – the components designers use to develop effective designs. Design principles are the fundamental truths that guide designers in the use of design elements. There are many design elements and design principles that contribute to the substance of design solutions, and while many of them are universal, some depend on the type of design in question. Let's highlight a few examples:

+ The elements of shape, colour and pattern are useful in all design fields, while sound, motion and time are central to interaction design but rarely used in graphic design.
+ Graphic designers must have mastery of typography but this isn't important to fashion designers.
+ Materiality – the nature of the substances used to fabricate physical designs – is key in the fields of fashion design, architecture and industrial design, but less central to two-dimensional design.
+ Use of proportion, repetition, balance and harmony are important in all fields, but use of scale, contour and flora are central to landscape architecture.

In this chapter we'll focus on the most general design elements and principles, and touch on others that you should be aware of, but it's important to remember that you'll need to adjust your considerations to the type of design project you work on. Shape, colour and pattern are considered universal design principles.

Balance: symmetry   Balance: asymmetry   Contrast
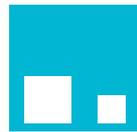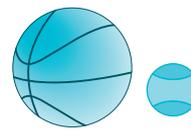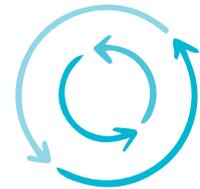
Scale   Proportion   Pattern: repetition

Figure-ground   Cropping   Hierarchy
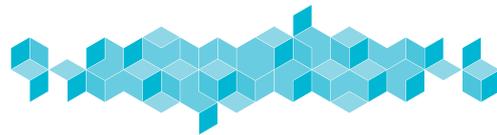
Pattern: alternation

▶ Design principles

Colour: subtractive   Colour: additive   Line

Shape   Tone   Texture

Form   Point   Type

▶ Design elements

16.1 DESIGN ELEMENTS

COLOUR

Colour is a very powerful design element. For 90 per cent of the population, colour is perhaps the most dominant and influential of all the design elements. Colour attracts us, warns us, calms and soothes us – it can influence our moods and our behaviour.

Colour theory can be confusing because there are two different colour systems – additive and subtractive.

Additive colour describes how coloured light behaves when added together. For example, an LED computer monitor is made up of numerous tiny blue, green and red light-emitting diodes; to create a yellow image on the screen, only the green and red LEDs are switched on. (At a distance the individual lights merge together.) Additive colours are often abbreviated to RGB.

Subtractive colour mixing describes how coloured pigments behave (such as paint, inks, the surfaces of objects). Pigments absorb some wavelengths of light and reflect others. For example, a leaf appears green under white light because all the light wavelengths are absorbed (subtracted) *except* green, so we perceive the leaf as 'green'.

Commercial printers (and inkjet printers) use cyan, magenta and yellow inks as well as black (abbreviated 'K') to create greater contrast, a process known by the abbreviation CMYK. Professional graphic design software, such as Adobe Illustrator or Affinity Designer will allow you to use RGB or CMYK 'colour spaces' depending on whether your work will be printed or displayed on screen.

Regardless of the colour system used, colours are created by mixing primary colours: red, blue and green for additive colour spaces; yellow, magenta and cyan for subtractive colour spaces. All other colours are derived from the primaries and can be modified by the addition of black and white (dimming or brightening light in additive colour spaces; adding black or showing more of the white page in subtractive colour spaces).

You don't need to be too concerned about these different colour systems in your school projects, but if you go on to become a graphic designer working in print media, it will become more important.
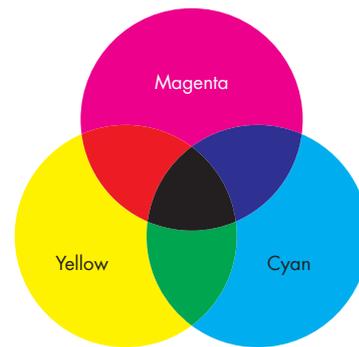
Subtractive colour
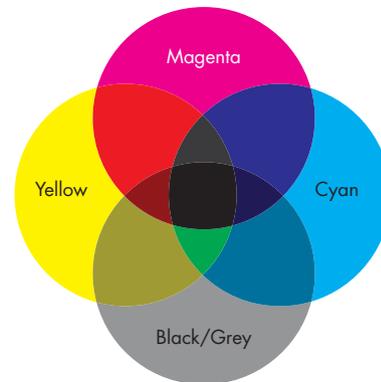
Subtractive colour
CMYK printing
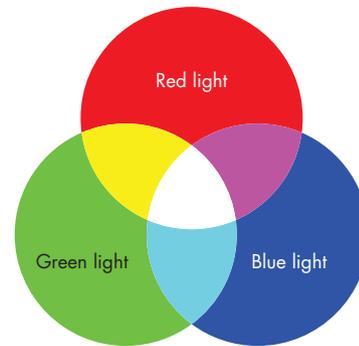
Additive colour

▶   Subtractive and additive colour systems

ADDITIVE AND SUBTRACTIVE COLOUR SYSTEMS

To learn more about this topic, visit the 'Additive and subtractive colour systems' page as part of the online resource 'Colour Theory: Understanding and working with colour' on the RMIT website.

Weblink
Interactive colour mixer
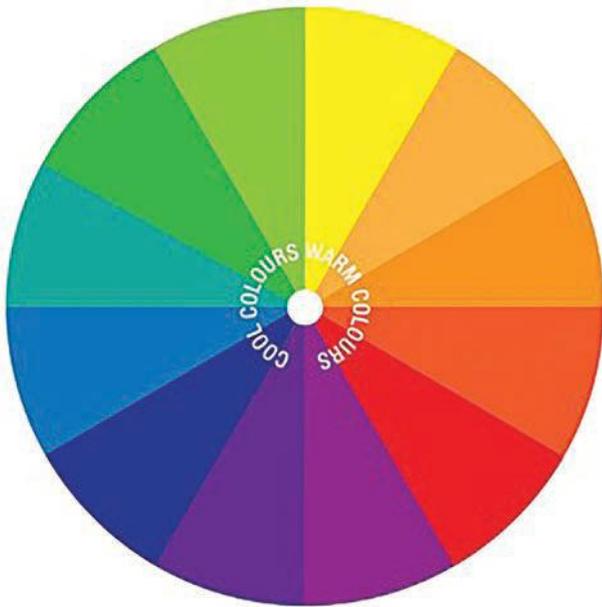
▶   The colour wheel

Primary colours

For the sake of simplicity, the primary colours are often referred to as yellow, blue and red, so we'll use that approach in discussing how different colours are used in design.
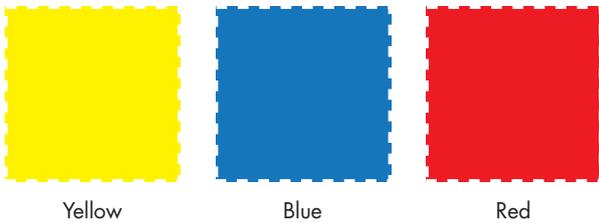
Yellow   Blue   Red

Secondary colours

The secondary colours are green, orange and purple. Secondary colours are created by mixing combinations of primary colours.

Green   Orange   Purple

Tertiary colours

Tertiary colours are created by mixing a primary colour and a secondary colour.

Yellow-green   Blue-green   Blue-purple

Red-purple   Red-orange   Yellow-orange

Harmonious colours

Also known as analogous colours, harmonious colours appear side by side on the colour wheel. When used together in a composition, they create subtle variations.
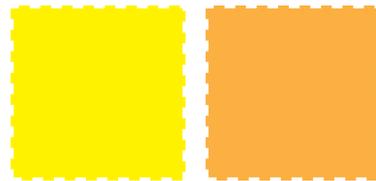
Complementary colours

Also known as contrasting colours, complementary colours are opposite each other on the wheel. These colours are often used together to create contrast. Colours that are direct opposites on the colour wheel can provide the strongest contrasts and draw the viewer's eye to key information within a composition. Complementary/contrasting colours can create deliberate tension in a composition, which might be required for emphasis or to create a sense of dynamic visual force. They can sometimes appear to vibrate – for example, red text on a blue background – and are deliberately used to create such an effect in some artworks.
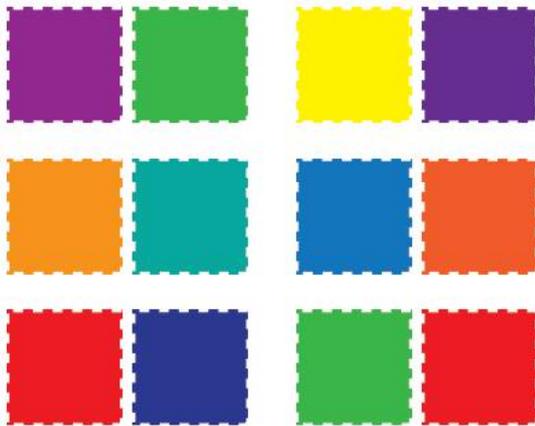
The colour wheel in practice

▶ Monochromatic (black and white)
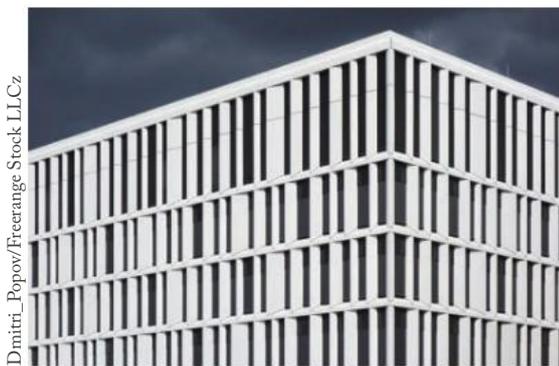
Dmitri_Popov/Freerange Stock LLCz

Boris Zhitkov/Alamy Stock Photo

▶ Primary colours

Phamai Techaphan/Moment/Getty Images

▶ Secondary colours

United photo studio/Shutterstock.com

▶ Tertiary colours

iStock.com/Photo168

▶ Harmonious colours

Badr Warrior/Adobe Stock Photos

▶ Complementary (contrasting) colours

We can look at colour from many directions, including its psychology, its symbolism and the extraordinary communicative power that colour holds. Though it is not possible to fully understand the significance and symbolism of every colour, it is essential to appreciate that colour has many facets, and to understand the influence it has in our lives.

Colour surrounds us – in language, in advertising, in fashion – and can even affect our behaviour. We quickly recognise that red means 'Stop' and green means 'Go'. When the use of colour challenges our understanding of its meaning, the message can become very confused. This can be seen in the illustration below.

To effectively use colour, designers must grasp its audience and sometimes cultural significance. The choice of colours in design can be influenced by cultural factors. For instance, in Chinese culture, red symbolises good luck, while white represents death. Understanding cultural nuances is crucial; for example, traditional bridal attire is red in China, unlike the Western white. Beyond culture, colours evoke strong emotions, often subconsciously. Flags and uniforms can foster patriotism and pride. The colours of a country's flag or the uniforms worn by its athletes at the Olympic Games might encourage a sense of national pride and loyalty. Colours are categorised as warm (reds, oranges, yellows) or cool (blues, greens, purples) based on the emotional feel rather than actual temperature.

▶ The two posters use the same graphic elements to promote a festival, yet the use of colour helps to describe the theme and season of the events.

Colour can be used in architecture and interior design to alternatively stimulate and sedate. Some research has shown that hues of pink can have a calming effect, and in fact a colour close to bubblegum pink was used in an American prison to subdue violent and angry prisoners. Schools often choose to paint walls in vibrant colours such as yellow and green, colours that are designed to stimulate learning and creativity.

▶ The Pixel building in Melbourne, designed by Studio 505 Architects, uses vibrant colour on the facade of the building. The coloured panels also function as insulation, shade and solar capture on this 6-star energy-efficient building.

▶ This interior design image illustrates the powerful statement that colour can make to a space. This gets us thinking of contrast which is covered later. Take a moment to consider Dieter Rams' 10 Principles for Good Design – is this unobtrusive?

FORM

Form generally refers to objects that are three-dimensional in nature. We readily recognise the forms around us – from the pencil on the desk to the form of the human body. Form is often depicted visually through the application of other elements, such as shape and line.

▶ Actress Joan Collins from the TV series *Dallas* wearing shoulder pads, is making a statement with the form of her outfit.

As you know from the physical environment that surrounds you, forms are infinitely varied and range from the geometric and constructed to the organic forms of the natural world. The representations of these forms are similarly varied and can range from the precision of an isometric engineering drawing to a loose and flowing charcoal life drawing.

Designers who work with the constructed environment – such as architects, industrial designers and interior architects – constantly experiment with our perceptions

▶ A landscaped space designed for a children's education environment

of form. Many variables can affect the design of new forms, including:

+ ergonomics
+ structural constraints
+ the environment
+ fashion and trends.

MARC NEWSON   FYI

Marc Newson may be Australia's most successful living designer. Newson was born in Sydney in 1963 and studied sculpture and jewellery at Sydney College of the Arts. His design expertise spans fashion for G-Star and domestic items for Magis and Alessi to aircraft interiors, automobiles and hotels. Newson's ability to create functional yet unique forms is his trademark. His innovative use of materials is also remarkable. His website provides a comprehensive archive of his extraordinary body of work.

▶ Bunky Bed designed by Marc Newson

Many professionals involved in environmental design – whether it is landscape, product design or the constructed environment – are heavily influenced by the versatility of form. Take a chair, which is useful for that most basic of functions – sitting. Yet this deceptively simple, functional object has developed, changed and evolved over the past century into a product that has challenged our ideas about form.

Ergonomics

Ergonomics is the study of human factors in design. This scientific discipline looks at the functions, limitations and needs of the human body in relation to product design. Ergonomists often work with designers to design products that take into account the physical, organisational and psychological effects on the user.

ERGONOMICS

For more detailed information about ergonomics, visit the International Ergonomics Association website. This is also covered in more detail in Unit 3.

Weblink
International Ergonomics Association

Form follows function

A phrase embraced by the modernists of the mid-20th century, 'Form follows function' suggests that aesthetic considerations should be secondary to the pure functionality of a design product. Many designers believe that beautiful design is only achieved when the successful function of the design is fully realised. Contemporary (and postmodern) interpretations of this phrase are less rigid and many current designs reflect a balance between functionality and decorative elements. A good rule of thumb is to remember that no matter how attractive a design looks, if it doesn't achieve its primary purpose, it is not a successful design.

KEYWORD ~ FORM

Form can be:
+ three-dimensional
+ organic
+ geometric
+ dominant
+ subtle
+ tactile
+ solid
+ fluid
+ graceful
+ irregular
+ textured
+ natural
+ manufactured
+ modelled
+ sculpted.

Form can be used:
+ to define space
+ to create contrast
+ as a model or prototype.

iStock.com/Evgeniy Ivanov

▶ This illustration enables us to understand the structural form beneath the upholstered surface. The linear wireframe and fully upholstered views provide contrast as well as context.

LINE

Line holds a paramount position within design. Serving as a fundamental element, line serves as a conduit for translating creative visions into tangible forms. Unlike other elements, line possesses inherent characteristics, boasting more length than thickness and exhibiting versatility in its forms – whether unbroken, broken or implied. Its dynamic nature allows it to traverse various

Animi Causa, with permission

▶ Animi Causa 'Feel' seating system. The form of this innovative seating system can be changed in multiple ways by the user. Made from 120 soft foam balls covered with a smooth elastic fabric, the form was inspired by molecular structure. (Not every design need be utilitarian. It might be said that the primary purpose of this design is novelty and style rather than utility, comfort and simplicity.)

orientations, from vertical and diagonal to horizontal and curved, while also accommodating variations in width, size and position. Line can suggest direction and movement. It can draw the eye into a composition and direct it along a path.

Lines transcend mere visual constructs; they possess the power to influence the viewer's perception and emotions, guiding their gaze through space with precision. When combined with other elements like colour, texture and movement, lines acquire additional dimensions, further enriching the design landscape. Within digital media, lines are used extensively, often employed to delineate or segregate visual elements, as exemplified by their role in defining navigation bars from content.

The significance of lines in design extends far beyond their simple appearance, underpinning the structural integrity of compositions and imbuing them with coherence and visual impact. This exploration delves into the myriad line usages across diverse design disciplines, illuminating its pivotal role in shaping creative narratives and visual experiences.

Point indicates a position in space.

A point extended becomes a **line** with properties of length, direction and position.

A line extended becomes a **plan** with properties of length and width, shape, surface, orientation and position.

A plane extended becomes a **volume** with proportions of length, width and depth; form and space; surface, orientation and position.

Point

1D   Line

2D   Plane

3D   Volume
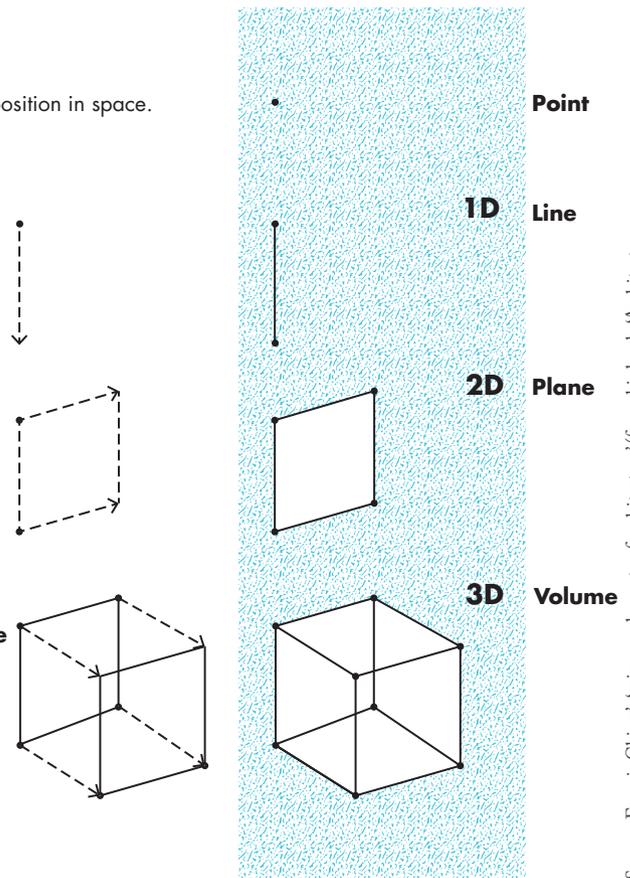
Source: Francis Ching's 'primary elements of architecture' (from his book, 'Architecture: Form, Space, and Order', Wiley 2014

▶ Francis Ching's 'primary elements of architecture' illustrates the conceptual relationship between the elements of point, line, plane and volume.
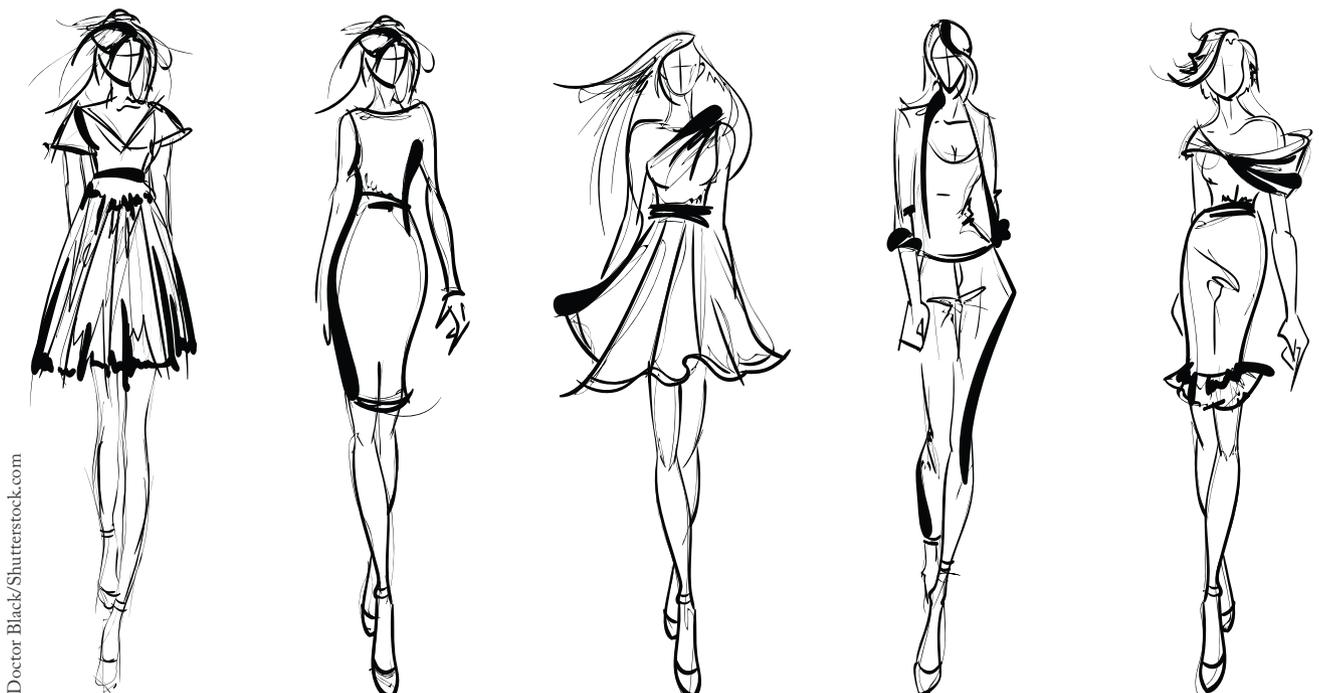
Doctor Black/Shutterstock.com

▶ Free-flowing design lines are used to show the movement of the dress.

KEYWORD ~ LINE

Line can be:

+ broken
+ flowing
+ bold
+ fine
+ medium
+ repeated
+ organic
+ eye-catching
+ dynamic
+ directional
+ static
+ curved
+ straight
+ sketchy

+ freehand
+ precise.

Line can be used to:

+ establish structure
+ create a pattern
+ indicate
+ direct
+ render.

Line can create:

+ contrast
+ pattern
+ formality
+ contour
+ structure.

Kurilpa Bridge demonstrates the use of line with structural cables and members.

Matt Makes Photos/Shutterstock.com

SHAPE

Shape describes representational or abstract shapes that are two-dimensional. Simple geometric shapes with the dimensions of length and width include squares, triangles, rectangles and circles.

There are limitless irregular or abstract shapes. These might appear as natural organic shapes, or as irregular geometrically based images.

Shape may form the ground in a composition, providing a space for the placement of other elements. Shape is used for emphasis and to draw attention to the figure in a visual communication. Shape may be the figure itself in the form of a logo or symbol.

Shape is an element that is very familiar to us, from the silhouette of the human figure to the shape of a stop or give-way sign on the road. Shape can inspire all kinds of reactions in a viewer; the shape of a heart or a cross might provoke an emotional response, whereas the hexagonal shape of a stop sign demands an immediate physical response from the car driver.

Gemma O'Brien

The use of hand-drawn line in this work by Gemma O'Brien helps to emphasise type and creates a vibrant and eye-catching pattern.
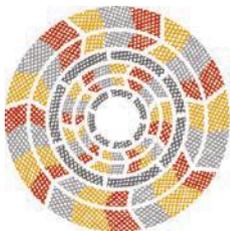
Courtesy of Kakadu Tourism

The logo of Kakadu Tourism

Shape applied to digital media design

Symbols are usually two-dimensional and are often based on simple geometric shapes.

Pictographs

A pictograph is a symbol that is based on a recognisable set of shapes or on a commonly recognised form. For example, the male/female signage used on public toilets is usually pictographic. The forms of the female and male figure are familiar and require no additional text for identification.
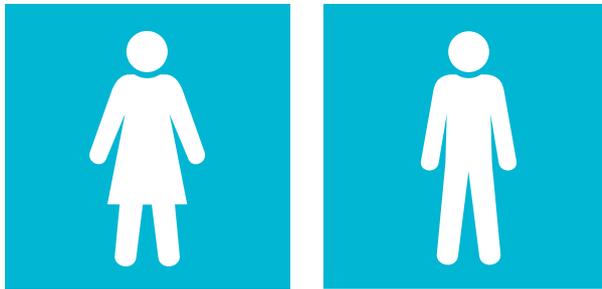
The use of shape incorporates the application of other elements such as line or colour. Shape can be created using a range of media (such as paper, fabrics or card) and methods (such as collage or monoprinting). Other design elements such as type, colour and line can be used abstractly to create shapes that increase the visual interest of a composition.

KEYWORD ~ SHAPE

Shape can be:
+ two-dimensional
+ solid
+ outlined
+ irregular
+ organic
+ geometric
+ defined
+ symmetrical
+ open
+ closed
+ free form.

Shape can create:
+ hierarchy
+ pattern
+ background
+ contrast.

SPACE

Space refers to the area around and between objects. It may refer to the distance between different shapes and forms within two-dimensional and three-dimensional environments. It may refer to physical spaces or to the spaces on a page or screen.

Designers of the built environment – architects, interior designers and landscape architects – often think of space in terms of *volume* – the spaces defined or enclosed by such structures as walls, roofs, openings, flora and terrain.

'Less is more': Using white space

Attributed to Bauhaus designer Ludwig Mies van der Rohe, this statement defines much of the philosophy of the influential design movement of the 1930s. The Bauhaus rejected the decorative details and motifs seen in previous design movements.
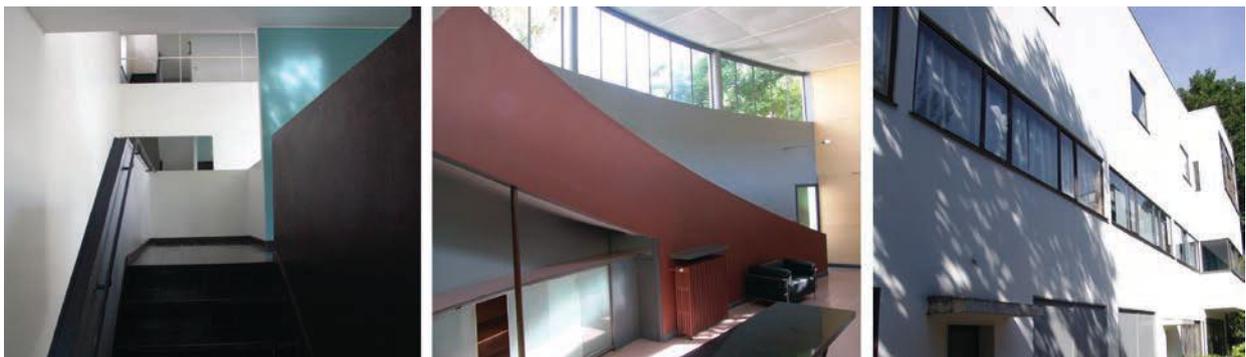
▶ Designed between 1923 and 1925 by Le Corbusier and Pierre Jeanneret, Maison La Roche in Paris is an early example of the modernist style embraced by many architects of the era, including the Bauhaus. Note the use of simple, uncluttered volumes and unadorned surfaces. These characteristics were typical of mid-century modernism.

They believed that what you leave out of a design can be as important as what you put in. White space, which doesn't have to be white, can help focus on important things. In rooms or buildings, how things are arranged affects how people use the space, like guiding people through an airport.
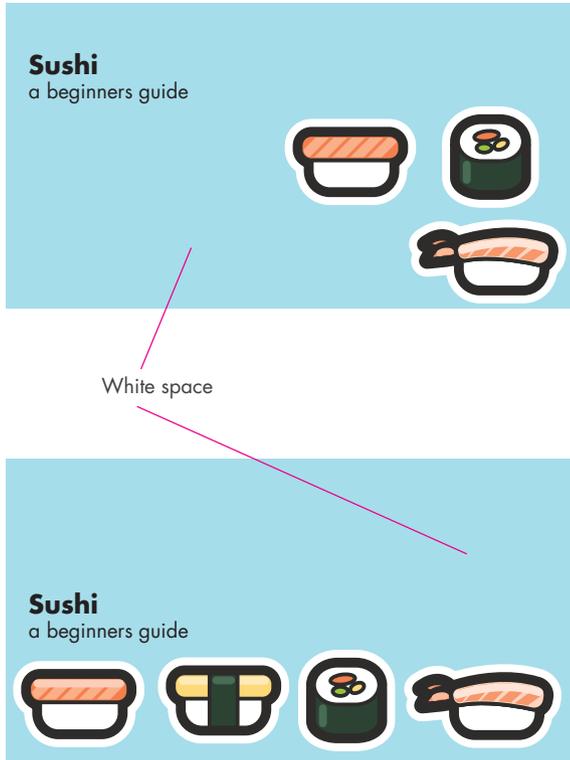
▶ Balance can be created with 'white' or empty space.

RESPONSIVE ARCHITECTURE
FYI

Recently, an emergent discipline called 'responsive architecture' has begun asking how physical spaces can respond to the presence of people passing through them. Through a combination of embedded robotics and tensile materials, architects are experimenting with art installations and wall structures that bend, flex, and expand as crowds approach them. Motion sensors can be paired with climate control systems to adjust a room's temperature and ambient lighting as it fills with people.

Source: Ethan Marcotte, 'Responsive web design', 2010

With practice, it is possible to create striking and memorable designs using space. In combination with design elements and principles such as hierarchy, scale and proportion, the organisation of space can influence the response of a user and achieve a variety of different design purposes.

▶ This illustration of a home interior is used to promote a new housing development. The representation of a dwelling in this way allows the viewers to imagine themselves within the environment and can assist in marketing a space that does not yet exist. In environmental design areas, the representation of space in this way enables the end user to visualise a three-dimensional space more easily than they might from a plan.

KEYWORD ~ SPACE
abc

Space can be:

+ defined
+ clean
+ expansive
+ confined
+ intuitive and responsive
+ delineated
+ minimalist
+ contemporary
+ ordered
+ flowing

+ inviting
+ targeted.

Space can be used to:

+ guide the viewer/user
+ control user/viewer behaviour
+ create a mood
+ emphasise important visual information.

TEXTURE

Texture in design refers to the tactile quality or surface characteristics of an object or visual element. It adds a sensory dimension to the overall design experience and can be applied across various design disciplines, including architecture, product design and graphic design.

In architecture, materials such as rough stone, smooth glass or textured concrete create tactile surfaces, influencing the perception of built environments. Product designers consider the texture of materials for components, enhancing both aesthetics and usability. In graphic design, texture is often visually simulated through patterns or images, contributing to the overall visual appeal. Designers use texture to achieve specific aesthetic, functional or emotional goals, enriching the user experience with depth and interest.

Texture offers considerable challenges when using visual communication to represent designs with texture; it is challenging to visually represent features that we usually recognise through our sense of touch. Representing texture on a two-dimensional surface takes some practice and acute observational skills. The key to depicting texture effectively is to take into account how tonal or colour variations can affect the appearance of texture.
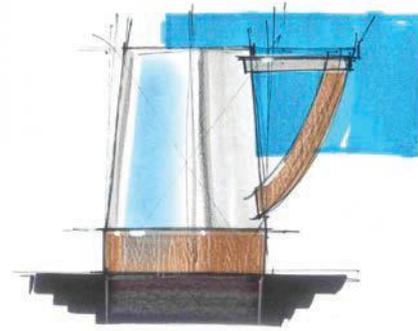
Mark Wilken

▶ A quick product sketch, designed to rapidly explain the form and materials of a kettle, makes use of pastel, marker and a texture board to represent metallic, wood and flat surfaces.

Importantly, texture communicates information about the characteristics of objects. Rendered architectural illustrations might depict stone or brickwork, reflective glass surfaces and the foliage of surrounding trees. Such detail communicates information that would not be available in two-dimensional plans or three-dimensional line drawings alone.
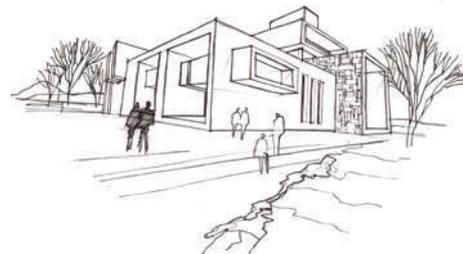
Mark Wilken

▶ An architectural sketch, using only line, can help describe the textural elements of an environment such as a stone wall or rendered surface.
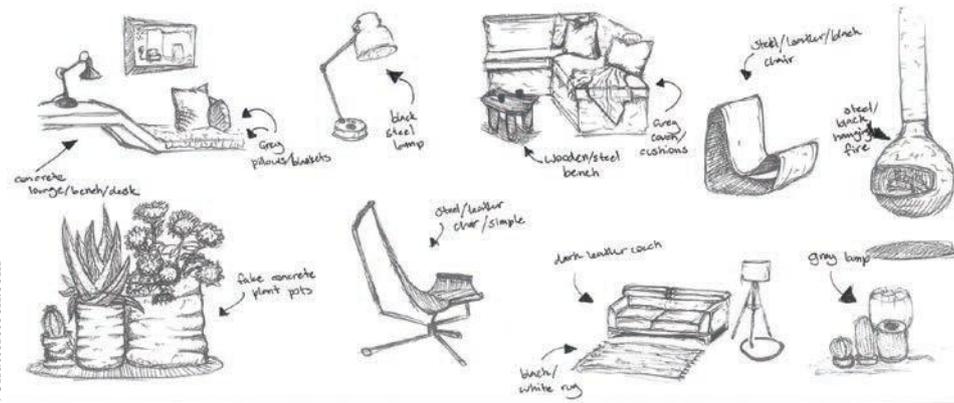
It_Girl87/Shutterstock.com

▶ Sketching by student, Oscar Hammersley.

The texture of a product or its packaging can influence our attitude towards it as consumers. Increasingly, the pursuit of 'greener' product design and packaging has led to an increase in products packaged in recycled materials. These have 'natural' textures that appeal to or encourage an environmentally aware audience.

Textures can appeal to us on a subconscious level. Humans enjoy the sense of touch; the appeal of a fluffy kitten or smooth velvet invites us to touch a surface. A soft texture may imply tenderness or luxury. Alternatively, harsh textures such as jagged edges, barbs or thorns might repel us and may even imply danger.

▶ An example of interior design using light sources to create a range of tone across a similar colour pallette

KEYWORD ~ TEXTURE   **abc**

Texture can be:

+ smooth
+ glossy
+ matt
+ uneven
+ coarse
+ tactile
+ reflective
+ dull
+ metallic.

Texture can be used to:

+ contrast
+ emphasise
+ create pattern
+ enhance and describe form.

APPLYING TONE   💬

When we consider applying tone, this refers to visual communication and the application of rendering to show highlights and shadows and the midtones between. This is explored within the visualisation section and can also be applied to graphical design outcomes.

TONE

In design, tone is a fundamental element that influences the overall mood, atmosphere and emotional resonance of a visual or spatial composition. Similar to the artistic colour concept of lightness and darkness, tone in design refers to the varying levels of brightness and darkness. Designers strategically manipulate tones through lighting, colour choices and spatial arrangements to create depth, dimension and a specific emotional response. Whether in architecture, product design or graphic design, understanding and implementing tone allows designers to craft engaging, harmonious and emotionally resonant experiences for users.

When discussing tone, you may come across the term 'tonal scale', which refers to a series of tonal values or levels between black and white. Tone describes the play of light and shadow on an object, defining its form or shape.

KEYWORD ~ TONE   **abc**

Tone can be:

+ dark
+ light
+ medium
+ subtle
+ dramatic
+ muted
+ soft
+ harsh
+ defined.

Tone can be used to:

+ render
+ contrast
+ model
+ highlight
+ emphasise
+ define
+ enhance
+ create form
+ describe texture
+ define structure.

16.2 DESIGN PRINCIPLES

PROPORTION

Proportion is about relationships – relationships between the scale of parts of an object or a composition. Proportion, properly used, creates balance and in turn provides visual harmony – essential in the creation of pleasing designs.

How do objects relate to one another within a composition? A chair that has a small seat and an oversized back support may be uncomfortable and ugly. That doesn't mean that an overly large back support is not a feasible design option; the chair's elements simply need to be in proportion to one another to become an effective design. Likewise, in two-dimensional design, proportion is essential to creating successful designs.

▶ Note the proportional differences between the two images of the teacup and saucer.

In the left-hand image of the teacup and saucer, the proportions of shape and line are incorrect. This interferes with the believability and the attractiveness of the illustration. If the viewer becomes distracted by inconsistencies such as poor proportion it is likely that they will miss the message of the visual communication.

Rushfaster.com.au, with permission

▶ Rushfaster sells bags and luggage online. To assist purchasers with decision-making, proportion or scale is used to help visualise the size of each bag.

AESTHETIC PERFECTION   **FYI**

During the Renaissance, artists were concerned with the pursuit of visual harmony and beauty in drawing, painting and architecture. This pursuit of aesthetic perfection led to the development of complex geometric systems of proportion. Artists and architects used systems such as the 'golden ratio', 'golden section' or 'divine proportion' devised by the ancient Greeks, which defined a clear visual order as a geometric equation.

Similarly, the 'harmonic ratios' of the Renaissance established a visual balance in objects by establishing that the proportions within the form matched the overall proportion of the form as a whole.

▶ The evolution of mobile phone size and proportion

GOLDEN RATIO

This online tool allows the user to calculate the golden ratio of a series of measurements; a handy tool when creating layouts for online and print pages.

Proportion relates to the comparison of different elements within a design. Relationships are important in any design; they indicate which elements relate to one another and lead the eye through information in the most effective manner.

▶ Fashion illustrators distort the proportions of the human figure to emphasise features such as legs and necks. Generally speaking, the human body is equal to the height of 7.5 to 8 heads. In fashion illustration, those proportions are extended to 9 heads, which creates a lengthened legs and torso.

ALIGNMENT

Alignment is the placement of elements in relation to one another. When using word-processing software, you may have used the text alignment tools, which enable you to justify (align) your text to the left, right or centre of your page. These tools can give your text and images a sense of order and organisation that keeps the message clear.

TECH TIP ~ LAYOUT SOFTWARE

Layout software such as Adobe InDesign is ideal for creating graphical design composition but it is possible to create equally effective grids using standard word-processing software. Use a table to form a grid and insert images and text into cells. You can hide the outlines of the table and adjust margins to form your compositional grid.

In graphic design, the considered alignment of type, imagery and other visual elements form effective compositions. The various visual components of a design are often managed within a visual 'grid'. A grid is an invisible structure that supports the layout of print and digital content. A designer will use a grid to create hierarchy within a design composition and to delineate the placement of text and image. Grids can be seen in newspapers, magazines, web pages and even mobile devices. The grid can be a powerful tool when used well; it can draw the eye through a composition and create strong visual relationships between type and imagery.

Left alignment

Centre alignment

Right alignment

▶ Effective use of alignment demonstrates that your design is organised and implies that elements have relationships with other elements and images.

Mark Laurie/Shutterstock.com
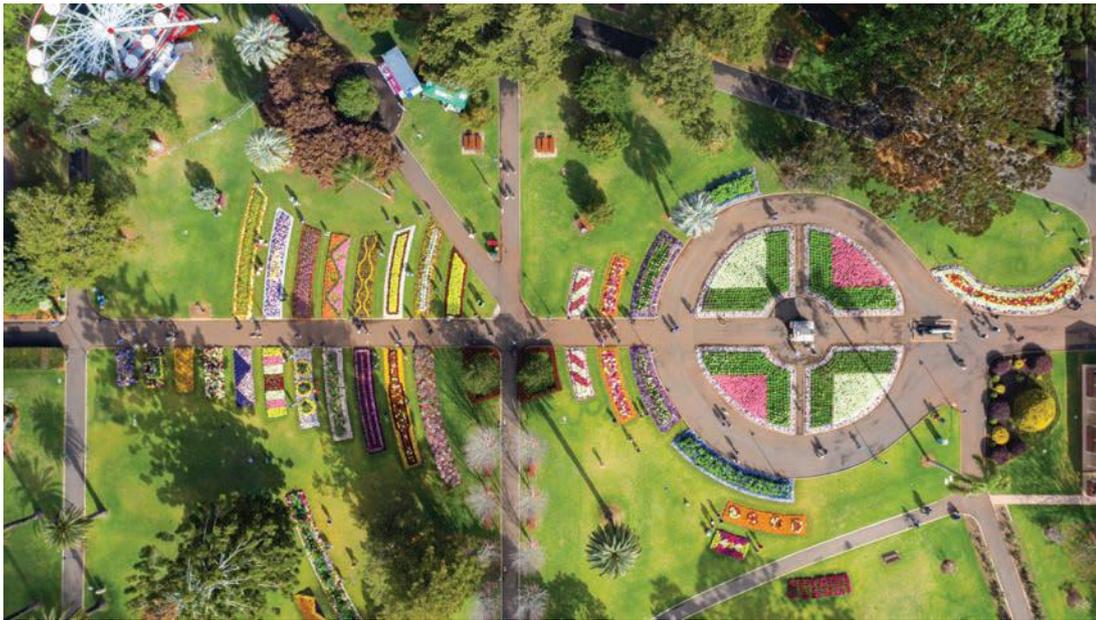
▶ Alignment is demonstrated by this aerial shot of the Carnival of Flowers display at Queens Park in Toowoomba.
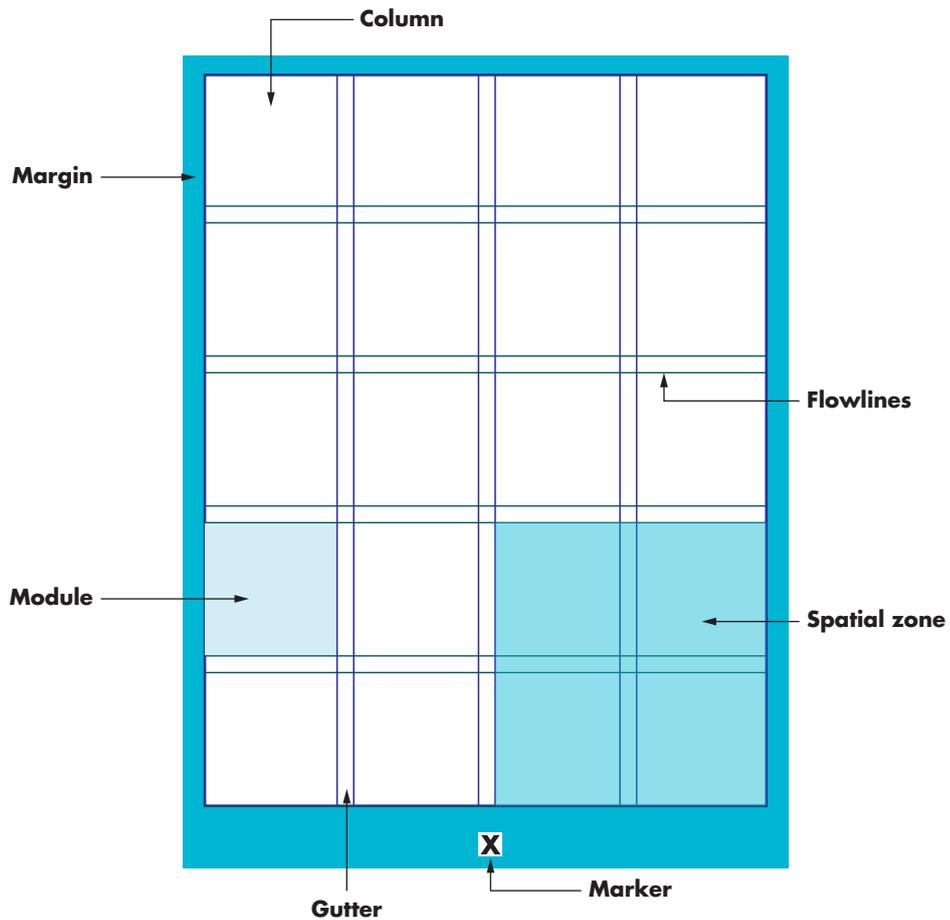
▶ The main components of a grid

| Single-column grid | Two-column grid | Multiple-column grid | Modular grid | Hierarchical grid |
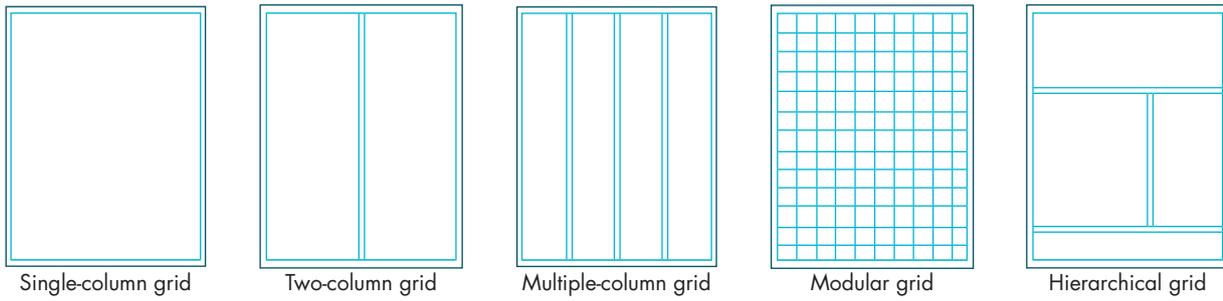
▶ Some common grid formats. The grid lines enable visual elements to be aligned effectively and assist in drawing the eye of the viewer to key information.

BALANCE

Balance in design is a foundational principle that influences various design areas. It serves to create harmony within a composition, leading to visual appeal. This principle is deeply rooted in our innate preference for equilibrium, mirroring the balance found in the human body. Unbalanced designs may lack emphasis and visual allure, potentially diminishing engagement.

Harmony, a key outcome of balance, doesn't equate to dullness; on the contrary, it enhances interest. There are two main types of balance: symmetrical and asymmetrical. The choice between them depends on the purpose, audience and context of the design, allowing for versatile and effective applications.

Exopixel/Shutterstock.com

Imagine a composition that has been divided through the centre by an invisible horizontal line (axis) and an invisible vertical line. Both axes provide reference points for creating balanced and visually harmonious compositions. Although we cannot see the axes, they provide a structure that can be used to assist in planning an effective design.
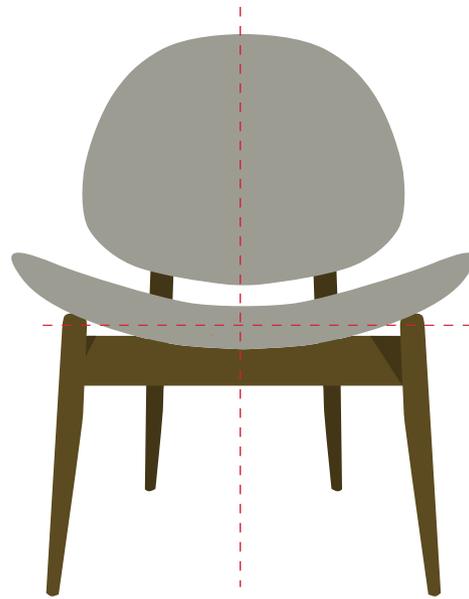
Symmetrical balance

A composition with symmetrical balance mirrors the elements on opposite sides of the visual axis – from one side to the other.

Harley Kingston/Shutterstock.com

▶ The Rockhampton School of Arts shows symmetrical balance in architecture.

Symmetrical design is seen as stable, static and passive. Such composition has a sense of regularity or conformity. Symmetrical balance can be perceived as formal and organised in style, but it can also achieve a sense of unity between design elements, creating order and even a sense of beauty.

When approaching a symmetrical composition, it is possible to over-emphasise the centre and align elements in a restricted manner. It is important to be aware of the entire space you are working with.

Asymmetrical balance

Asymmetrical balance is characterised by an arrangement of elements that is not mirrored or equal in appearance. Asymmetrically balanced compositions appear to be more dynamic than symmetrical compositions because the placement of elements creates a sense of dynamic energy.

The important thing to remember with asymmetrical balance is that the composition is still balanced! Balance is created by manipulating elements and does not have to fit the traditional 'left, right and centre' alignment approach. Asymmetrically balanced compositions can be created by repetition of elements and images, and creative use of scale, emphasis and texture.

CONTRAST

Contrast is created when two very different elements are used together for aesthetic effect. Contrast can create conflict between elements – light versus dark, bold versus fine – which leads to a visually dramatic composition.

▶   Asymmetrical balance in fashion design

Contrast creates a tension between elements. In fiction and film, tension heightens the interest for the reader or viewer – an increased level of tension encourages a sense of anticipation by raising the heart rate and stirring further interest in the storyline. Although visual contrast or contrast in design experience may not always make the heart race faster, it attracts attention and encourages interest in the design.

▶   Personal portfolio of Felix Lesouef presented in an asymmetrical format on a web page

▶ Bold contrasts between light and dark in this illustration convey a sense of drama.

Contrast is created in many different ways and with many different elements. The key to effective use of contrast is to use it boldly. Don't be afraid to take risks with contrasting elements.

Juxtaposition

Juxtaposition refers to the placement of two different elements together within a composition in a proximity that suggests a comparison. Otherwise, unrelated elements are contrasted to create a strong visual relationship that communicates a message.

▶ Royal Ontario Museum, old meets new

Contrast in colour

The use of contrasting colours can create optical effects. Blue and red used at equal intensity can seem to 'fight' for the most dominant role in a composition, creating the illusion of movement.

▶ In this interior design, the use of copper creates a contrast with the timber, providing a change in colour, texture and light from the reflective surface.

Contrast by tone and texture

Contrasting tones can assist in defining the form of objects in rendering. The difference between a dark tone and a very light or white highlight creates a sense of an object in space. Tone provides information about the surface of a form that, without contrast, would appear flat. When applying tone to an object, it is important to use a wide range of tones and to be comfortable about applying black and using white.

Contrast can be used for dramatic effect when combining textures. In fashion and textile design, it is possible to see clear plastics and soft fabrics incorporated together in some contemporary clothing and accessories. Clashing colours and contrasting fabrics are often used to draw attention to part of a garment.

▶ Contrasting textures including wood and concrete draw attention to the angles and forms of this Southport Park project by Rothelowman Architects.

Contrast in space, shape and form

Contrasting shapes such as a square and a circle can be used as part of an alternating pattern to create visual interest. A pattern that contains variation and particularly strong contrasts is immediately more dominant and noticeable than a pattern that does not. Point can also be used in this way to create noticeable visual variations.

Shape is used to contrast with other elements. Organic shapes can soften strong colours, and geometric shapes can provide a contrasting ground for text and the placement of images.

Geometric forms can be used with organic abstract forms to create contrast in interior and exterior architecture. In the design of residential and commercial buildings, architects often work with landscape designers to create contrast between the natural and constructed environment; for example, the contrast between a gently sloping garden and the geometric lines of a contemporary home can create a dramatic effect.

▶   Defying logic, the large building appears to rest on a soft, red ball. In architectural design, the contrast between forms and materials, textures and colours can create striking and provocative structures.

HARMONY

Imagine that you are listening to a friend sing during a session of karaoke. Although some people have a natural gift for singing their favourite songs, many people sing out of tune, off-key and with no 'harmony'. That lack of harmony can be painful to listen to and the same goes for visual harmony; a lack of it can be painful to view. The human eye is instinctively attracted to harmonious design and this has an impact on our preferences for products, environments and communication designs.
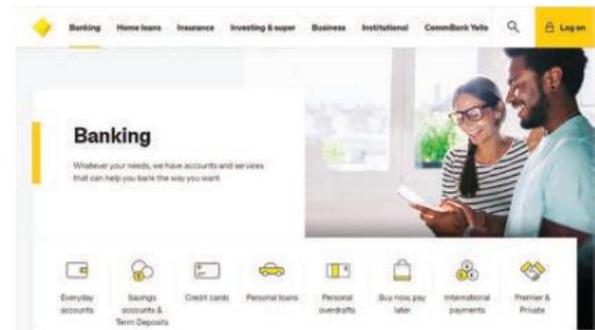
▶   This banking website is an example of of visual harmony.

▶   This digital pattern for a web page is created using analogous colours. The use of cool, harmonious hues of blue and green provide a pleasing visual background to more important information.

HIERARCHY

As we grow up, we become familiar with the concept of hierarchy. If you are a youngest child and were forced to sit in the middle seat in the car, or were the last person to have your opinion heard, you may have been painfully aware of family hierarchy. Hierarchy is the establishment of an order of importance. Just like a 'pecking order' within a family, there is a hierarchy within a composition.

THE NEWS

PRICE OF TEA IN CHINA
SKYROCKETS

Price of a cuppa to soar

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Nullam malesuada lectus. Praesent enim neque, pellentesque pulvinar, laoreet non, tristique in, tellus. Quisque et neque. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Aliquam eget ipsum in enim luctus rhoncus.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Nullam malesuada lectus. Praesent enim neque, pellentesque pulvinar, laoreet non, tristique in, tellus. Quisque et neque. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Aliquam eget ipsum in enim luctus rhoncus. Pellentesque et libero.

THE EYE HAS IT!

When attempting to understand the hierarchy of a composition, close your eyes for a few seconds. When you open them, what is your eye first drawn to? The dominant element will establish the hierarchy.

Hierarchy can be established in many ways. The use of scale is only one method. Dominant colours, shapes and textures can also draw the eye to the most important aspects of a composition. However, poor use of hierarchy can distract from the message and meaning of a design, so it is essential to control the dominance of elements in a composition.

Kevin Hellon/Shutterstock.com

▶ The Sydney Opera house was designed by Danish Architect Jorn Utzon. Hierarchy is created by the shells with each measured by size and location.

PROXIMITY

The principle of proximity is a principle of perception that states that objects placed close to one another are perceived to be related. Objects that sit close to one another establish a clear visual relationship, while objects that are separated or that sit far apart within a space or composition are perceived as having little or no visual relationship.

Andrey Sedoy/Shutterstock.com

▶ In this remote control, proximity is used in the positioning of the buttons to denote the similar functions of some buttons. This helps the user to navigate the many functions provided by the device.

P-jitti/Shutterstock.com

▶ Town planners consider the relationship of zones and the proximity of buildings that have common purpose to reduce traffic and promote social and community connections.

Domestic pet comparison: dogs vs cats

Dogs

Caninem

Usually easy to train

Social

42 teeth

Non-retractable claws

Earthbound

Long distance runners

Highly developed sense of smell

Can be housetrained

Carnivorous

Respond positively to love and affection

Cats

Feline

Can be difficult to train

Solitary

30 teeth

Retractable claws

Can jump and climb

Sprinters
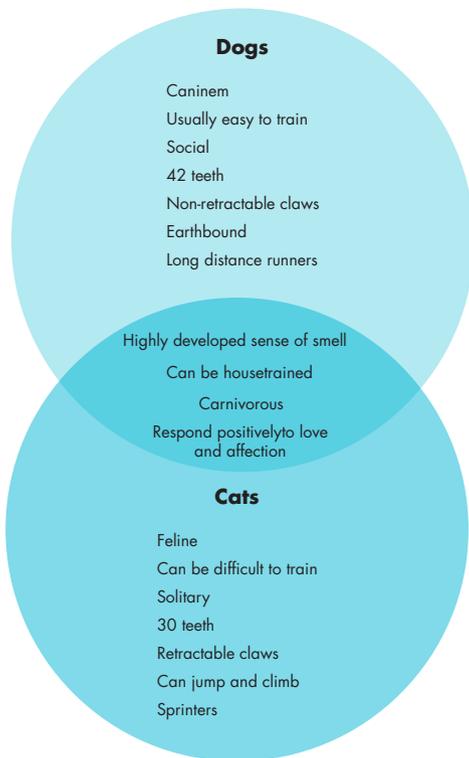
▶ Venn diagrams are a good example of the use of proximity to illustrate sets of overlapping facts, concepts and ideas. Where the circles intersect, concepts are shared.

When creating an effective space, product or composition, it is important to consider the connectedness of elements. For instance, in the design of a car, the proximity of essential functions to the driver, such as the indicator controls, means that the driving experience is logical and efficient.

The application of proximity depends entirely on the original purpose of the design itself. Take care to understand the needs of the audience and the purpose of the design when applying the design principle of proximity.

REPETITION

Repetition refers to the use of the same or similar design elements repeatedly within a design. Repetition is most commonly seen in the creation of visual pattern. Created from shapes or combinations of shapes, the repetition of visual elements can be seen in many design areas, including environmental design, product design and graphic design.

Repetitive patterns create a sense of unity and establish clear relationships within a composition. The power of repetitive patterns lies in consistency. The repetition of elements may be as basic as a bulleted list in a document, or as complex as the structure of enlarged snowflakes or a Byzantine tile mosaic.
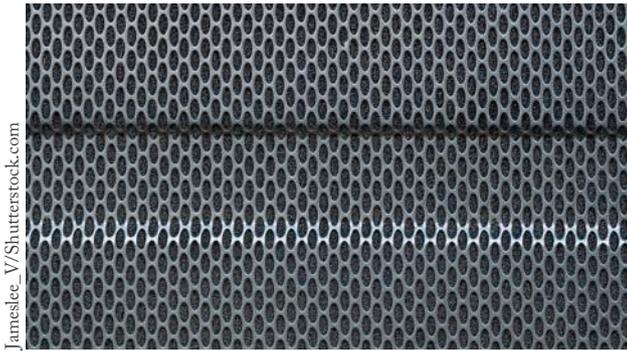
Jameslee_V/Shutterstock.com

▶ Speaker cover with repetition of shape

Repetitive patterns can create a sense of rhythm in a composition, adding movement to the elements. Repeating an arrangement of shapes in a manner that is dynamic adds energy and visual interest. Creative use of figure–ground can allow for the construction of patterns that are visually ambiguous and optically intriguing.

Arcaid Images/Alamy Stock Photo

▶ Repetition of elements in interior design. Replica Eames chairs are repeated with variety of colour.

Repeated elements are also seen in patterns that alternate. Such patterns may consist of several different elements used in a changing sequence. Alternating patterns can be created using any visual element and can add visual variety and dynamism to a composition.

Textile designers commonly use alternating patterns that display variations in colour, line and shape. Although designers who work with fabric and textiles may focus on the purpose of the material – such as its application to an individual item of clothing – they also have a keen sense of how pattern will appear on a larger scale.

Like repetitive pattern, alternating pattern creates a sense of order, but in a very different way. The variation of a pattern that alternates a range of elements conveys innate energy and life.

AlterYourReality/Getty Images

Millsrymer/Getty Images

Brainsil/Getty Images

▶ Patterns occur in nature and the constructed environment.

Many patterns occur in nature and in the constructed environment. These can be a great source of inspiration in design and may trigger ideas for two-dimensional and "three-dimensional design concepts.

Pattern is used in many areas of design. Digital designers use repeating patterns to create wallpapers and backgrounds for computer operating systems and web pages.

Textile and interior designers use patterns in fabrics and surface decoration. Patterns may alter as fashions and trends change, but they are integral to many areas of design. Pattern designers may use traditional techniques and materials in the creation of pattern such as screen printing, drawing and dyeing. However, in fashion, the patterns of many commercial fabrics are developed and refined entirely by computer.

Lexver/Shutterstock.com

▶ Paisley textile pattern

CHAPTER REVIEW

1 Explain the meaning of:
   a   analogous colour
   b   symmetrical balance
   c   repetitive pattern
   d   spatial
   e   dominant hierarchy
   f   unproportioned
   g   dramatic contrast
   h   white space
   i   geometric form.
2 a   Develop a glossary of descriptive words for each of the design elements. Use the suggestions in this chapter to start your list and add as many additional words as you can.
   b   In your own words, create a minimum of eight sentences that describe the effect of each design principle. For example: 'Repetitive pattern can help to reinforce a visual motif or theme'. Build up as many sentences as you can for each principle. Share with your class to create a helpful collection to assist with analysis and annotation.
3 Suggest how at least one design element and one design principle might be applied within the following design scenarios.
   a   A poster to promote the opening of a new early learning centre for 3- to 4-year-olds
   b   The interior of a bookshop and café in a regional hospital
   c   A scale model of a sustainable 'tiny house'
   d   A wayfinding system at a water park
   e   The cover design for the program of an acrobat-based circus
4 Find images that show examples of designs for each of the elements and principles. You can use a moodboard to present these. The designs could be from any of the design disciplines (fashion design, digital design etc.) or perhaps one from each.
5 Identify the design elements and principles that are most important within your project. You could also look at a design that you have lots of experience with if you are between design projects.

DESIGN STYLES

We look at the present through a rear-view mirror.
We march backwards into the future.

Marshall McLuhan

In this chapter:

Learn the language:

+ collaboration
+ culture
+ influences
+ modernism
+ movements
+ postmodernism
+ reaction
+ society
+ styles

Where do new ideas come from? Simply put, they emerge via extrapolation – modifying existing solutions in a straightforward way to suit current circumstances or invention – combining existing ideas in new ways. This happens with technologies but also styles. All new things are grounded, in some measure, on existing things.

Design always reflects the styles, technologies and culture of its time. Styles in art and design reflect the zeitgeist (a word from German meaning 'the spirit of the time'). They emerge from and show trends from that period. Social changes affect different design areas like fashion, architecture, graphic design and product design. As people's feelings change, the way things look also changes. What might have been seen as strange or challenging 30 years ago might seem old-fashioned and boring now.

All art and design are influenced by prior work. In much the same way that cultures influence and change each other, design trends often take ideas from the past and recombine and remake them for the present. This retrospective, or 'retro', design approach is not new: the Egyptomania of 19th-century Europe, spurred on by Napolean's conquest of Egypt, was one of the influences on the Art Nouveau and Art Deco movements of the 19th and 20th centuries. Looking back at designs helps us see how technology, media and materials have influenced contemporary design. Materials and techniques used in designs change because of new technologies.

Analysing previous designs helps designers avoid repeating mistakes and improve successful elements. It's learning from the past to make better designs in the future.

17.1 THE HISTORICAL CONTEXT

There are recognisable links and influences that flow through the history of design styles. The development of designs does not occur in a vacuum, and many designers take the historical successes or failures of earlier designs into account when developing new concepts. Designers understand that to create something new, they must look to a range of sources, including designs of the past. Designers understand that everything they design is, at least in some measure, built from ideas and designs that have gone before.

Historical influences on design can be subtle, perhaps even imperceptible. A designer may look at past designs and analyse examples as part of research. What aspect of the design succeeded? What failed? What appealed to the audience of the time? Answers to these questions can help designers to avoid repeating mistakes and lead them to focus on expanding the successful elements of a previous design.

EVERYTHING IS A REMIX **FYI**

Everything is a remix is a web series and theory by filmmaker Kirby Ferguson. It explores the concept that creativity relies on combining existing ideas in new ways. The series contends that all creative works, across various fields, are essentially remixes of pre-existing content. It challenges the notion of strict originality, emphasising how artists and inventors build upon existing work to create something new. *Everything is a remix* highlights the interconnected nature of creative expression and the role of borrowing, transforming and combining elements in the creative process.

You can watch *Everything is a remix* on Kirby Ferguson's channel on YouTube and explore his ideas further on its website.

Weblink
Everything is a remix

Some designers incorporate their historical references more obviously than others. Fashion trends often refer to past styles and movements for inspiration, creating garments and textiles with obvious links to past styles, and the same thing happens in communication design. Retro actually means 'backward looking', and it is possible to trace the origins of many contemporary designs that look back into the past.

Designers look to historical sources for:
- inspiration and ideas for new design concepts
- information about techniques and methods of production
- analysis of successes and failures as reference for design concepts
- use of design elements and design principles that have endured and remain effective
- concepts that emulate an era, style or historical climate.

17.2 KEY MOVEMENTS IN DESIGN

To understand some of the historical influences that affect contemporary design, it is valuable to have a general grasp of key design developments over the past 150 years. Many excellent reference books present detailed information about design movements, from the Arts and Crafts movement of the 19th century to postmodernism and design in the digital

era. The internet also offers many websites that feature design timelines and profiles of significant designers in every field.

This chapter is a comparatively brief overview of historical styles and it is recommended that you expand your knowledge by reading some of the many books and websites that offer rich information about design history.

Major developments in design occurred after the Industrial Revolution of the 18th and 19th centuries, a period of immense change in agriculture, manufacturing, mining, transportation and technology that had a massive impact on the social and cultural makeup of Western society.

The 19th and 20th centuries saw significant change in the way products, services and environments are produced. The mechanisation of manufacturing processes, the rise of factories and the growth of global markets ushered in major changes in how products were manufactured. Products once produced locally by artisans were now produced en masse and distributed widely. Interestingly, many design styles evolved in direct reaction to the social and cultural changes imposed by the Industrial Revolution; some designers reacted negatively while others embraced the new processes.

DESIGN HISTORY SINCE 1850

1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020	

1850–1914 Arts & Crafts Movement

1870–1900 Aesthetic Movement

1880–1910 Art Nouveau

1897–1905 Vienna Secession

Modernism

1907–1935 Deutscher Werkbund

1909–1930 Futurism

1916–1923 Dada

1917–1935 Constructivism

1917–1931 De Stijl

1919–1933 Bauhaus

1920–1980 International Style

1920–1939 Art Deco

1930–1960 Organic Design & Biomorphism

1930–1950 Streamline

Postmodernism

Pop 1958–1975

Radical Design & Anti Design 1968–1978

Eco Design 1970–present

Postmodern Design 1965–present

Memphis 1981–1988

Digital Design 1984–present

Maker Movement 2000–present

Arts and Crafts movement, 1850–1914

The Arts and Crafts movement was influential in British decorative arts, architecture and landscape design. The movement was inspired by the writings of John Ruskin, and was a reaction to both the mechanisation of the Industrial Revolution and the over-intricate styling of the Victorian era. The movement called for simplicity and clear function, and adherents believed that beautiful decorative products played a role in the improvement of people's lives. The movement eschewed mass-production techniques in favour of a hand-crafted and artisan-based approach. Designers of the Arts and Crafts movement looked to the natural environment for inspiration and their work often used visual motifs directly sourced from flora. Handmade and carefully crafted, the work was often manufactured by slow, traditional techniques, which meant pieces were generally rare and expensive.
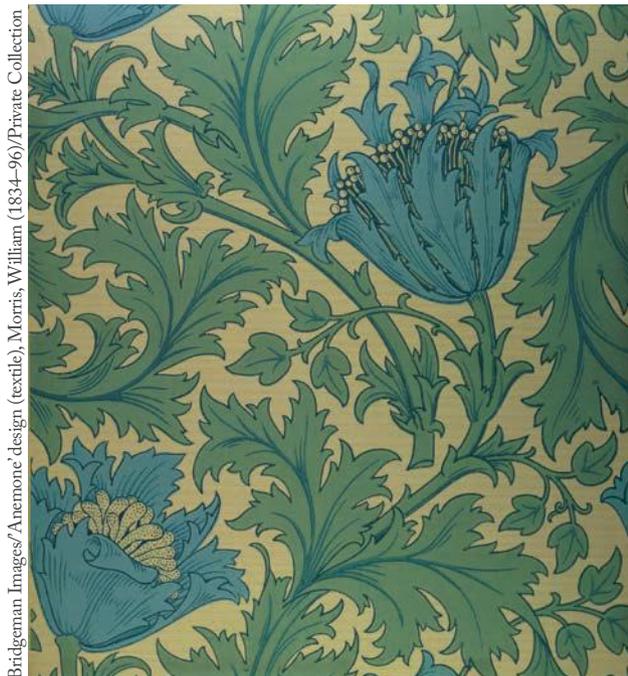
▶ Morris wallpaper from the Victoria and Albert Museum collection

In Australia, some furniture makers embraced the Arts and Crafts style; Christobel Francis Rojo in Melbourne and Beard Watson Ltd in Sydney were highly regarded for their Arts and Crafts styling using distinctively Australian timbers. Some houses were built in this style and a few can still be seen in Canberra, Sydney and Melbourne.

Key designers

William Morris, Charles Rennie Mackintosh, Margaret MacDonald Mackintosh, Frank Lloyd Wright, Alexander Knox

▶ 'Argyle' chair by Charles Rennie Mackintosh, c. 1897

Aesthetic movement, 1870–1900

Inspired by Japanese woodcuts and Eastern goods and furnishings, the Aesthetic movement was concerned with the representation of the natural and the beautiful in an Anglo-Oriental style. The movement's emphasis was on interiors and objects that could improve quality of life through their sheer beauty. As in Art Nouveau, a focus on the stylised abstraction of natural imagery was embraced. Writers, artists and designers took up the Aesthetic movement's doctrine of 'art for art's sake' as defined by playwright Oscar Wilde.

Key designers

Liberty (Arthur Liberty), Aubrey Beardsley, Arthur Silver

▶ The Liberty department store in London is an example of architectural design from the Aesthetic movement

Art Nouveau, 1880–1910

Art Nouveau was a global movement, but was most commonly known by its French identity. It displayed an emphasis on decoration and artistic unity based on natural, organic, flowing shapes and forms. Like movements in Britain, this was a reaction to the urban environment fostered by the Industrial Revolution. Art Nouveau is distinguished by its organic curvilinear forms, and sensual and rhythmic styling. The influence of Art Nouveau can be seen in the product design, architecture, jewellery, signage, interior design and graphic design of the period.

Kristen Guthrie

▶ Detail of an Art Nouveau glass wall, Museum of Modern Art, Brussels

In Germany, Jugendstil was an Art Nouveau movement focused on Germanic themes and mythology. The driving force of the Jugendstil movement was the magazine *Munchner Jugend*, which made extensive use of the illustrations and designs by German Art Nouveau artists. In Australia, the influence of Art Nouveau was seen mostly in architecture.
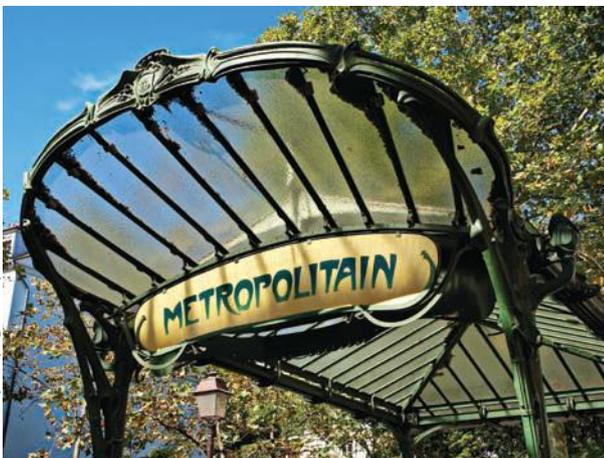
Didier Zylberyng/Alamy Stock Photo

▶ Art nouveau entrance to the Paris Metro designed by Hector Guimard in 1900

Iain Masterton/Alamy Stock Photo

Key designers

Jules Cheret, Henri Toulouse-Lautrec, Leonetto Capiello, Victor Horta, Hector Guimard

Vienna Secession, 1897–1905
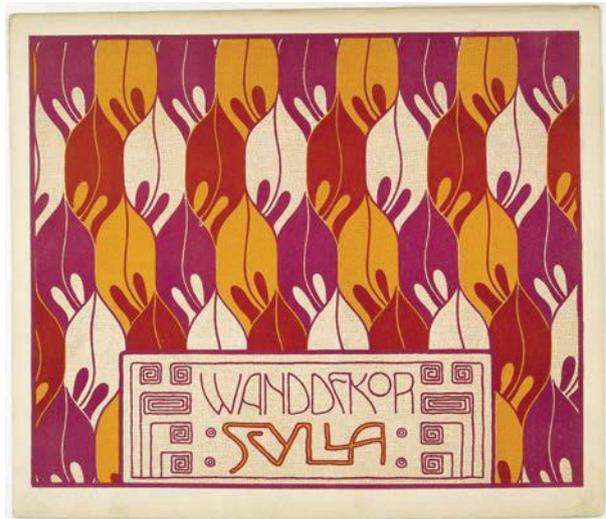
The Picture Art Collection/Alamy Stock Photo

▶ Print by Koloman Moser

The Vienna Secession (meaning withdrawal) was a reaction to the conservatism of the established artistic community in Austria at that time. With the assistance of the City of Vienna and a number of wealthy patrons, the secessionists, a group formed by artist Gustav Klimt in 1897, constructed an exhibition hall in which to display their work, including metalwork, furniture, lithographs and paintings. The hall, designed by Josef Olbrich, with its distinctive geometric features including a gold dome and elaborate decorative elements, is a good example of Viennese Art Nouveau architecture.

The exhibition hall became the focus of the movement and many large-scale exhibitions were held featuring avant-garde artists and designers from across Europe. The secessionists, though together for only a brief time, were highly influential and innovators in the area of graphic design. Their journal *Ver Sacrum* fused typography, ornamental decoration and images with influences from Asia, including Japan.

Key designers

Gustav Klimt, Josef Olbrich, Josef Hoffmann, Koloman Moser

Deutscher Werkbund, 1907–35

Established in Germany in 1907, the Deutscher Werkbund is considered by many historians as the foundation of modernism. Members of the Deutscher Werkbund recognised that a formal visual language of function was overtaking the decorative and expressive design of the Jugendstil. In the chaos that followed the First World War, the group recognised the need for standardisation in the production of objects, and produced simple forms that featured plain rather than decorative surfaces.
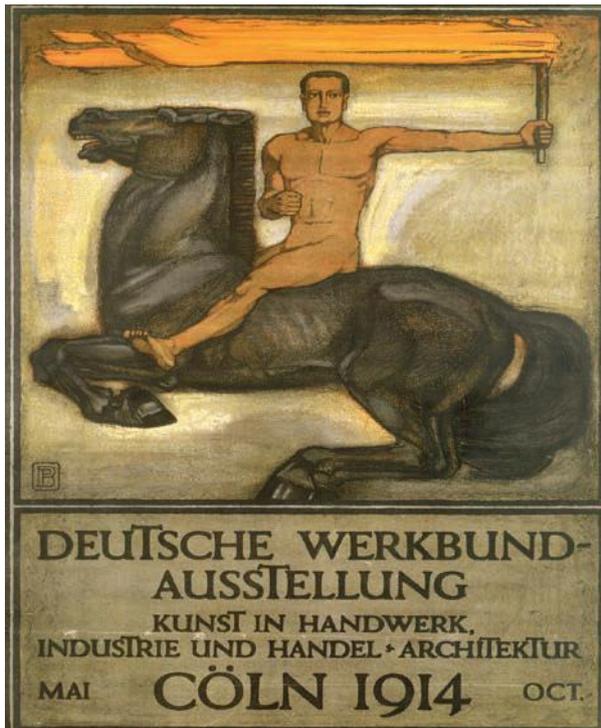
Bridgeman Images/Deutsche Werkbund Austellung, Coln, 1914 (colour litho), Behrens, Peter (1868–1940)/Victoria & Albert Museum, London, UK

▶ Poster for Deutsche Werkbund-Ausstellung by Peter Behrens, 1914

Key designers

Peter Behrens, Julius Klinger, Walter Gropius, Ludwig Mies van der Rohe

MODERNISM

FYI

Modernism is a design aesthetic that developed in the early part of the 20th century and continued into its later stages. Modernism reflected the zeitgeist, or 'spirit of its age'. Rising from the bleakness of wars, modernism was optimistically underpinned by utopian social ideals. Modernists rejected the decorative motifs of the 19th and early 20th centuries in favour of clean, functional forms. Surface decoration was minimally used and, when it was applied, appeared restrained. Visually, modernism was characterised by the use of modern materials (such as steel and glass), the application of abstract forms, the manipulation of space and a conservative colour palette, dominated by whites, greys and black. Modernism is often summarised by the expression 'Less is more', coined by Bauhaus member Ludwig Mies van der Rohe.

Elizabeth Whiting & Associates/Alamy Stock Photo

Futurism, 1909–30

Established by Italian writer Filippo Tommaso Marinetti, and inspired by Cubism, Futurism was one of the first truly radical design movements. Concerned with embracing technological progress, the Futurists were highly influential on subsequent movements. The written word and the printed word were central to the philosophy of Futurism, and designs often involved

bold, complex combinations of fragmented typography, repeated icons and Roman numerals. In London, the visual characteristics of Futurism were adopted by the Vorticists. During the 1920s, many of the stylistic elements of Futurism, such as strong grid structures, were incorporated into print advertising, book design and magazine layouts.

Key designers

Giacomo Balla, Umberto and Carlo Carra, Edward McKnight Kauffer

▶ Heydar Aliyev Centre, a cultural centre in Baku Azerbaijan, designed by architect Zaha Hadid

Uskarp/Shutterstock.com

Dada, 1916–23

Established in reaction to the atrocities of the First World War, this artistic and literary movement used experimental techniques, collage and randomly generated words and images to create theatre, poetry and artworks. Although Dada is not usually seen as a design movement, the Dadaists exerted a major influence on modern graphic design. Their unconventional compositional strategies and anarchic approach to visual 'order' continued to inspire many designers in the later part of the 20th century.
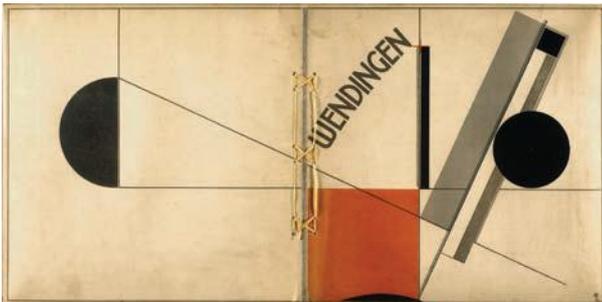
▶ *Wendingen* journal cover by El Lissitzky

Key members of Dada

Tristan Tzara, Man Ray, Francis Picabia, Kurt Schwitters, Hannah Hoch, Richard Huelsenbeck.

Da-Dandy, 1919 © Hannah Hoch/VG Bild-Kunst. Copyright Agency 2018/Private Collection/Bridgeman Images

▶ *Da-Dandy*, 1919 (collage) by Hannah Hoch

Constructivism, 1917–35

Constructivism refers to a primarily Russian movement that arose after the revolution of 1917. Constructivist designers developed an approach to design that was strongly linked to the industrial production of well-designed utilitarian objects accessible to the masses. The Constructivists strove to reflect the principles of communism in their work and eschewed the purely decorative for the primarily functional. They rejected the value of fine art, as they believed that utilitarianism was superior. In their print work, the Constructivists used geometric shapes and bold colours to represent industrial products. Colour symbolism was important, with the revolutionary colours of red and black forming the main colour palette. Typography was used extensively, as was photography. Constructivist posters by El Lissitzky often showed highly experimental techniques, including photograms and photomontage, reflecting the Constructivist theme of 'artist as engineer'.

Key designers

Vladimir Tatlin, El Lissitzky, Valentina Kulagina, Kazimir Malevich

▶ The Bank of Georgia, Tbilisi headquarters

De Stijl, 1917–31

De Stijl or 'The Style' was a movement established by a small group of Dutch artists, architects and designers in 1917. De Stijl designs were characterised by the use of strong, simple geometric forms and blocks of solid colour that defined space. Decorative excess was rejected in favour of dramatic simplification. De Stijl designs had an immediate impact on graphic design in the period after the First World War, and their designs for typefaces, posters and journals were embraced by the European avant-garde.

De Stijl design principles continued to be influential in the later part of the 20th century. Theo van Doesburg's letter forms and Gerrit Rietveld's famous Red-blue chair symbolise the style of the movement.

Key designers

Theo van Doesburg, Gerrit Rietveld, Bart van der Leck, Piet Mondrian

Bauhaus, 1919–33

Formed in 1919, the Bauhaus, meaning 'building house', was a significant German design school established first in Weimar and then Dessau. The Bauhaus director, Walter Gropius, believed that the making of objects and constructions was an important social and intellectual pursuit, and he encouraged students to follow a functional aesthetic. Initially, members of other design movements, including Theo van Doesburg, Laszlo Moholy-Nagy and El Lissitzky, became part of the Bauhaus. Artists such as Paul Klee and Wassily Kandinsky also found positions within the school's varied faculties.

All brought influences from across Europe, and many aspects of the early Bauhaus were directly linked to the principles of Constructivism. Core studies at the Bauhaus focused on the logical analysis of form and function. The use of materials such as steel, Plexiglass, rayon and even cellophane in design were radical departures from traditional visual arts training. Students were taught to use instruments in their drawings; items such as the compass and the straight-edge ruler, which had previously been the tools of engineers and draftsmen, became part of the creative process within the Bauhaus.

▶ 'Barcelona chair' by Ludwig Mies van der Rohe, 1929

Bauhaus designers did not like decorative motifs, instead creating designs that featured an industrial 'machine aesthetic'. Studies at the Bauhaus included graphic design, typography, furniture design, architecture, textiles and metal. The design of geometric letter forms and the use of lower-case type in publication design were progressive and influential. Eventually, the radical designs of the Bauhaus were seen as subversive by the Nazis and the school closed, with key teachers or 'masters' moving to the United States, where they inspired the rise of the International Style.

Brandt Marianne (1893–1983): Kandem Bedside Table Lamp, 1931. New York, Museum of Modern Art (MoMA). Lacquered steel h. 9 1/4' (23.5 cm), base w. 7 1/4' (18.4 cm) Phyllis B. Lambert Fund. Acc.n.: 191.1958 © 2012. Digital image, The Museum of Modern Art, New York/Scala, Florence

Key designers

Walter Gropius, Ludwig Mies van der Rohe, Marcel Breuer, Marianne Brandt, Gunta Stölzl, Laszlo Moholy-Nagy

International Style, 1920–80

The term 'International Style' was established following an exhibition called 'International Style: Architecture Since 1922' held at New York's Museum of Modern Art in 1931. The exhibition featured modernists such as Le Corbusier, Walter Gropius and Mies van der Rohe. The term refers

Raimund Koch-View/Alamy Stock Photo

to a global movement of architects and designers whose application of function and pared-down geometric forms reflected aspects of the Bauhaus aesthetic. This period is most identified with modernism and reflected the shift of design influence from Europe to the United States.

From the 1950s onwards, advertising agencies appeared in great numbers, driving the need for print-based design. The importance of logos and branding was recognised during this period; in Europe the rise of the 'Swiss' style was exemplified by developments in typography. In fashion, this period was personified by Christian Dior's 'New Look'.

In Australia, the International Style was reflected in architecture and product design. Roy de Maistre's furniture and the works of Harry Seidler and Robyn Boyd indicate the style aesthetics. The former ICI building in East Melbourne (now Orica House) is a Heritage-listed example.

GRANGER - Historical Picture Archive/Alamy Stock Photo

▶ An example of a dress by French fashion designer, Christian Dior as part of his 'New Look' collection from 1947

Key designers

Ludwig Mies van der Rohe, Le Corbusier and Charlotte Perriand, Philip Johnson, Saul Bass, Hera Roberts, Fred Ward, Florence Knoll

Art Deco, 1920–39

Art Deco refers to a mix of styles that arose between the world wars, from 1920 to 1939. The title of the movement came from the 'Paris Exposition Internationale des Arts Décoratifs et Industriels Modernes' expo of luxury goods and decorative arts in 1925. The visual characteristics of the Art Deco style – symmetry, simplicity and geometry – formed a visual language that was applied across a wide range of products and artworks.

▶ Empire State Building lift doors

The style was seen as a celebration of glamorous modern lifestyles, and it distilled many visual features of modern art styles such as Cubism and Futurism. Art Deco influenced architecture, interior design, industrial design, jewellery, furniture, ceramics, textile and graphic design. It was an enduring style that spanned almost two decades and took inspiration from an increasingly global society. As an impressively eclectic design movement, Art Deco drew influences from many sources; however, it was the exoticism of Egypt, Asia and Africa that gave the style many of its distinctive characteristics. The works of architect Walter Burley Griffin and graphic artist Percy Trompf typify the Australian Art Deco style.

James Jenkins – Visual Arts/Alamy Stock Photo

▶ Art Deco tea set by Clarice Cliff

▶ Typical Australian Art Deco architecture featured rounded corners and linear details. Colours were muted and surfaces rendered or painted.

ART DECO CAPITAL OF THE WORLD

FYI

Designers tend to reflect the prevailing styles and fashions of the moment. For example, in 1931 the city of Napier, New Zealand, suffered a major earthquake that destroyed its CBD. Many of the buildings were rebuilt in the style of Art Deco, and to this day Napier is known as 'the Art Deco capital of the world'. To learn more about Napier and see photos of the impressive architecture, visit the 'Art Deco' page on the Napier City Council website.

Weblink
Art Deco – Napier, NZ

Key designers

Cassandre, William van Alen, Jean Carlu, Pierre Legrain, Mariano Fortuny, Thea Proctor, Clarice Cliff, Marion Mahony Griffin, Walter Burley Griffin, Walter Jardine

Streamline, 1930–60

Streamline refers to the sleek, rounded and smoothly finished forms that were used during the 1920s and 1930s in the design of ships, trains, cars and aircraft. These streamlined forms – designed to enhance the aerodynamics of transportation – were appropriated in product design and used to make household objects appear sleek, modern and more appealing to the consumer. Particularly common in American product design, streamlining became popular after the stock-market crash of 1929, as consumer spending decreased and markets became more competitive. This period is sometimes referred to as American Moderne.

▶ Emerson Patriot Radio, designed by Norman Bel Geddes, mid-20th century

V&A Images/Alamy Stock Photo

Organic Design and Biomorphism, 1930–60

While the International Style was dominated by powerful geometric forms, Organic Design – and later, Biomorphism – approached design from a holistic perspective, taking into account human factors such as comfort. Frank Lloyd Wright was a pioneer of Organic Design; his architectural and furniture designs were conceived as a whole theme rather than in single parts. It was hoped that designs brought together in a holistic way would reflect nature. In the late 1920s, designers such as Alvar Aalto crafted wood into furniture that moulded to the human form. In the 1940s, husband and wife designers Charles and Ray Eames developed single-form moulded chairs that have had an immense and lasting impact on furniture design. Designers Grant and Mary Featherston pioneered the use of formed wood in Australian furniture design.

▶ 'A new Blue Train to the Cote D'Azur', by Pierre Zenobel, 1928

Shawshots/Alamy Stock Photo

▶ Eames lounge chair and ottoman designed by Charles and Ray Eames for Herman Miller

Charles Eames (designer) Ray Eames (designer) Herman Miller, Michigan (licensee) Herman Miller (Aust.)Pty Ltd, Melbourne (manufacturer) Lounge chair 670 and Ottoman 671 (1956) [designed]; (1972) [manufactured] leather, plywood, aluminium, nylon, zip, (other materials) (1) 85.2 × 86.2 × 83.3 cm (lounge chair) (2) 42.7 × 65.6 × 54.6 cm (ottoman) National Gallery of Victoria, Melbourne Purchased, 1972 (D80.1-2-1972)

Key designers

Norman Bel Geddes, Raymond Loewy, Eliel Saarinen, Walter von Nessen, Kem Weber, Gilbert Roohde

Key designers

Charles and Ray Eames, Eero Saarinen, Frances Burke, Verner Panton, Frank Lloyd Wright, Alvar Aalto

Pop Design, 1958–72

Pop Design set many of the foundations for postmodernism. Just as Pop artists like Andy Warhol looked to popular culture for inspirational material, Pop designers appropriated materials and design elements found in the everyday. Readily discarded objects constructed from disposable materials – such as inflatable furniture – reflected the prosperity of the time. Pop Design was aimed at a youth market and was inspired by social change such as the rise of the psychedelic phase, the space race and the growth of consumerism in the 1960s.

Pop Design was strong in Britain during the 1960s, and its non-conformism later splintered into the rise of Punk in the early 1970s. Direct links to earlier movements such as Art Nouveau and Dada can be seen in many works from this period. The design of magazines such as *Rolling Stone* and *Oz* challenged the formal traditions of the International Style.

Michael Ochs Archives/Getty Images

▶ Dylan poster by Milton Glaser

Key designers

Victor Moscoso, Seymour Chwast, Milton Glaser, Eero Aarnio, Joe Colombo

Radical Design and Anti-Design, 1968–78

Established in Italy in the late 1960s, Radical Design was epitomised by two main studios: Archizoom Associati and Superstudio. The groups wrote manifestos and designed products inspired by the sculptures of Claes Oldenburg. Radical Design is often seen as the direct precursor to postmodern design, as it sought to blur the traditional visual language of modernism and push the bounds of socially defined 'good taste'. The distortion of proportions, clashing colours and the juxtaposition of materials were common in Anti-Design, which was ideologically similar to Radical Design.

Key designers

Ettore Sottsass, Alberto Colombi, Ezio Didone, Jonathan de Pas, Donato D'Urbino, Paolo Lomazzi

Photo: Harri Kosonen, Studio Sempre

▶ Ball chair, designed by Eero Aarnio

▶ Calculating machine Olivetti Summa 19, with integrated printer, design Ettore Sottsass and Hans von Klier, Italy, 1969

Eco Design, 1970–present

After the energy crisis of the early 1970s, Victor Papanek published a book called *Design for the Real World*, which outlined the responsibility of the design community in developing and using sustainable materials and reducing environmental impacts through design. In the 1980s, environmental concerns gained public momentum and companies began to use 'green awareness' to distinguish their products within the marketplace. During the 1990s, raised awareness of greenhouse gas emissions and deforestation meant that consumers began to demand alternative and recyclable materials. This movement is also known as Green Design or DfE (Design for the Environment). Sustainable design is an ongoing challenge for designers in all disciplines.

POSTMODERNISM   **FYI**

Postmodernism is a term used to describe the progressive architecture, design, literature, visual communications, music, sociology and film that have evolved since the 1960s. Like modernism, postmodernism is a reflection of the zeitgeist. Early postmodernists reacted against the perceived structural constraints of modernism, which they saw as conservative and restrained. Postmodernism is firmly embedded in contemporary creative and popular culture. Visually, it is characterised by the decoration and ornamentation that was rejected by the modernists, and by experimental approaches. The term is a complex one and therefore quite difficult to define, but architect, designer and writer Robert Venturi wrote 'Less is a bore', turning the modernist credo on its head.

Postmodern, 1965–present

Postmodernism refers to the stylistic developments that depart from the norms of modernism. Postmodern designers questioned the modernists' emphasis on logic, simplicity and order, suggesting that ambiguity and contradiction may also have a valid place. They sought to make reference to past design movements in order to re-establish an emotional connection between the designer and the user – a connection that they believed had been lost in the abstraction of the modernists. Magazines such as *The Face* and *Emigre* pushed the boundaries of typographic and structural style. Postmodernism is stylistically diverse and ever-changing. The product designs of the Alessi Company in Italy are recognised as postmodern design, as is the work of Australian designer Marc Newson.

Key designers

Frank Gehry, Philippe Starck, April Greiman, Michael Graves, Richard Eckersley, Tibor Kalman

▶ An icon of postmodern design, the 'Juicy Salif'

Memphis, 1981–88

Memphis was a reaction to the formal lines and forms of the International Style. It was a design group that shook things up, akin to the Punk music genre and its impact upon the music industry. Formed by Ettore Sottsass in 1981 and based in Milan, the Memphis group drew inspiration from Art Deco, Pop art and kitsch. Memphis challenged the aesthetic concerns of the modernist styles, blurring the boundaries of design through the incorporation of highly decorative forms, bold colours and pattern. Memphis looked to popular culture, mass-produced objects, and the rise of computer games and science fiction, and worked across a wide range of media and products.

▶ Memphis 'Carlton' room divider by Ettore Sottsass

WENN Rights Ltd/Alamy Stock Photo
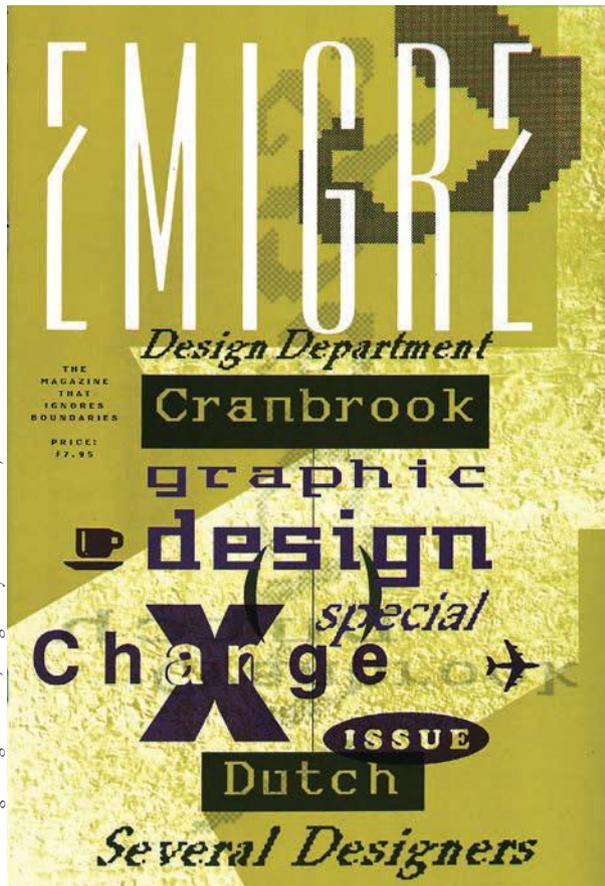
Cover *Emigre* magazine #10, designed by Glenn Suokko, 1988

▶ *Emigre* magazine was published from 1984 to 2005 and was a leading graphic design magazine. It was one of the first publications to use computers for layout and used many different typefaces and layout styles in each issue.

Members of the Memphis Group

Ettore Sottsass, Martine Bedin, Aldo Cibic, Michele De Lucchi, Matteo Thun, Marco Zanini

Digital Design, 1984–present

The rise of digital technology has had an enormous impact on the nature of design and visual communication. Computer-based technologies have transformed the traditional design space, and designers are required to respond. The ability of the computer to research, model, test, form and enhance design has had an effect on the work of the designer. Easy access to digital tools means that individuals with little or no training can 'design' content for print or electronic format. Some postmodernists see the computer as an equaliser, moving the realm of design from specialists to anyone with interest and access. The diversity of digital media has blurred the definitions of artist, designer, filmmaker, musician and animator.

Significant contemporary designers

Michael Place, Vince Frost, Marc Newson, Deanne Cheuk, Rinzen, Joshua Davis, Zaha Hadid, Tord Boontje, Karim Rashid

▶ Hand-drawn and digital image by Deanne Cheuk
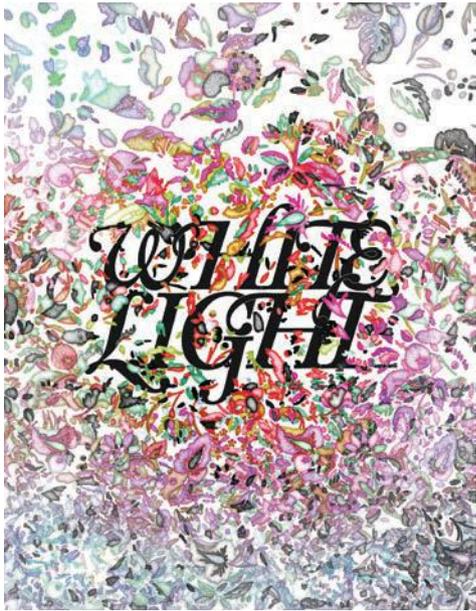
Deanne Cheuk, with permission

▶ Kettle by Karim Rashid

Image courtesy of Karim Rashid

MINIMALISM

FYI

Minimalism, as a design style, has its roots in the Bauhaus movement and gained notable expression through Braun products and the design philosophy of Dieter Rams. Dieter Rams played a pivotal role in shaping the principles of minimalism through his work at Braun.

This minimalist approach extended its influence to other design contexts, notably evident in Apple's design philosophy. Apple, under the leadership of Steve Jobs and designer Jony Ive, embraced minimalism in product design, user interfaces and branding. The sleek and clean aesthetics of Apple products, characterised by simplicity and user-centric design, reflect the principles of minimalism.

Beyond product design, minimalism has permeated various design disciplines, including graphic design, architecture and interior design. In graphic design, minimalist principles stand on clarity, legibility and the use of negative space. Architectural minimalism focuses on clean lines, open spaces and a reduction of unnecessary elements. Interior design embraces simplicity, functionality and a focus on essential furnishings.

Tolo Balaguer/Alamy Stock Photo

▶ House originally designed by Walter Gropius for professors at the Bauhaus art school in Dessau, 1925

The impact of minimalism goes beyond individual products; it has become a design ethos influencing how we perceive and interact with the world across diverse design domains.

The enduring appeal of minimalism lies in its ability to distil complex ideas into clear and elegant forms, creating a timeless and universally appreciated aesthetic.

FYI
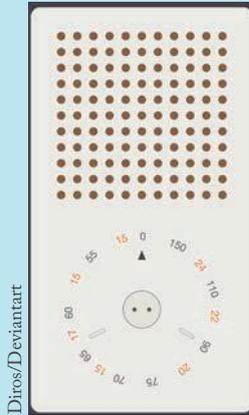
▶ Braun T3 pocket radio from 1958 alongside an early Apple iPod

▶ Vivianna watch by Vivianna Torun Bülow-Hübe, 1962

The Maker movement, 2000–present

Seen as a response to the dominance of digital products, the Maker movement evolved from growing interest in traditional methods of making and production, combined with new technologies. The movement embraces social media and fosters a sharing culture, using Instagram and Pinterest to observe, collect and encourage artisanal production. As technologies have developed, so have the collaborative possibilities of Maker culture. Some Maker spaces provide digital fabrication technologies while others focus on traditional hand-craft skills. Maker spaces, which became more prominent in the mid-2010s, appeared as shared workshops and 'labs' at schools and universities, and in the public and private sectors. Creativity was recognised as an essential tool in learning, professional development and a wider community context.

Over a relatively short period of time, Maker culture expanded into areas not previously considered part of the design movement, such as food and personal care. Artisanal products such as coffee roasting, beer brewing and traditions such as barbershops appeared, using a dynamic social media presence and tools such as app-based bookings and order systems.

At its core, Maker culture strives for a balance between recognising the origins of products while embracing new technologies to build, promote and create products, services and designs. In many areas, it is possible to see the 'hand' of the artist evident in Maker products from hand-drawn lettering to handmade clothing. Promoting many aspects of the movement was a parallel expansion of market culture, including many art markets, farmers' markets and makers' events in urban and regional areas.

▶ Spaces such as MakerSpace in Sydney provide industrial-grade machinery for woodwork, metalwork, ceramics, textiles and electronics, partly in response to the need for equipment that requires hands-on interaction, rather than making through the interface of a screen.

▶ Commonfolk in Mornington, Victoria, is an example of a creative, multi-use maker space. Small, artist-run studios operate in the same space as an artisanal coffee roaster and café. The coffee is ethically sourced and the space allows for creative processes to be viewed from many angles.

▶ Glass artist Sarah Dingwall, one of the founders of Commonfolk, in her glass studio adjacent to the café and roaster. Visitors can watch Sarah at work and purchase her designs directly from her studio space.

IDENTIFYING HISTORICAL CONNECTIONS

The history of design is not linear – it interweaves and overlaps, infiltrates and inspires. As time and movements pass, new designers take the legacy of their predecessors and either develop it further or react against it. Each stage of design history is connected to the next and to those beyond.

In the 1990s, an increased interest in minimalism and the aesthetic of the modernists arose amid existing postmodern designs. Product designers, architects, textile designers and fashion designers made reference to the Bauhaus and International Style in their new work. Such influence is not always direct or obvious, and the stark minimalism of the mid-1990s was not a direct copy of its modernist forbears, but a nod to their original aesthetic. It is interesting to note that postmodern characteristics can live in relative harmony with modernist considerations in the 21st century.

Identifying the links and influences between design styles and movements is not always straightforward and can involve having to sort through the popular combinations of historical and contemporary styles. However, there are steps that can be taken to make the task of seeking and recognising links easier.

Familiarise yourself with key design movements

Using the timeline at the beginning of this chapter as a guide, investigate some significant examples of each design style. Each style is identified by characteristics such as the application of design elements and principles and the use of materials. In architectural design, for example, the application of steel, glass and rendered white surfaces in the construction of simple geometric structures could be linked to the designs of Richard Neutra and the International Style.

Don't assume that contemporary design is 'new' design

Many designers make reference to other designers deliberately. Such references might be designed to appeal to a specific audience that is aware of the other designer's work, or to give the design historical significance through a linked relationship. There are few truly original ideas, and many creative and striking designs are a hybrid of the designer's creativity and the influence of a mentor, inspirational figure or movement.

▶ The cut-and-paste collages by Jamie Reid (a friend of the Sex Pistols' manager, Malcolm McLaren) became an intrinsic part of the Sex Pistols' visual identity. It is possible to see influences from Kurt Schwitters and the Dada artists in his work.

Read design blogs

Design blogs provide a wealth of information about professionals working in contemporary design. Writers and designers who have specialist experience in design are often aware of the influences and similarities between designers, design studios and even the design produced by different countries.

Look at the wider context

When looking at the work of designers at any stage in history, it is valuable to investigate other professionals, such as artists, musicians, writers and academics, who were active at the same time. Many designers form networks and groups with those who share the same values and interests, and develop their ideas and design philosophies together. Understanding a design group or movement is important when understanding the wider context of design.

The social, economic and political environment has a significant impact on the establishment and evolution of design movements. Economic and financial factors can also influence the growth and development of design. Given the fundamentally commercial nature of design, the economic climate may dictate the success and longevity of design products.

OTHER DESIGN STYLES

There are many more design styles, movements and inspiring periods in history for you to explore. Some design styles are adopted by particular design disciplines more than others. Here are some design styles you could start exploring, although it is not an exhaustive list.

Design style	Favoured design disciplines
English landscape movement	Landscape architecture
Mid-century modern	Interior design, product design, graphic design, architecture and urban development
Queenslander Federation	Architecture
Neo-industrial	Interior design, product design
Shabby chic	Interior design
Abstract	Graphic design, digital media design
Flat design	Digital media design
Japanese garden	Landscape design
Boho-chic	Fashion design, interior design

Resource
Design analysis guide

Phillip Harrington/Alamy Stock Photo

▶ An example of mid-century modern architecture and furniture

Richard sowersby/Alamy Stock Photo

▶   An example of a traditional Queenslander house
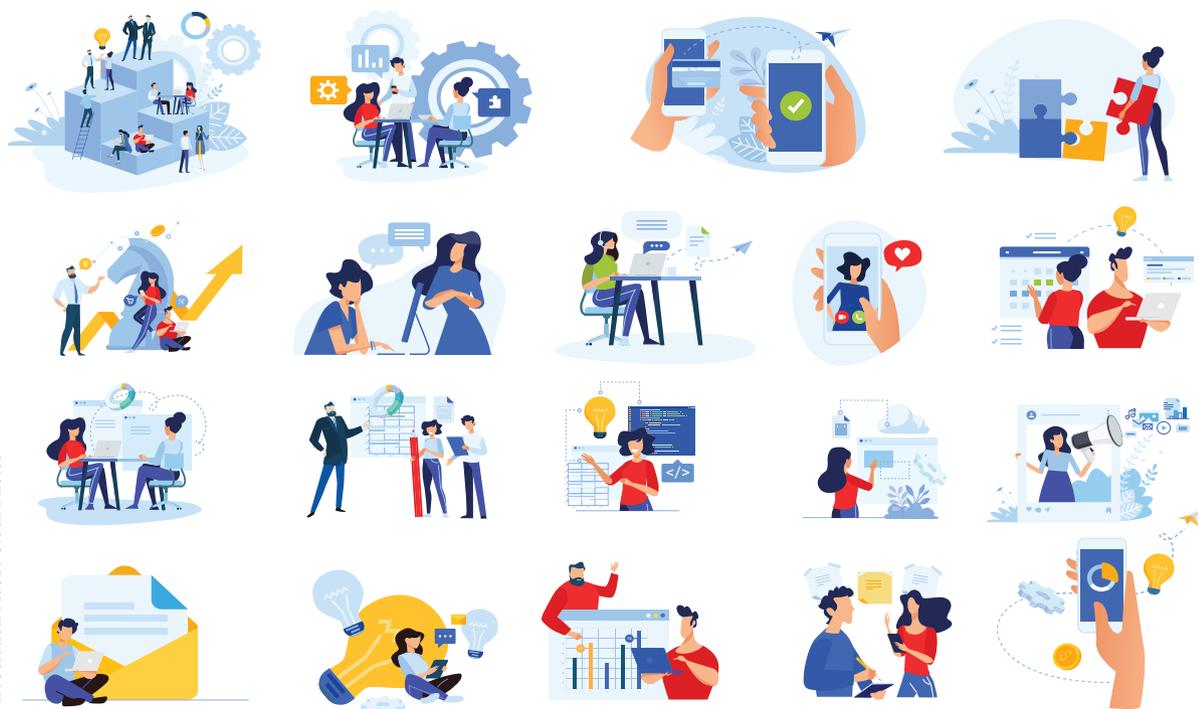
PureSolution/Adobe Stock Photos

▶   Examples of flat design

▶   An example of Japanese landscape design

▶   An example of Boho-chic interior design

CHAPTER REVIEW

1 Compare two design movements. Investigate the application of design elements and principles to graphic design (of items such as movie posters, brochures, packaging) during two periods of history. Using the information gathered, create a written or multimedia presentation that explains the similarities, differences and influences observed.

2 Investigate the influence that a past design movement continues to have on contemporary design. For example, investigate Futurism and its effect on the contemporary application of letter form in publication design, or the Bauhaus and its influence on contemporary residential architecture. Communicate your findings as a digital presentation with illustrations and diagrams that clearly indicate the influences.

3 Design a diagram that depicts the characteristics of a past design movement. Use imagery and examples from key designers of the period. Incorporate visual means to describe the influence that movement has had through history.

4 Select a significant contemporary designer and investigate the influences that have affected their design work. Collect examples of the designer's work and make visual comparisons with earlier work created by other designers. Annotate your findings and indicate the links between the current and past design movements. Present your findings in a digital or written format that reflects the stylistic influences you have investigated.

5 Find examples of Maker culture where the collaboration between makers and technology has led to significant design developments. Look at crowdfunding tools such as Kickstarter to find new designs that fit within Maker culture and suggest how it might be used in a wider social context. Create your own design idea using a combination of traditional or artisanal techniques and digital technologies. Conversely, find an existing design (e.g. a piece of furniture) and suggest how it could be 'hacked' and made into new products using technology.

DESIGN TREND

CHAPTER

18

I don't design clothes. I design dreams.
Ralph Lauren

In this chapter:

Learn the language:

+ cultural
+ iconic
+ life cycle
+ obsolesce

+ retro styling
+ society
+ styles
+ timeless

+ trend
+ upcycling

In this chapter we will be exploring timeless classic designs and enduring design trends by reviewing a range of examples. We will examine the lasting impact of certain design features and how they have stood the test of time. By unpacking the intricacies of well-known designs, we aim to understand the principles that connect them, revealing the factors that go beyond passing trends. Drawing insights from Dieter Rams and his 10 Principles of Good Design, we'll explore how these timeless designs continue to shape the look and function of everyday designs.

18.1 TIMELESS CLASSIC DESIGN

Timeless design is characterised by its enduring quality, defying the ebb and flow of trends. It stands the test of time, never falling out of style and crafted with a purpose beyond the fleeting. Such designs possess a lasting resonance and continue to inspire, maintaining their relevance regardless of the changing winds of fashion.

There are different perspectives held on what makes a classic design, and to unpack a greater understanding we should look at some terms first.

- Objective: *not influenced* by personal feelings, tastes or opinions
- Subjective: *influenced* by personal feelings, tastes or opinions

According to these definitions, design appears to be mainly an objective process. To succeed as a designer, it is recommended to follow an objective approach in the initial phases of a project, rather than being swayed by emotions, personal taste or unverified assumptions.

Assessing the success of a design outcome can often rely heavily on our emotional responses and aesthetic preferences. Often a classic design to one person is not a classic to another. The challenge arises because emotions and feelings are complex and unpredictable, making our judgment subjective.

The Viscount Ambassador, a mobile built environment, is an example of enduring appeal, having kept a simple shape that continues to hold value today. Does this caravan still hold the same function? Does it work like a modern caravan? Is it as safe? But still a classic …

Zoltán Csipke/Alamy Stock Photo

▶ The Viscount Ambassador Caravan is considered an Australian design classic.

We could also look at something simple, a binder clip, also known as a bulldog clip. Invented in 1910, it is not necessarily winning beauty awards, but it is a cost-effective binding system that is clearly old enough to qualify as a timeless design. But perhaps it is not on all designers' classic list.

Chris Tefme/ Shutterstock.com

▶ The binder clip was patented in 1910 by Louis E. Baltzley.

Achieving timeless design is not immediate; it requires thoughtful and rigorous processes, with simplicity as a key element. Despite appearing effortless, timeless designs demand significant effort and refinement.

Interestingly, many timeless designs were initially conceived as modern and cutting-edge, challenging the status quo. Yet, they stand the test of time by evolving and adapting to external influences, whether technological advancements or shifts in consumer preferences.

Ultimately, the true measure of timelessness lies in how designs withstand the test of time, remaining elegant and simple despite inevitable adaptations. It's a testament to their enduring quality and adaptability, ensuring their relevance in an ever-changing world.

CASE STUDY ~ THE POLAROID CAMERA

FOUNDED

The Polaroid Corporation, founded by Edwin H. Land in 1937, revolutionised instant photography. Land's vision was to create a camera that could capture and develop photos on the spot, eliminating the need for lengthy waiting times associated with traditional film processing.

DESIGN FEATURES

+   Instant gratification: The hallmark of Polaroid cameras lies in their ability to provide instant prints. Users could witness their captured moments materialise within minutes.
+   Integrated film and camera: Unlike traditional cameras that required separate film and camera units, Polaroid cameras seamlessly integrated both, simplifying the photography process.
+   Self-contained processing: Polaroid's unique film packs contained all the necessary chemicals for developing the photograph. Users simply ejected the photo and watched as it developed within the film pack.
+   User-friendly: Designed with simplicity in mind, Polaroid cameras featured intuitive controls, making photography accessible to everyone, regardless of their technical expertise.

EVOLUTION AND VARIATIONS

Over the years, Polaroid cameras have undergone various transformations, adapting to changing technologies and user expectations:

+   Digital evolution: With the rise of digital photography, Polaroid introduced digital instant cameras that combined the charm of instant prints with modern imaging capabilities.

Giulio Benzi/Alamy Stock Photo

▶   Classic designs often have elements of innovation. Although the Polaroid camera almost touches on invention, many examples don't go so far but continue to have the same principles of good design, leading to long periods of success.

+   Instant film resurgence: Nostalgia sparked a renewed interest in instant film, leading to the re-release of classic Polaroid film formats and the creation of new instant film cameras.
+   Creative innovations: Recent versions boast enhanced features, such as creative shooting modes, bluetooth connectivity, and compatibility with mobile apps, aligning with contemporary photography trends.

It is important to note that the Polaroid business model failed in 2001, as a result of not adapting to fundamental changes in the market with the advent of digital cameras. The company was acquired by new owners in 2017. Sales of their instant developing cameras have experienced a resurgence in recent years.

CASE STUDY ~ THE SINGAPORE BOTANIC GARDENS

The Singapore Botanic Gardens stand as a testament to the harmonious fusion of nature and human design. As a classic example of landscape architecture, its sprawling beauty has earned it acclaim worldwide. This verdant oasis has not only withstood the test of time but has continually evolved, garnering numerous accolades for its meticulous design and preservation of natural splendour.

FOUNDED

Established in 1859, the Singapore Botanic Gardens were conceived during the colonial era to promote agricultural and horticultural interests. Over the years, it has evolved from a colonial experimental garden into a lush sanctuary that seamlessly blends curated landscapes with the intrinsic beauty of tropical flora. It was declared a UNESCO World Heritage

Site in 2015, acknowledging its historical significance and ongoing contributions to botanical research.

DESIGN FEATURES

+ Diversity: The Singapore Botanic Gardens showcases a meticulous design that encompasses both formal and informal elements. From the serene Swan Lake to the intricately landscaped National Orchid Garden, each section is a testament to the thoughtful integration of design principles with the diverse tapestry of Singapore's tropical biodiversity.
+ Cultural significance: Beyond its botanical significance, the Singapore Botanic Gardens holds cultural importance for locals and visitors alike. It serves as a picturesque backdrop for various events, from outdoor concerts to leisurely picnics. The Gardens have become an integral part of Singapore's cultural fabric, providing a tranquil retreat in the heart of the bustling city.
+ Educational role: The Gardens go beyond aesthetics, serving as a hub for botanical research and education. Its rich collection of plant species, including the iconic orchids,

contributes to global biodiversity studies. Educational programs and guided tours further underscore its role as a living classroom for nature enthusiasts and students alike.

Joyfull/Shutterstock.com

EVOLUTION AND VARIATIONS

The addition of themed gardens enhance accessibility, and sustainability initiatives showcase its commitment to staying relevant while preserving the essence of its original design. Its ongoing evolution and the myriad accolades it has garnered underscore its status as a classic design that not only withstands the passage of time, but flourishes as a living testament to the enduring relationship between humans and the natural world.

CASE STUDY ~ THE EVOLUTION OF THE ADIDAS LOGO: STRIPES OF IDENTITY

FOUNDED

Adidas, established by Adolf Dassler in 1949, swiftly became a global leader in sportswear. The brand's logo has played a pivotal role in establishing its identity and resonance in the world of athletics.

DESIGN FEATURES

+ Three stripes symbolism: The introduction of the three stripes in the Adidas logo was a strategic move in 1971 by in-house designers. Originally symbolising a mountain, the three stripes evolved to represent the challenges athletes face, the goals they strive to achieve, and the recognition that comes with success.
+ Simplicity and versatility: The Adidas logo's enduring appeal lies in its simplicity. The three stripes, often accompanied by the trefoil or

wordmark, create a versatile design that adapts seamlessly to various products and contexts.

Seeshooteatrepeat/Shutterstock.com

+ Timeless aesthetic: By combining simplicity with meaningful symbolism, Adidas ensured its logo remains relevant across decades, avoiding the pitfalls of passing design fads.

EVOLUTION AND VARIATIONS

+ Colour variations: While the classic black and white colour scheme remains iconic, Adidas has embraced colour variations to cater to diverse marketing needs and product lines.
+ Adaptations for collaborations: Adidas frequently collaborates with artists, designers and other brands, leading to unique adaptations of the logo that capture the essence of each collaboration.
+ Digital integration: In the digital age, the Adidas logo has seamlessly transitioned into various digital platforms, maintaining its distinctive look and feel across websites, apps and social media.

The Adidas logo, with its three stripes, is not just a design: it's a symbol of the brand's commitment to excellence, innovation and the pursuit of athletic achievements. Its graphical evolution reflects the dynamic spirit of Adidas, making it an enduring emblem in the world of sports and fashion.

David Ramos/Getty Images Sport/Getty Images

▶ Soccer superstar Lionel Messi has had a longstanding connection with the Addidas brand, including his own sports range, Adidas x Lionel Messi.

Manorm/Shutterstock.com

▶ A timeline showing how the Addidas logo has evolved since 1949

RESOURCES

FYI

Timeless and classic design is such a subjective topic that it is recommended for further reading and investigation. More examples of what could be considered timeless classic designs will make your own opinion more informed.

To learn more about the topic of timeless classic design, the book *Watches Tell More than Time* by Del Coates is an excellent resource. You can also see a list of more recommended resources in the Design Resources section on Nelson MindTap.

Resource
Design resources

18.2 ICONIC DESIGN

Some classic designs go beyond just looking good and being timeless; they also become part of our shared history. These iconic designs often mark important moments or connect to big changes in our culture. They can symbolise elements that relate to national pride or breakthrough ideas that start whole movements. They can be seen as bookmarks in time, showing us important parts of our shared story. Some of these examples help explore designs that have not only shaped how things look but have also become timeless classics that have great meaning to many.

CASE STUDY ~ THE EIFFEL TOWER

The Eiffel Tower, an iconic symbol of France and one of the most recognised structures globally, stands as a testament to the intersection of art, engineering and cultural identity. Constructed in the heart of Paris, this towering landmark has become synonymous with the romance and grandeur associated with France.

FOUNDED

Designed by Gustave Eiffel and his construction company for the 1889 Exposition Universelle (World's Fair), the Eiffel Tower was initially met with mixed reactions. While some criticised its unconventional design, it quickly became a triumph of architectural innovation and a symbol of French ingenuity.

DESIGN FEATURES

+ Web structure: The Eiffel Tower's design is marked by its wrought-iron lattice structure, showcasing an intricate web of interconnected metal elements. Its open design not only serves as an engineering marvel but also allows for breathtaking views of Paris from its observation decks.

+ Cultural connection: Beyond its architectural significance, the Eiffel Tower is deeply intertwined with French culture and history. Serving as a backdrop to countless films, literature and artworks, it has become a symbol of romance, artistic inspiration and national pride. Its silhouette is instantly associated with the enchanting streets of Paris.

+ Timeless appeal: The Eiffel Tower's enduring popularity is a testament to its timeless design. Over the decades, it has withstood changing trends, remaining a beacon of elegance and innovation.

EVOLUTION AND VARIATIONS

While the original Eiffel Tower in Paris remains unparalleled, its design has inspired numerous replicas and adaptations worldwide. From Las Vegas to Tokyo, these reinterpretations pay homage to the iconic structure, showcasing its global impact.

The Eiffel Tower stands not only as an architectural marvel but as a symbol deeply rooted in the cultural identity of France.

▶ The Eiffel Tower in the centre of Paris

WDG Photo/Shutterstock.com

▶ Merchandise celebrating the connection between the tower and the city

Graphic Vector-City/Shutterstock.com

▶ The Paris Hotel in Las Vegas has recreated the distinctive landmark at half the scale of the original.

Little Vignettes Photo/Shutterstock.com

CASE STUDY ~ THE COCA-COLA BOTTLE

The Coca-Cola bottle is a globally recognised symbol, embodying the essence of one of the world's most popular soft drinks. Its distinct contour shape and cultural significance have supported the brand and company in success.

FOUNDED

The Coca-Cola bottle was designed in 1915 by the Root Glass Company in Terre Haute, Indiana, USA, as part of a design competition. The company sought a distinctive bottle shape that would set Coca-Cola apart from imitators and create a unique identity for the brand. The winning design, with its contoured silhouette, became an integral part of Coca-Cola's brand identity.

DESIGN FEATURES

+ Distinctive shape: The Coca-Cola bottle's design features a unique contour with ridges, creating an unmistakable silhouette. Its design was inspired by the cocoa pod and was intended to be identifiable even when shattered.

▶ Classic and distinctive design of the Coca-Cola bottle

+ Cultural connection: Its introduction came at a time when the beverage market was saturated, and the distinctive design aimed to set Coca-Cola apart. Over the years, the bottle's shape became a symbol of shared moments and celebrations.
+ Advertising impact: The Coca-Cola bottle's design became a powerful tool in advertising. Its silhouette was featured in print and media campaigns, reinforcing brand recognition. The shape became so significant that it could be recognised even in silhouette form, eliminating the need for explicit branding in some advertisements.

▶ The red colour is strongly associated with Coca-Cola.

EVOLUTION AND VARIATIONS

While maintaining its classic contour, the Coca-Cola bottle has undergone subtle modifications and variations over the years. Special editions, seasonal designs and collaborations with artists have kept the iconic bottle fresh and relevant, showcasing the brand's ability to blend tradition with contemporary trends.`

CASE STUDY ~ DUNLOP VOLLEY SHOE

The Dunlop Volley, an iconic Australian shoe, has left an indelible mark on both sports and casual footwear. Born from the collaboration between Australian tennis player Adrian Quist and the Dunlop company, it has evolved into a cultural symbol with a unique place in Australia's sporting and fashion history.

FOUNDED

Founded by Adrian Quist, a prominent Australian tennis player, and introduced by the Dunlop

company in the 1930s, the Dunlop Volley was originally designed as a tennis shoe. Adrian Quist's firsthand experience as both an athlete and an employee of Dunlop contributed to the development of a shoe that would later become an Australian classic.

DESIGN FEATURES

The Dunlop Volley is recognised for its simple and functional design. The canvas upper, rubber sole and distinctive herringbone tread pattern make

it versatile for various activities. Its minimalist aesthetic and lightweight construction have contributed to its enduring popularity.

+ Cultural connection: The Dunlop Volley quickly transcended its original purpose as a tennis shoe, becoming a part of Australian culture. Its affordability, comfort and understated style made it a staple for generations. Beyond sports, the Volley became synonymous with a laid-back Australian lifestyle and a symbol of enduring quality.

+ Timeless appeal: The Dunlop Volley's timeless appeal lies in its adaptability. While initially designed for tennis, its design and comfort have made it a favoured choice for everyday wear. It has maintained a consistent presence in

Australian wardrobes, reflecting a timeless and enduring design. In 2014 the brand collective was sold to a capital investment firm that continues to focus on the original rubber sole and canvas upper design.

EVOLUTION AND VARIATIONS

Over the years, the Dunlop Volley has seen various adaptations and collaborations. From classic white canvas models to contemporary iterations featuring different colours and materials, the shoe has embraced modern trends while staying true to its core design principles.

The Dunlop Volley's journey from a tennis shoe designed by an Australian tennis legend to an iconic cultural symbol speaks to its lasting impact.

The Sydney Morning Herald/Getty Images

James D. Morgan/Getty Images
Sport/Getty Images

▶ Volleys were worn by the Australian Olympic team as part of their official uniform at the 2012 London Games.

CASE STUDY ~ THE VESPA

The Vespa, an iconic Italian moped, has become synonymous with style, freedom and an enduring design that has transcended generations. Introduced by Piaggio in the aftermath of the Second World War, the Vespa's distinctive design and cultural impact have made it an emblem of Italian craftsmanship and a symbol of carefree mobility.

FOUNDED

The Vespa was introduced by the Italian company Piaggio in 1946, emerging as a response to the need for affordable and efficient transportation in

Dani Jazmi/Shutterstock.com

▶ The Vespa symbolises more than just a mode of transport.

postwar Italy. The designer, Corradino D'Ascanio, aimed to create a simple, accessible and elegant vehicle that would empower people to navigate the challenges of the time.

DESIGN FEATURES

The Vespa's design is characterised by its sleek, unibody construction, enclosed engine and distinctive curves. The step-through frame, compact size and ease of use made it an instant success. The functional yet stylish design contributed to its popularity and set a new standard for two-wheeled transportation.

+ Cultural connection: The Vespa quickly became more than just a mode of transportation; it became a cultural icon. Embraced by the 'dolce vita' lifestyle of postwar Italy, the Vespa symbolised a new-found sense of freedom and sophistication. It became an integral part of cinematic and artistic movements, further embedding itself in global popular culture.

+ Lifestyle symbol: Beyond its utilitarian purpose, the Vespa became a symbol of a carefree and adventurous lifestyle. Its association with films like *Roman Holiday* and its adoption by celebrities solidified its status as a fashionable accessory. Owning a Vespa became a statement of style and individuality.

+ Cultural movements: The Vespa played a role in various cultural movements, from the 'mod' culture in the 1960s to the contemporary revival of vintage aesthetics. Its timeless design has adapted to changing times while retaining its original charm, making it a favoured choice for those seeking a blend of classic style and modern functionality.

EVOLUTION AND VARIATIONS

Moving with recent trends of electric transport and the capacity for increased performance, a Vespa Elettrica is available based on the original styling.

The Vespa's journey from a postwar mobility solution to a global cultural phenomenon is a testament to its timeless design and cultural impact. It stands as more than a mode of transportation; it is an enduring symbol of style, freedom and the open road, embodying the idealised spirit of Italian design and lifestyle.

▶ The Vespa was used in the movie *Roman Holiday* to indicate freedom and youth, and popularised the Vespa around the world.

▶ The Vespa Elettrica

18.3 RETRO STYLING

Retro styling is a design approach that intertwines the charm of the past with contemporary creations. It involves selectively incorporating design elements from bygone eras, offering a nostalgic yet modern aesthetic. This intentional revival goes beyond replication, encouraging reinterpretation and innovation. Retro styling often draws inspiration from

▶ This Smeg toaster is inspired and styled from 1950s inspiration, a period connected with the space-age design movement.

cultural movements, weaving a tapestry of timeless trends into various design disciplines.

Central to its appeal is the connection with cultural and historical sentiments, making it a versatile and enduring design philosophy. From mid-century modernism to disco-era vibrancy, retro styling bridges generations by celebrating iconic elements from different time periods.

When considering design as part of a business and sales strategy, commercial retro styling has potential to attract consumers seeking a timeless look. Aesthetic familiarity coupled with a contemporary twist can enhance product appeal.

CASE STUDY ~ NEW MINI

FOUNDED

The New Mini, owned by The BMW Motor Group, originated as a revival of the classic Mini Cooper, an iconic British car from the 1960s. Launched in 2001, the New Mini aimed to capture the essence of its predecessor while incorporating modern features and technologies.

DESIGN FEATURES

Retaining the compact size and distinctive profile of the original, the New Mini embraced retro styling in its design. Iconic elements like the contrasting roof, circular headlights and compact body shape paid homage to the 1960s model. Interiors featured retro-inspired details, blending nostalgia with contemporary functionality.

EVOLUTION AND NEW VERSIONS

Over the years, the New Mini evolved and introduced new versions, maintaining its retro appeal. While embracing technological advancements and performance upgrades, each version retained the signature design elements that linked back to the classic Mini.

The New Mini capitalised on its cultural connection, becoming more than a car; it became a lifestyle statement. The retro styling resonated with consumers seeking a blend of vintage charm and modern efficiency. The car's association with pop culture and its cameo appearances in films reinforced its status as a symbol of timeless design.

The intentional use of retro styling played a pivotal role in the success of the New Mini. By tapping into nostalgia and providing a contemporary driving experience, BMW strategically positioned the car in a market segment that appreciated the fusion of classic design and modern functionality. Notably the New Mini has never been priced towards the same demographic that the original Mini was, being aimed at a prestigious small car market.

▶ The New Mini

Jonathan Weiss/Shutterstock.com

▶ Mini Clubman

VDWI Automotive/Alamy Stock Photo

▶ Electric Mini

SOPA Images/LightRocket/Getty Images

18.4 DESIGN OBSOLESCENCE

Life span can also be referred to as life cycle and is used when defining the period of time that a design fulfils its original purpose. Some designs can often find a new purpose and extend their useful life cycle, a process often referred to as upcycling or repurposing.

▶ The worn-out gumboots have been upcycled into planters.

Many design areas have trends and even seasons of designs that often get inspiration from one another and continue to develop over time. Notably in fashion design, the seasons of designs provide continued opportunity for designs to evolve and, arguably as a business model, provide consistent financial security. When a consumer considers a design to be of no use despite the life cycle not being complete, it is often referred to as perceived obsolescence, a user thinking that it has no more purpose, often because of the aesthetic appeal.

Planned obsolescence is the practice of designing and manufacturing products with the intention of giving them an artificially limited life span. This may be achieved through low-quality materials, lack of technical support or poor production methods. In some cases, products are designed in such a way that they cannot be repaired. Particularly evident in electronic goods, fast fashion and mass-produced, single-use items, planned obsolescence is an ongoing issue in the journey to sustainability.

In the examples shown here, the car tyre has wear indicators that help drivers to identify when a tyre is at the end of its safe use, and the razor has an indicator to reflect the likely end of life, the sharpness of the blades. These life cycles are determined by the material characteristics, and the user is supported by an indication of the expected life cycle.

▶ A low-price electric kettle has components (the heating coil) that are difficult or impossible to replace. The manufacturing methods keep costs low but reduce the life cycle of the product.

▶ The examples here could be described as planned obsolescence: both a car tyre and disposable razor have life cycles that are expected.

CHAPTER REVIEW

1 Review the following case studies in this chapter and, using Dieter Rams' 10 Principles of Good Design, complete the table below. Rank the importance of each principle listed with 5 being the most relevant for the design and 1 being the least.

Design	Good design is aesthetic	Good design makes a product understandable	Good design is long-lasting	Good design is innovative	Good design is long-lasting
Polaroid camera					
The Vespa					
Eiffel Tower					
Dunlop Volley shoe					

2 Find three designs that you think are timeless classics. Consider the period of time they have been in the market and how each of them has lasted beyond other designs from that period. Your three timeless classic designs should be from different design fields; for example, fashion, architecture, product design, graphic design.

3 Choose a classic design, if needed find one from this chapter, and analyse it using the Dieter Rams' 10 Principles of Good Design. Consider the five most important principles of good design that made the design a success and put them in order of importance.

4 Now choose a classic or iconic design that you can see has some opportunities for refinement. Sketch the design in its original form and then sketch the design with your suggested improvements.

COMMERCIAL DESIGN INFLUENCES

DEMOGRAPHICS

CHAPTER

19

The only important thing about design is how it relates to people.

Victor Papanek

In this chapter:

Learn the language:

+ audience
+ demographics
+ design problem
+ inclusivity
+ needs
+ target market
+ user
+ user group

Demographics involve the analysis of statistical information about a population. Demographic data can provide information about trends, ethnic diversity, average age, education levels and socioeconomics. Designers use demographics to understand the characteristics and needs of the users they're designing for. Designers use demographic information to make decisions about product development, and needs and characteristics of potential users. When marketing professionals use buzzwords and phrases such as 'the target demographic', they are simply talking about an audience that shares common characteristics.

19.1 THE AUDIENCE

The audience is the group of people, market or target group for whom the design will be created. All design has an end user or audience. In commercial terms, the client could have a clear idea of the market, but may be seeking to expand or attract a new audience to a product or service with the general aim of increasing profits. The designer's task is to identify the specific characteristics of the user group, understand their needs and context, and improve their lives in some way through the design of an object, environment or experience. Any special characteristics and needs of this group will affect how the design is developed, constructed, manufactured and distributed. Statistical information and data about a user group or target audience, including their location, age and gender, is referred to as demographics.

Although the audience will always vary, it is important for a designer to fully understand and respond to user needs. Audience and user research is an integral part of a design process and often defines the direction of design concepts. The characteristics of an audience are often divided into specific types of data such as age, gender, socioeconomic status and interests. Other factors such as cultural background, educational level and religious affiliation can also affect the content, appearance and functionality of a design.

AUDIENCE FACTOR: AGE

Age can be identified in very specific terms or more broadly, and is often classified by arrangement into groupings. For example, 18–25 years might be more loosely defined as young adults, 40–55 years might be classified as middle-aged adults, and so on. Terms such as Baby Boomers, Generation X or Y, and Millennials, used by marketers to establish generational groupings, are somewhat helpful but can be overly broad categorisations.

iStock.com/Skynesher

AUDIENCE FACTOR: GENDER

Designs can cater to a male or female audience or may not be gender-specific. The influence of gender is very strong in defining personality traits and consumer preferences, and will dictate the use of materials, design elements and principles in a design.

AUDIENCE FACTOR: SOCIOECONOMIC STATUS

This usually refers to the financial and social position of an audience. In Australia we perceive ourselves to be an egalitarian society and have little interest in a 'class' structure. Rather than defining social groups as working class, middle-class and so on, we tend to identify ourselves by our level of financial income. Employment status, salary level and educational background can be factors in identifying the socioeconomic status of an individual or group. The amount of money people earn determines their 'disposable' or discretionary income (that is, the income remaining after essentials are covered). Groups with a high disposable income are attractive to marketers.

AUDIENCE FACTOR: ABILITIES

Abilities can have a wide range of interpretations as each body and mind is different. While some elite athletes can achieve amazing things physically, other people are less physically able and have difficulties with everyday tasks. As a designer it is important to consider as many groups and individuals as possible, promoting inclusivity, which is covered in more depth in Unit 3.

Having a greater understanding of the abilities of individuals and groups who may use a design can provide insight into ways to adapt the design that not only improves accessibility, but can lead to an improvement in the design solution for all.

LANGUAGE TO DESCRIBE PEOPLE LIVING WITH DISABILITIES

When describing a group of people with disabilities, it's important to use neutral language that respects their dignity and autonomy. Avoid terms that imply pity or victimisation, such as 'afflicted by' or 'stricken with', as these can perpetuate stereotypes and undermine their agency. Instead, opt for neutral and person-first language that focuses on the individual rather than their condition. For instance, you might say, 'She has cerebral palsy' or 'He uses a wheelchair' to describe someone's disability without attaching stigma or assumptions about their quality of life. This approach promotes inclusivity and supports individuals with disabilities as active participants in society.

AUDIENCE FACTOR: ERGONOMICS

Ergonomics plays a crucial role in addressing the needs of various audiences, particularly those with specific body size considerations. Physical ergonomics includes factors such as height, weight and grip strength. For instance, ergonomic design can accommodate individuals of different heights by providing adjustable seating or workstations to ensure optimal comfort and posture. Similarly, considerations for grip strength can influence the design of products such as tools or handles to be easier to use for individuals with varying strength levels. Cognitive ergonomics looks at mental processes and abilities, including memory, reasoning and understanding, which are important for making designs easy to understand

and use. By tailoring designs to the ergonomic needs of different demographic groups, designers of products and environments can enhance usability, comfort and overall user experience. Ergonomics is explored further in Unit 3.

THE CURB-CUT EFFECT   **FYI**

The curb-cut effect, also known as the curb-cut phenomenon or curb-cut principle, refers to the concept that adaptations made for individuals with disabilities often benefit a broader range of people beyond those with that disability. It originated from the practice of installing curb cuts, sloped ramps at street intersections, to assist wheelchair users in navigating footpaths.

Wirestock Creators/Shutterstock.com

The curb-cut effect highlights how inclusive design solutions intended to address specific accessibility needs can have positive impacts on many groups. For example, while curb cuts were initially implemented to assist wheelchair users, they also benefit parents with strollers, cyclists, delivery workers, and individuals with mobility impairments.

Beyond physical infrastructure, the curb-cut effect extends to other areas of design, such as technology and communication. Features like captioning on videos, alt text for images, and adjustable font sizes designed to accommodate individuals with hearing or vision impairment also enhance usability for a broader audience, including those in noisy environments, non-native speakers, and individuals with temporary injuries.

▶ Not all doorways accommodate all heights of people

Bill Pugliano/Getty Images Sport/Getty Images

INVISIBLE WOMEN

FYI

Historically most designers and engineers have been male and this has led to a bias towards men in society. The 2019 book *Invisible Women: Exposing Data Bias in a World Designed for Men* by Caroline Criado Perez discusses how harmful this bias is for women. For example, most crash test dummies have been modelled on male physiology, which has led to more serious injuries for women involved in car crashes. Perhaps the best way of addressing this is to have more female designers and engineers.

Valentyn Hontovyy/Shutterstock.com

CASE STUDY ~ FOLKS KITCHEN: DESIGNING FOR INCLUSIVITY

INTRODUCTION

Folks Kitchen is a pioneering venture that redefines kitchen design by prioritising inclusivity. Founded in 2017 by Kevin Chiam, an advocate for inclusive design, Folks Kitchen aims to revolutionise culinary spaces to be accessible and user-friendly for everyone, particularly targeting the visually impaired demographic.

BACKGROUND

Folks Kitchen was born out of Kevin Chiam's personal experience and passion for inclusive design. After witnessing the

Folks Kitchen

challenges faced by his visually impaired friends in the kitchen, Kevin embarked on a mission to create a culinary space that caters to individuals of all abilities.

DESIGN INNOVATION

The hallmark of Folks Kitchen's design philosophy lies in its emphasis on inclusivity and accessibility. The designs include innovative design elements such

as tactile markers, contrasting colors and strategically placed appliances to facilitate navigation and usage for individuals with vision impairments.

AWARDS AND RECOGNITION

Folks Kitchen's groundbreaking approach to inclusive design has garnered widespread acclaim and numerous accolades. In 2019, the kitchen received the prestigious Innovation in Design Award from the National Association of Kitchen and Bath Professionals (NKBA). Furthermore, it was honoured with the Excellence in Accessibility Award by the American Society of Interior Designers (ASID) in recognition of its commitment to creating accessible culinary spaces.

INCLUSIVITY

Folks Kitchen exemplifies the transformative power of design in fostering inclusivity and empowerment. Through its innovative approach and unwavering commitment to accessibility, it has set a new standard for kitchen design, championing the rights and dignity of individuals of all abilities. It is worth noting that funding projects such as this for a smaller demographic has its challenges.

AUDIENCE FACTOR: LOCATION

Where an audience lives can have an impact on the effectiveness of a design. A target audience in a remote area may have different opportunities to view designs compared with an audience in an urban location. Designs may also be quite specific to a region or area. Location can also affect the socioeconomic status of an audience, as some areas offer different opportunities for employment or professional advancement. Location can also affect the language used in a design, the appropriateness of colour and images, and the scale or proportions of the design. An environmental design is affected by its location; the use of materials and the appearance of the structure may be affected by geographical and planning boundaries.

INFOGRAPHICS

Infographics are dynamic visual tools that simplify complex information using images, charts and minimal text. They enhance communication by breaking down intricate details into easily digestible visuals, making information accessible to a broader audience. With colour, icons and visual hierarchy, infographics guide viewers through a structured narrative, capturing attention and ensuring key messages are understood and retained. Incorporating well-designed infographics as evidence in presentations reflects a commitment to clarity, precision and effective communication, which can be useful in supporting communication outcomes.

90% of the information the brain processes is visual

Mike King

▶ Visual power of infographics
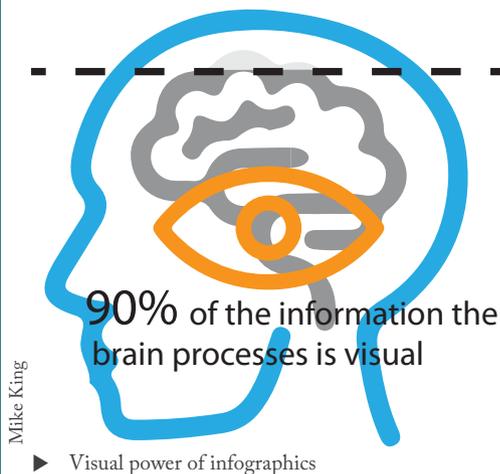
19.2 PSYCHO-GRAPHICS

Psychographics refers to insightful information about an audience's attitudes, aspirations and psychological characteristics. This valuable data offers designers a window into the shared values and attitudes of stakeholders, aiding in crafting designs that resonate on a deeper, more meaningful level. Understanding the psychological criteria of the target audience allows designers to create tailored solutions that align with the mindset and preferences of the intended users. It's a tool that goes beyond demographics, delving into the intricate landscape of human motivations and emotions for more effective and impactful design outcomes.

AUDIENCE FACTOR: INTERESTS

This is a vast category of great importance to designers. The interests of a specific audience may include music and fashion, for example, but there exist subcategories of those interests that can define an audience in even more detail. The specific style of music and the fashion labels that are preferred by an audience will influence their habits as users. Interests may also refer to specific professional, academic, cultural, political or personal interests.

AUDIENCE FACTOR: CULTURAL BACKGROUND

The content of a design may be influenced by the belief system of the audience. The appropriateness of imagery and content will be defined by cultural and religious traditions. If a brief addresses the needs of a culturally specific audience, it is essential that the designer understands what visual material is and is not appropriate to use.

CASE STUDY ~ CROCS: DESIGN CHANGE INFLUENCED BY DEMOGRAPHICS AND PHYSCHOGRAPHICS

FOUNDED

Crocs, a global footwear brand, was founded in 2002 by three friends: Scott Seamans, Lyndon 'Duke' Hanson and George Boedecker. The company gained fame for its signature foam clog design, known for its comfort, durability and distinctive appearance.

EM Arts/Shutterstock.com

Michelle Williams

▶ Jibbitz were introduced to allow customers to decorate and personalise their Crocs

KEY DESIGN FEATURES

The Crocs design featured a lightweight, slip-resistant foam material, creating a comfortable and functional shoe suitable for various activities. The clog's design became a hallmark, making Crocs instantly recognisable in the footwear industry.

CHALLENGES AND ADJUSTMENTS

In 2008–09, Crocs faced a significant setback as the company experienced a sales dip, leading to financial pressures. To recover, Crocs undertook strategic adjustments based on demographic and psychographic data. The market they had always relied on began to fade, with feedback that the no-frills design was tired and some reports of foot issues.

DESIGN AND MARKETING ADAPTATIONS

Crocs responded by diversifying their product line to appeal to a broader audience. They introduced new designs, including high-heeled Crocs, aiming to blend comfort with fashion. This adaptation catered to different consumer preferences, expanding the brand's reach. The market expanded and looked closer at a younger demographic.

ENHANCEMENTS

To further enhance personalisation and engage consumers, Crocs introduced Jibbitz, decorative charms that could be inserted into the holes of the shoe. This addition allowed users to customise their Crocs, reflecting individual styles. The introduction of Jibbitz marked a creative move to revitalise the brand and attract new market segments.

Celebrity endorsements, even unofficial ones, can also increase the appeal of products.

Thecelebrityfinder/Bauer-Griffin/Getty Images

▶ Celebrity endorsement from Heidi Klum

Crocs' ability to navigate challenges through thoughtful design adjustments and strategic marketing showcased their resilience in the ever-changing footwear market. The company's evolution beyond the original clog design highlights the importance of adaptability and innovation in sustaining a successful brand and investigating the needs and wants of the stakeholders.

Demographic descriptors	Personal descriptors	Socioeconomic descriptors	Other descriptors
Singles Families (young family, new family, established family) Couples Non-traditional families/couples Parents (mothers, fathers, grandparents) Adults Middle-aged (40+) Seniors (60+) Elderly (75+) Retirees Pensioners	Youthful Outgoing Carefree Happy Social Adventurous Risk taking Conservative Frail, unwell, sickly Experienced Worldly Organised Sensible Quirky Creative	Professionals Young professionals Older professionals Tradespeople/tradesmen Qualified/highly qualified Manager Employee/employer Unemployed, jobseeker Highly educated Poorly educated Corporate Retired (supported by pension, family, superannuation) Privileged Deprived	Socially aware Environmentally aware Informed Hard working Self-sufficient Sedentary Engaged Politically aware Interested in social justice Family-oriented Community-minded Responsible Outspoken Critical of … Supportive of …
Young adults Students Teenagers/adolescents Youth School-leavers Pre-teens (tweens) Children School-aged children Toddlers Infants and babies	Eccentric Independent/dependent Intellectual Busy Mischievous Loving, caring Empathetic, compassionate Helpful Intelligent Fit and healthy Colourful Relaxed Focused Positive Energetic, vibrant Concerned, worried Chic, fashionable Sophisticated, unsophisticated Multicultural Curious, intrigued Optimistic, pessimistic Enthusiastic, keen, motivated Sporty, athletic, active	Budget-conscious Average incomes Student Graduate Tertiary educated Undergraduate Employed full-time, part-time, casual Well paid, poorly paid High disposable income Moderate disposable income Low disposable income Independent, dependent Stay-at-home (parent) Working from home (small business) Business owner Worker Secure, insecure Ambitious Single income, dual income, limited income Wealthy Established Reliant	Passionate Impassioned Multicultural Migrant background Non-English-speaking background Culturally diverse Influenced by … Religiously affiliated

USER/AUDIENCE CATEGORISATION

It is advisable to avoid formulaic groupings and develop a deeper profile of the end user. Think about your friends and family, your school colleagues or workmates. Chances are they are a diverse group. Designers need to understand the diversity and breadth of an audience. These are some examples of user/audience descriptors.

KEY QUESTIONS FOR AUDIENCE RESEARCH

+ Who is the audience?
+ Who falls within the company's or organisation's existing market?
+ Who does the company perceive as the target market for the new design?

+ Is this a different or new market for the company? If so, why?
+ What are the company's primary and secondary target markets? (For a product aimed at teenagers, for example, the teenagers themselves are a primary market and the parents who might pay for the item are a secondary market.)
+ What research has been done to establish this market?
+ What are the details of the market? (These include age, income, background, interests, purchasing patterns, ethnicity, location, familiarity with product, technological knowledge.)
+ What other products appeal to this market?

19.3 CREATING PERSONAS

A persona is a fictional character that embodies a particular stakeholder that could be a user or customer for your product, service or environment. This character is crafted by combining insights from real customer data and identifying common themes or characteristics observed among them. This research-driven approach helps gain a deeper understanding of customers' needs, behaviours, experiences and goals.

CREATING A PERSONA: TYPICAL CREATION STEPS

Step 1　Research and analysis: Gather and analyse information about identified group. Surveys could be a tool to collect this information.

Step 2　Persona descriptions: Develop a character representing your customers. Give them a name.

Step 3　Problem analysis: Explore the challenges your stakeholder may have relating to your design task.

A persona can be used in the divergent and convergent stage of the Explore phase to help consider the needs and wants of stakeholders, and help identify and explore design problems.

Personas are explored in Chapter 4.

'Rita'

Mr.Exen/Shutterstock.com

Demographics
• **Age:** 42
• **Employment:** 4 days/ week
• **Family:** Married, 3 school-aged children
• **Lives:** Peregian, Qld
• **Household income:** $150,000/ year

Behaviours
• Frequently feels stressed and overwhelmed
• Drives children to extracurricular activities 4 nights a week and on weekends
• Has a cleaner once a fortnight
• Uses online supermarket shopping and delivery service for her weekly food shop
• Buys take-away 3 nights/week

Needs and wants
• More time and to feel like she has everything under control!
• Help keeping the household and children's activities running smoothly
• Time to herself and quality time with her friends

Resource
Persona activity
Persona template
A3 Persona worksheet

▶　A persona can help you identify your audience.

EXPLORE
Needs, wants, opportunities
Problem definition
Use sketching and prototyping skills.
Divergent
Convergent

Design brief

DEVELOP
Ideas
Concepts
Use sketching and prototyping skills.
Divergent
Convergent

Design proposal
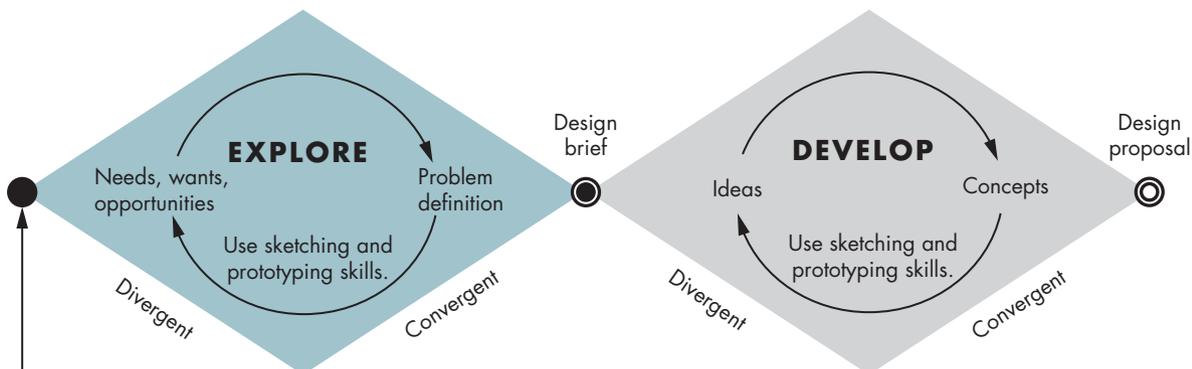
A basic brief including client and influences is provided for you.

Design 2025 v1.1 General Senior Syllabus, p. 27. Design 2019 v1.1 General Senior Syllabus © Queensland Curriculum and Assessment Authority (QCAA).

CHAPTER REVIEW

1   Using the audience description provided, create one or more concepts for the packaging for natural soap. Use the template to depict your concept.

The audience is health-conscious singles and families residing in Queensland, who value natural ingredients and quality personal products. They may range in age from 25 to 35 and are responsible for purchasing goods for their household. They shop at the local supermarket and are careful with their household budget, but are prepared to pay a small premium for products that are kind to the environment and to the user. They may be educated about the benefits of natural, organic and healthy ingredients. Products that use natural and native Australian plants would be very appealing to the target market who may have a preference for home-grown products and Australian-made items. The audience would be house-proud and enjoy a tasteful and refined living environment. They are likely to appreciate products that fit into contemporary home decor. The target audience is both male and female, youthful and aware of healthy living.
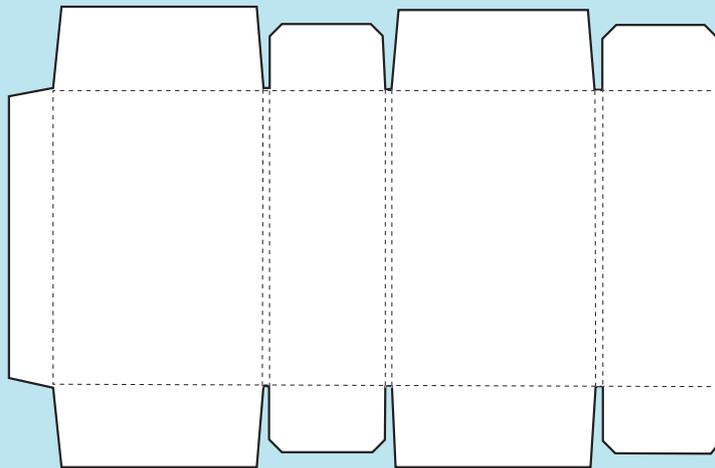
DESIGN INFLUENCES

Design is in everything we make, but it's also between those things. It's a mix of craft, science, storytelling, propaganda, and philosophy.

Erik Edigard

In this chapter:

Learn the language:

+ brand development
+ consumerism
+ cultural impact
+ cultural influences

+ cultural intelligence
+ disruption
+ economic impact
+ influences

+ market gap
+ social design
+ social impact

20.1 SOCIAL, ECONOMIC AND CULTURAL INFLUENCES ON DESIGN

In the exploration of design considerations discussed in Chapter 12, we delved into the many features shaping the creative process. Now, we turn our focus to the factors of social, economic and cultural dimensions, and their profound significance in the success of designs within the commercial landscape. These factors serve as a compass guiding designers through the dynamic terrain of consumer preferences, market demands and cultural nuances.

Designs that resonate with the pulse of society, respond to economic trends and embrace cultural diversity stand poised for success. The evidence required for robust learning outcomes in design projects hinges on a keen understanding of these influential dimensions, sparking meaningful conversations and observations.

Money is not always the driving force behind designs and their purpose, but to ensure financial sustainability we can't ignore the importance of a return on investment to ensure that designs provide a legacy. Unit 4 explores financial sustainability in more detail.

Often the discussion and exploration of social, cultural and economic influences can lead to the discovery of potential gaps in the existing market. Let's unpack what a gap in the market is.

GAP IN THE MARKET

The concept of a 'gap in the market' refers to an unmet need or opportunity that exists within a particular industry or market space. From a design perspective, identifying and exploring these gaps is essential for innovation and creating solutions that resonate with users. This exploration involves a comprehensive analysis of the existing market landscape, delving into social, economic and cultural aspects to understand the diverse needs and desires of stakeholders. By adopting various thinking approaches, designers can uncover potential gaps, paving the way for creative solutions and products that address unfulfilled demands in the market.

20.2 SOCIAL INFLUENCES ON DESIGN

SOCIAL DESIGN

Designers typically concentrate on designing outcomes with a primary focus on their commercial viability, satisfying a client/stakeholder that has financially invested in the process. However, there's also a branch of design known as social design, which considers the broader impact of a product or service on society and infrastructure. Unlike traditional design, social design aims to create positive societal change and improve overall wellbeing. Social design can and should be a factor within all design problems.

IDENTIFYING A GAP IN THE MARKET

How can I stand out from my competitors?
I can stand out from my competitors by utilising the recyclable rubbish collection from sustainability groups to create the fabric for the dogwear. This allows our brand/product to connect to the community and encourage sustainable fashion practises.

What is my gap in the market?
Sustainable and waterproof dog wear that utilises local recycled materials.

What is the gap in the market?
A gap in the market is defined as a need, service or product that is not currently being given or offered to consumers.

How will I advertise this?
Through social media tactics, advertising in local markets and implementing the product into popular surf stores in the sunshine coast.

Who am I selling to?
Sunshine coast buyers who have dogs and are passionate/ conscious about local sustainability efforts

What aesthetics would my persona like for my product?
The aesthetic should be the beach for the design. It'll connect with consumers better, as the majority of Sunshine Coast families are beach people, and go there regularly. Blues, whites and yellows are common colours I want to use in my product.

Which environmental organisations already exist on the Sunny Coast
Noosa Youth advocacy group is very passionate about youth sustainability, but Sea Sheppard focuses more on ocean sustainability and marine life.

Jade Leaman, Year 12 Design student

▶ Identifying a gap in the market

Hippo rollers are used to collect and transport water in South Africa. They have greater storage capacity, and can be used to transport water across a range of terrains and distances, which means less risk of injury compared to alternatives, particularly carrying.

Social design incorporates several crucial elements, including:

+ understanding what defines a society
+ how a community works
+ meeting the community's needs with solutions.

The iterative process involves continually refining designs based on user feedback until they effectively meet user requirements. This method often integrates principles from other philosophies like design thinking and human-centred design to develop comprehensive solutions for various challenges. Ultimately, social design brings together user insights and systemic thinking to create sustainable products that cater to those most affected by them.

Weblink
Hippo roller

Social design aims

+ *Enhancing lives:* Design solutions aimed at social good directly enhance people's lives by addressing specific needs or challenges. For instance, an app facilitating access to social services can streamline support for individuals in need.
+ *Fostering sustainability:* Designing for social good promotes both social and environmental sustainability through responsible and sustainable solutions. For example, energy-efficient and affordable housing designs contribute to reducing greenhouse gas emissions and increasing housing accessibility.
+ *Raising awareness:* Socially oriented design endeavours raise awareness about critical social, cultural and environmental issues. For instance, marketing or graphic

design campaigns can educate and motivate individuals to take action on important issues.

+ *Strengthening communities:* Design initiatives for social good contribute to building stronger, more cohesive communities by uniting people around common goals and projects. For example, collaborative design projects involving community members in the development of public spaces foster a sense of ownership and pride within the community.

SOCIAL IMPACT

To explore an example of a business with a focus on social impact, visit the Impact Boom website. The Brisbane-based company was founded by local industrial designer Tom Allen.

Weblink
Impact Boom

20.3 ECONOMIC INFLUENCES ON DESIGN

CONSUMERISM

Consumerism reflects a society where individuals pursue the acquisition of goods and services extending beyond basic survival needs or traditional status symbols. Many people think they must have new things. This phenomenon profoundly influences social, cultural and economic dimensions.

CASE STUDY ~ EMPOWERING COMMUNITIES: THE LITER OF LIGHT INITIATIVE

The Liter of Light initiative exemplifies the power of social design in addressing fundamental needs within economically disadvantaged communities. Focused on providing sustainable lighting solutions, this innovative project aims to illuminate homes and empower individuals in areas with limited access to electricity.

BACKGROUND

In many parts of the world, access to reliable electricity remains a challenge. Without adequate lighting, households rely on inefficient and often hazardous alternatives, such as kerosene lamps or candles, affecting both safety and wellbeing.

DESIGN CONCEPT

Re-purposing plastic bottles filled with water and bleach to create solar-powered lamps is at the core of the Liter of Light design. Using the principles of refraction and diffusion, allowing sunlight to penetrate the bottle during the day and emit a

Jay Directo/AFP/Getty Images

▶   The founder of the Liter of Light project, Illac Diaz, explaining how the device works

soft, ambient glow at night. This cost-effective and environmentally friendly approach not only provides illumination, but also reduces reliance on non-renewable energy sources, contributing to long-term sustainability.

IMPLEMENTATION

The implementation of Liter of Light projects involves collaboration with local communities, volunteers and organisations to identify areas lacking adequate lighting and assess the feasibility of installing solar lamps. Workshops and training sessions are conducted to educate community members on the assembly and maintenance of the lamps, fostering a sense of ownership and self-reliance.

IMPACT

The impact of the Liter of Light initiative extends beyond illumination, touching various aspects of community life. By providing access to clean and reliable lighting, households experience improved safety, productivity and quality of life. Children can read after dark and families feel safer at night. Moreover, the adoption of solar lamps reduces carbon emissions and environmental degradation, contributing to broader sustainability goals.

The Liter of Light project was implemented in a rural village in South-East Asia, where the majority of households lacked electricity access. Through a series of community workshops and volunteer efforts, over 100 solar lamps were installed in homes, schools and community centres.

Weblink
A Liter of Light at Night

+   *Social impact:* Consumerism shapes social interactions, material possessions and lifestyle choices as markers of identity. It fosters a culture where individuals often define themselves by their possessions, affecting personal relationships and societal values. The constant pursuit of the latest products can contribute to a sense of competition and status anxiety.

+   *Cultural impact:* Consumerism plays a pivotal role in shaping cultural norms and preferences. It influences cultural identities as people adopt trends and lifestyles associated with certain products. Cultural practices may evolve around consumption patterns, affecting traditions, rituals and values as societies adapt to the prevailing consumerist culture.

+ *Economic impact:* Economically, consumerism drives market dynamics and influences production and consumption patterns. The demand for a continual stream of new products stimulates economic growth, but it also raises concerns about resource depletion, environmental sustainability and waste. The focus on consumption as a key economic driver can lead to cyclical patterns of production and disposal.

In summary, consumerism is a multifaceted force that extends beyond mere buying and selling. It affects societal structures, influencing how people perceive themselves, interact with others, and contribute to economic and cultural landscapes. Understanding its impacts is crucial for addressing the broader implications on social, cultural, and economic states.

DIGITAL DISRUPTION

Digital disruption refers to the ongoing process where digital technologies bring changes to conventional business models, practices and industries. The integration of digital tools and strategies alters the way organisations operate, interact with customers, and deliver products or services. This evolution is driven by technological advancements, influencing consumer behaviours and market structures. To stay relevant, designers must adapt to these changes, acknowledging the impact of digital disruption on established norms and finding strategic ways to navigate this evolving landscape. Digital disruption can lead to cultural and social shifts that result in a change in economic trends.

CASE STUDY ~ COOL CABANAS: SHAPING THE BEACHSIDE EXPERIENCE

IDENTIFYING THE GAP IN THE MARKET

Cool Cabanas, a visionary venture founded in 2011 by an innovative architect, emerged from the shores of Noosa. The inception took root as the designer, architect Mark Fraser, observed a gap in the market for a beach shelter that seamlessly combined convenience, style and panoramic views.

DESIGN FEATURE

Traditional beach umbrellas fell short of providing optimal shade and unrestricted views. The design solution focused on creating a shelter that could be easily set up, offered ample shade, and allowed beachgoers to soak in the scenery from both sides.

Cool Cabanas incorporated a sand pocket system, using the natural surroundings as a key design element. This not only ensured stability in varying beach conditions but also added a touch of practicality. The design, with its clever use of materials and a thoughtfully engineered framework, transformed the mundane beach shelter into a stylish haven.

SUCCESS AND GROWTH

From its humble beginnings in Noosa, Cool Cabanas has evolved into a multi-million-dollar company, achieving remarkable success globally. The brand's commitment to addressing the gap in the market and delivering a superior beachside experience has resonated with consumers, making Cool Cabanas synonymous with innovative beach solutions.

▶ Cool Cabanas use sand to weigh down the corners of the beach shelter.

IMPACT OF CULTURAL AND SOCIAL INFLUENCES

Cool Cabanas exemplifies the influence of cultural and social factors on design success. Its designs align with the contemporary lifestyle, where beachgoers seek not just functionality but also aesthetics and ease. The brand's growth attests to its ability to adapt to shifting cultural trends and address the evolving needs of its audience.

Weblink
Cool Cabanas

CASE STUDY ~ NETFLIX

Ecrow/Adobe Stock Photos

▶ Netflix's model has evolved as technology has evolved.

FOUNDED

Founded in 1997, Netflix revolutionised the media industry, introducing a subscription-based model for renting DVDs by mail. As technology evolved, so did Netflix's user features, transitioning to a streaming platform, offering a vast library of movies and TV shows accessible anytime, anywhere.

ECONOMIC SHIFT

The streaming industry brought about a notable economic shift. Consumers moved away from traditional cable subscriptions to more affordable and flexible streaming services. This transition disrupted the traditional economic model of cable TV, affecting advertising revenue and challenging the established media distribution channels.

CULTURAL SHIFT

Netflix's on-demand content delivery transformed the way people consume media. Binge watching became a cultural phenomenon, influencing how stories are told and how content creators approach narrative structures. Cultural conversations shifted from scheduled TV shows to entire seasons released at once, reflecting a new era in media consumption.

SOCIAL SHIFT

The rise of streaming services altered social dynamics, fostering a global community of viewers connected by shared content experiences. Social media platforms became hubs for discussions and recommendations, even influencing production decisions based on audience feedback. The ability to personalise viewing experiences contributed to a more individualised and yet collectively shared entertainment culture.

Netflix, along with other streaming services, exemplifies the impact of digital disruption on the economic, cultural and social facets of the media landscape.

Weblink
Netflix

Source: Netflix, Inc.

▶ Netflix on multiple platforms with multiple features

CASE STUDY ~ 3D PRINTING

FOUNDED

The concept of 3D printing originated in the 1980s, with Chuck Hull inventing stereolithography technology. Since then, it has evolved into a revolutionary method for creating three-dimensional objects layer by layer.

DESIGN FEATURES

3D printing allows rapid prototyping and small-scale manufacturing. It enables intricate and customisable designs, transforming the traditional approach to creating prototypes and products across various industries.

IMPACT

The economic impact is evident as companies adopt 3D printing for faster, cost-effective prototyping and production in small quantities. This disrupts traditional manufacturing processes, leading to a shift in economic models and supply chain strategies.

3D printing has created a cultural shift in how products are conceived and developed. It cannot yet compete with the speed, quality and quantity of mass-production techniques such as injection moulding, but excels in creating small quantities of complex forms. This technological advancement embodies the ongoing digital disruption, influencing economic, cultural and social aspects of various industries.

▶ These shoes were designed using a 3D printer.

▶ This prosthetic hand for a child was created using a 3D printer. This is a cheaper option while the child is still growing and will need to regularly replace the hand.

BRAND DEVELOPMENT

Brand development is the strategic process through which a company shapes and refines its brand identity to resonate with its target audience. It involves crafting a distinct personality, visual elements and messaging that set a brand apart in the competitive market. This deliberate effort extends beyond creating a recognisable logo; it encompasses the holistic formation of a brand's character and values.

Consumer confidence and trust are integral outcomes of effective brand development. A well-crafted brand establishes a clear and positive perception in the minds of consumers, fostering a sense of reliability and credibility. This connects directly to the 10 Principles of Good Design. Being honest, a brand or design can build trust with consumers and deliver on original and consistent values.

Brand development ensures consistency across all brand touchpoints, from visual elements to messaging. A cohesive and uniform brand experience builds confidence by presenting a reliable and stable image, reinforcing trust with every interaction.

Effective brand development creates a memorable brand identity that stands out in the minds of consumers. A recognisable brand fosters trust through familiarity. Consumers are more likely to choose a brand they can easily recall and associate with positive experiences: a reliable vehicle, a trusted builder, a clothing line that has always delivered style and standards.

Through brand development, companies can intentionally cultivate positive associations with their brand. Whether through quality products, exceptional customer service or community engagement, these associations contribute to a positive brand image that bolsters consumer confidence.

CASE STUDY ~ LEGO: MASTERING BRAND DEVELOPMENT

FOUNDED
LEGO Group was founded in 1932 by Ole Kirk Christiansen in Billund, Denmark.

Dean Bertoncelj/Shutterstock.com

KEY DESIGN FEATURES
LEGO's iconic interlocking brick system, introduced in 1958, has remained consistent over decades, allowing compatibility across sets and ensuring long-term customer loyalty.

Kostikova Natalia/Shutterstock.com

▶ LEGO's consistent interlocking brick system means that LEGO from the 1970s is compatible with LEGO created today.

DIVERSE PRODUCT RANGE
LEGO has expanded its product range beyond traditional bricks to include themed sets, video games, movies and educational tools, catering to various age groups and interests.

FOCUS ON PLAY AND LEARNING
LEGO recognises the importance of play and learning in child development, aligning its products with educational values and fostering creativity and imagination.

BRAND DEVELOPMENT
LEGO has achieved unparalleled success in brand development, setting a benchmark for consistency, honesty and value. Few competitors have been able to match the enduring appeal of LEGO. LEGO's commitment to quality and consistency is evident in its interlocking brick system.

LEGO's products provide honest value, creativity, durability and the joy of building. The brand communicates these values transparently, creating trust among consumers. LEGO actively engages with its community through user-generated content, fan events and crowdsourcing ideas. This involvement fosters a sense of belonging and co-creation, strengthening the brand's relationship with its audience.

AlesiaKan/Shutterstock.com

▶ LEGO also has electronic capabilities, and can be used with programming.

20.4 CULTURAL INFLUENCES ON DESIGN

Culture plays a significant role in design and the success of designs. What works in one place may not work in another, making a one-size-fits-all approach ineffective. For example, the colour white symbolises purity in Western cultures but signifies death in some Asian cultures. Understanding these cultural nuances is crucial in design to ensure effective communication with diverse audiences.

Cross-cultural design aims to create design outcomes that are usable and understandable by people from various cultures. It considers factors such as language, colour, symbols and customs to make designs welcoming and intuitive for the target audience. For instance, layout adjustments may be necessary within a user interface based on cultural reading patterns, like left-to-right for English readers and right-to-left for Arabic readers.

iStock.com/Skynesher

▶ Designing based on cross-cultural principles broadens your audience.

By embracing cross-cultural design principles, products can resonate with a broader audience, enhancing user experience and engagement, and ultimately driving connection to users and success of the design.

CULTURAL DESIGN GUIDELINES

While there may not be a single authoritative set of standards, the considerations listed below reflect widely accepted principles and norms within the design community. The guide below provides essential considerations for creating designs that resonate with diverse audiences and avoid unintentional offense or miscommunication.

+ *Inclusivity:* Designs should be inclusive and considerate of diverse cultural backgrounds, beliefs and perspectives. They should avoid stereotypes and discrimination, ensuring that all individuals feel represented and respected.

+ *Cultural symbols and meanings:* Designers should be mindful of cultural symbols, colours and meanings when creating visuals, logos or branding materials.

+ *Language and communication:* Language plays a significant role in design, especially in communication materials such as signage, websites and packaging.

+ *Accessibility:* Cultural design standards prioritise accessibility for all individuals, including people with disabilities or diverse needs. Designs should be easy to understand, navigate and use by people from different backgrounds and abilities.

+ *Respect for traditions and customs:* Designs should respect traditional practices, customs and rituals observed by different cultural groups.

+ *Ethical considerations:* Cultural design standards emphasise ethical considerations, such as social responsibility, environmental sustainability and fair labour practices.

+ *Adaptability and flexibility:* Designers should be adaptable and flexible in their approach, willing to modify designs based on cultural feedback and evolving societal norms.

Ballygally View Images/Shutterstock.com

▶ The addition of a ramp makes this house more accessible for people using wheelchairs and strollers.

By adhering to universal cultural design standards, designers can create inclusive, respectful and effective designs that bridge cultural divides and foster meaningful connections across diverse audiences.

CULTURAL INTELLIGENCE

Cultural intelligence refers to the capability to function effectively across various cultural contexts, encompassing understanding, adapting to, and interacting with people from different cultural backgrounds. It involves being aware of cultural norms, values, beliefs and behaviours, and possessing the skills to navigate and engage with diverse individuals and groups.

As a developing research area, cultural intelligence explores how individuals and organisations can enhance their ability to operate in multicultural environments. Researchers analyse how cultural factors impact communication, decision-making, leadership and collaboration, seeking to identify strategies for improving cross-cultural effectiveness.

This research space involves monitoring and studying different cultures globally to understand their unique habits, customs and social norms. By examining how behaviours and practices vary across cultures, analysts aim to uncover insights that can inform the development of cultural intelligence and facilitate successful interactions in diverse settings. This is an area that connects well to demographics discussed in Chapter 19.

CHAPTER REVIEW

1   Find one product, one service and one environment that you use or have always admired. Now write a short summary on how they respond to social, cultural and economic demands of users. Your response is a summary and should be short and concise. You could also respond to this by annotating an image of those products, services and environments, recognising elements that respond to social, cultural and economic influences.

2   Sketch a design that you think is unique and has not been seen before. It should respond to a need or want. For example: a way to clean a water bottle that has moving parts and parts that are tricky to reach. Once you have a concept, try to find the closest match online. Did you find a gap? Was there something already there?

3   List five brands that you often use. It could be a range of products, services or environments. Now identify why you use each brand? What would need to change for you to consider different brands? How has the brand developed your trust?

ETHICAL AND LEGAL CONSIDERATIONS

Designers have a dual duty; contractually to their clients and morally to the later users and recipients of their work.

Hans Holger

In this chapter:

Learn the language:

+ artistic craftsmanship
+ attribution
+ copyright
+ design registration
+ fair dealing
+ intellectual property
+ moral rights
+ patents
+ standards
+ trademarks

As in any professional area, designers need to consider the legal and ethical issues that affect their field. As professionals, they have responsibilities towards their clients, users and the wider community. These issues include:

+ copyright
+ intellectual property
+ standards and safety
+ image manipulation
+ cultural sensitivities.

Legal issues are set; they are issues that are defined by law and cannot be breached without serious consequences. Legal regulations apply to designs created and sold in Australia and might include safety regulations and standards that designers are required to adhere to. Ethical concerns are less concrete. They may range from 'Can I work for this client?' or 'Is this a conflict of interest?' to 'Does this design negatively impact those who will see it or use it?'

Designers in all design fields need to take legal issues into account in their work. An architect may be required, by council by-laws, to consider the effects of a design on the community and make aesthetic judgements with those in mind. The same architect has an obligation to create a safe construction for the client, and there are legal implications if safety is compromised. All designers are faced with issues of copyright and attribution, both in their own work and when using the work of others. Decisions about the use of materials from other sources may be constrained by copyright, costs and licensing restrictions. Likewise, a designer may seek to protect their work under copyright laws.

ASK QUESTIONS ABOUT INTELLECTUAL PROPERTY

If you are starting to ask questions about your own design work and about intellectual property that belongs to someone else, it is not uncommon. But start with specific questions: Was I inspired by another design? Have I begun to make that design my own through some sort of adaptation, repurpose or other change? Have I shown reference and acknowledgement of the previous design if needed?

21.1 INTELLECTUAL PROPERTY

Intellectual property is literally 'the property of your mind' and refers to the creative production of a new invention, brand, design or artistic creation. In designing a new product, for example, intellectual property rights enable the designer to legally protect their design idea from copies and imitations for a limited period. Copyright and moral rights are automatically applied to artistic works in Australia. Other areas of intellectual property (IP) are not automatically recognised and a product, design idea or concept must be registered for a given period of time, for a monetary cost.

Intellectual property protections are a way of balancing the needs of an inventor or a creator with the public good. For example, a patent gives the inventor a limited period (usually 15 years) within which to commercialise their invention to defray the costs of development and to reward their initiative in exchange for making the details of the invention public. This encourages sharing and the development of new ideas and designs, as opposed to keeping them secret and stagnant. (Note that you can't patent an idea, only the new 'embodiment' of an idea in the form a novel device, substance, method or process.)
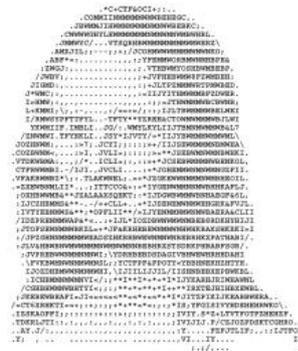
▶ Examples of ways the *Mona Lisa* has been co-opted by designers and corporations to sell products, from stamps to T-shirts.

Copyright operates in a similar way for art and literature – although the protection period is much longer than patents, eventually the work enters the public domain and becomes the property of culture at large, allowing anyone to adapt, 'remix' or retell the work without permission. Famous works in the public domain include Arthur Conan Doyle's *Sherlock Holmes* stories and Leonardo Da Vinci's *Mona Lisa*.

Using the Australian Government's intellectual property organisation, IP Australia, designers can apply for patents, trademarks and registered designs to protect the originality of their work and ideas. IP Australia takes care of four distinct types of intellectual property: patents, trademarks, designs and plant breeder's rights. The table below outlines the relevant types of intellectual property that are usually registered.

IP rights are legally enforceable in Australia and protect many designers from the copying and misuse of their designs. Areas of design that benefit from IP protections include:

+ architecture
+ digital media
+ exhibition design and display
+ fashion design
+ furniture design
+ graphic design
+ industrial design
+ interior design
+ jewellery design
+ landscape design
+ television, film and set design
+ textile design.

It's given me freedom to create, by transforming existing elements and combining them to create something new. Everything is a remix!

Kirby Ferguson

WHO OWNS INTELLECTUAL PROPERTY?

When creating work for a client, the ultimate owner of the design (the intellectual property, IP) is usually established in the contract at the beginning of the design process. In the majority of cases, the contract between client and designer will state that all IP generated becomes the property of the client in return for design fees.

Although a 'normal' contract would assign all IP rights to the client, a designer might negotiate at the beginning with the client over what will be assigned – and under what payment terms – and then write this agreement into the contract. For example, one option is to agree to assign the IP rights to only the final, selected idea, retaining rights to any other design ideas.

INTELLECTUAL PROPERTY RIGHTS

The website of IP Australia provides comprehensive information about all areas of IP. The site explains the key differences between copyright and IP rights and offers visual examples of each IP category: patents, trademarks, designs and plant breeder's rights.

What is protected	Type of IP right	What the IP provides
Art, illustration, literature, music, film, broadcasts and computer programs	Copyright (automatically applied)	The owner's original expression of ideas is protected, though not the ideas themselves. The owner has the exclusive right to use, sell or license the copyrighted work for a limited period.
Letters, numbers, words, colours, a phrase, sound, smell, logo, shape, picture, aspect of packaging or any combination of these	Trademarks	A trademark identifies the particular goods or services of a trader as distinct from those of other traders. The owner has the exclusive right to use, sell or license the trademark.
The way a product looks or a design on a manufactured product	Designs	The visual appearance of a manufactured product is protected, but not the way it works. The owner has the exclusive right to use, sell or license the registered design for a limited period.
Inventions	Patents	The owner has the exclusive right to use, sell or license the invention for a limited amount of time. Patents also allow the owner to stop others from manufacturing, using, copying and/or selling the device or process.

Adapted from www.ipaustralia.gov.au/understanding-intellectual-property/how-to-use-ip/what-can-you-protect/

COPYRIGHT

Copyright is designed to protect the products created by writers, designers, artists, composers, filmmakers and other creative professionals. In Australia, copyright is automatically granted to a product once it is put into 'material form' such as being drawn or written down. The owner of the copyright has the right to show, publish or perform the work in the public realm and can prevent others from reproducing the work without explicit permission. The copyright owner may sell the rights to that work or 'assign copyright' to another party.

▶ Copyright logo. Even when the logo is not present, copyright still exists under Australian law.

Copyright protects:

+ artistic works: paintings, photographs, maps, graphics, cartoons, charts, diagrams and illustrations
+ literary works: novels, textbooks, poems, song lyrics, newspaper articles, computer software, computer games
+ musical works: melodies, song music, advertising jingles, film scores
+ dramatic works: plays, screenplays and choreography
+ films and moving images: feature films, short films, documentaries, television programs, interactive games, television advertisements, music videos and video podcasts
+ sound recordings: MP3 files, CDs, DVDs, vinyl and tape recordings, podcasts
+ broadcasts: pay and free-to-air television and radio.

Copyright does not protect techniques, concepts or ideas, but it does protect their tangible physical representation. An *idea* for a textile design featuring original patterns and illustrations, for example, is not copyrighted; however, copyright law covers the sketches, drawings, prototypes and final design product.

The owner of copyright may be different from the owner of the designed item. An individual may own the design, yet the copyright to the design remains in the hands of the original copyright owner, who may be the designer or manufacturer.

Many designers use sourced imagery in their work. Copyright images and photographs may be used in publications, websites and other public domains only with the permission of the copyright owner.

CASE STUDY ~ COPYRIGHT INFRINGEMENT: VON GLITSCHKA

US illustrator and designer Von Glitschka maintains a highly visible profile online, at conferences and as an educator. However, his distinctive work has been used at various times without permission.
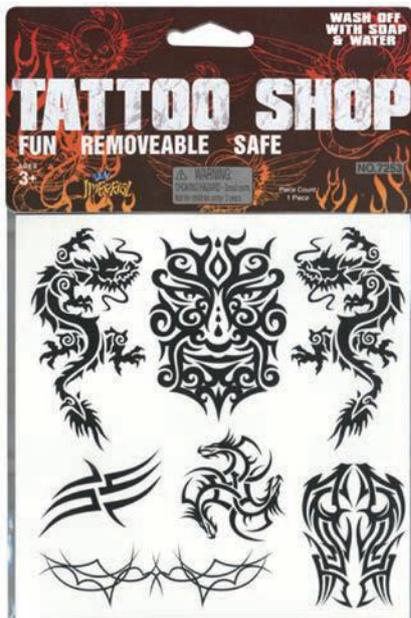
▶ Product that infringed Von Glitshka's copyright

▶ Original artwork by Von Glitschka, as displayed at www.glitschkastudios.com
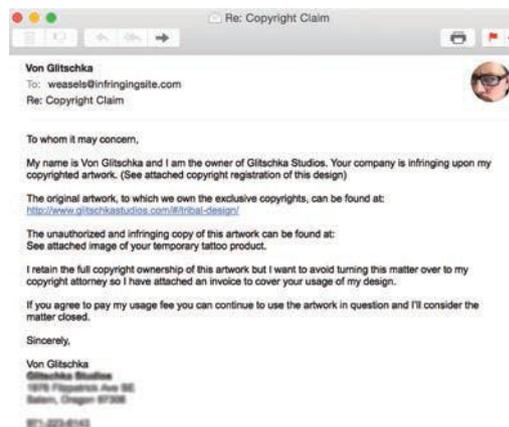
▶ Von Glitschka's initial response is directed to the owner of the infringing materials.

CASE STUDY ~ COPYRIGHT AND DESIGN REGISTRATION: LUMIERE ART & CO.

Artist and designer Emma Cleine juggles multiple intellectual property issues in her business, Lumiere Art & Co. Her unique artworks are automatically protected under copyright law. Her cushions, homewares and other products are protected with a combination of copyright and design registrations.

Lumiere Art & Co.

THE COPYRIGHT TIMELINE

FYI

Just because a work appears online does not mean that it is out of copyright. For artistic, literary, musical and dramatic works, the period of copyright protection runs from the time of creation until 70 years after the death of the creator. Films, sound recordings and broadcasts are protected for 70 years from the end of the year in which the work was released. Sometimes it takes some searching and research to identify whether creative products are in or out of copyright. Once out of copyright, a work is considered to be in the 'public domain' and can be used freely.

COPYRIGHT COUNCIL

The Australian Copyright Council supports the copyright needs of creative professionals in Australia. The website offers information organised by profession and features detailed information about all aspects of Australian copyright law. Council members include representatives from the peak professional associations for Australian writers, musicians, photographers, visual artists, journalists, filmmakers and architects.

Weblink
Australian Copyright Council

Copyright for students

The rules for using copyright-protected materials in education are slightly different. Under Australian law, schools have expanded rights to use copyright materials without seeking permission from the copyright owner as long as content remains within the classroom. There are still parameters set as to the amount of copyright works that may be copied, displayed and reproduced, but the rules make the use of copyright materials for educational purposes much more flexible.

Sources used by students should always be acknowledged. When using images, the original source of the image should be acknowledged in an annotation that records the original author or copyright owner. If the owner cannot be identified and the image has been sourced from an online location, note the web address or use a screen capture to identify the source. This is called attribution.

If student work is to be displayed publicly, there must be clear acknowledgement and attribution of any content used that has not been created by the student.

DON'T COPY!

FYI

Despite popular belief, it is not OK to change an existing creative work by 10 per cent or 20 per cent and claim that it is no longer protected by copyright. Misuse of copyright material is measured by the term 'substantial', usually decided on a case-by-case basis. The safest approach is to be inspired but *don't* copy!

Tips for students using the work of others

Always identify the source when using the work of others. You are entitled to use a 'fair' amount of work from other sources for 'research and study' without gaining permission from the copyright owner; this is known as fair dealing. Fair dealing requires that the work is used only for research, criticism, satire and parody, or reporting of news. It is likely that most work used in QCE Design will fall under the 'research and study' area.

You are entitled to use the work of others when you have express permission from the copyright owner to do so. You should have evidence of the permission.

You are entitled to use work with a Creative Commons licence that allows use by others (see the Creative Commons licence types on page 293).

CASE STUDY ~ COPYRIGHT

As part of her Units 3 & 4 SAT folio, student Stephanie Hosler created a series of original book covers for a re-issue of classic literary works by Oscar Wilde. Wanting to have her work appear as authentic as possible, Stephanie contacted publisher Harper Collins and requested permission to include its logo on her designs. Via email, she received permission from the company to use the logo and was able to document the permission in her development work.
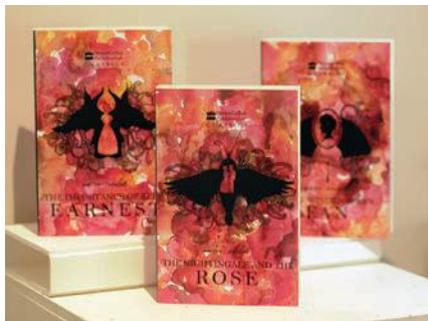
Stephanie Hosler

SMARTCOPYING

This official website is designed for teachers and students at Australian schools and TAFEs. Educational use of resources entails different copyright requirements, which are clearly outlined here.

Weblink
Smartcopying

MORAL RIGHTS

Established under the *Copyright Amendment (Moral Rights) Act* 2000, moral rights protect the personal connection between creator and work. Moral rights are designed to address issues of misuse, misrepresentation and distortion of original works. They cannot be sold or transferred, and remain with the original creator (except filmmakers) for the period of their life plus 70 years. These rights protect a work's original 'author', a legal term used to describe communication designers, illustrators, craft makers, architects, musicians, writers and other creatives. Moral rights remain with the original creator even when a work is sold. Copyright to a work can be assigned to another person or entity, but the moral rights to that work always remain with the original author/creator.

FEDERAL REGISTER OF LEGISLATION

For further details on moral rights, read *Copyright Amendment (Moral Rights) Act 2000* No. 159 2000 at the Federal Register of Legislation website.

Weblink
Federal Register of Legislation

Moral rights law covers three areas, listed in the table.

Moral right	What is covered
Right of attribution of authorship	The original author of the work has the right to be identified. The creator has a right to correct attribution.
Right against false attribution	The original author has the right to pursue legal action against anyone who falsely attributes their work to someone else.
Right of integrity of authorship	The original author is protected against 'derogatory' treatment of their work. Any distortion, destruction, defacement or alteration that may negatively impact on the reputation of the author is not allowed.

CASE STUDY ~ MORAL RIGHTS

Designer Nicholas Found and illustrator Emma Morgan collaborated to produce a unique illustrated spoon as a gift. Nick hand-carved the spoon from blackwood using traditional tools and techniques. Emma applied her original drawing by hand to the finished spoon in permanent black ink. Although the item was then presented as a gift, both Nicholas and Emma jointly retain the moral rights to the final design. Any change or modification to the spoon by the recipient would infringe upon the moral rights of the creators.

Nicholas Found and Emma Morgan

AUSTRALIAN ATTORNEY-GENERAL

The official website of the Australian Attorney-General offers information about current copyright law.

Weblink
Attorney-General's Department

TRADEMARKS

Trademarks distinguish the brand or identity of a business, individual or organisation. A trademark may be a symbol, logo, phrase, name, sound, colour or even smell. Registered trademarks are designed to protect an identity from close copying by a competitor within the same marketplace or goods and services classification. Trademarks are registered by IP Australia within a defined category of goods and services. For example, trademarked Christmas decorations fall under Class 28 and a bank or insurance company trademark is covered by Class 36. Trademarks can also be registered for distinctive characteristics of a product or service. Famously, Cadbury Chocolate holds registered trademarks for the distinctive purple colour of their packaging and advertising. A patterned design, in the case of David Jones department store's houndstooth design, and a product form such as Coca-Cola's distinctive classic bottle are also protected by registered trademarks.

Trademark registration is a complex process and has high associated costs. It is possible to assert a trademark without registration by placing the figure™ beside a logo; whereas, a registered trademark is represented by the ® symbol. A trademark is not compulsory for a brand or product and you may find that some businesses use similar marks, names and phrases within different goods and services classifications. An application for a trademark will be rejected if it is too similar to an existing trademark within the same classification. It is also important for designers to note that Australian trademark registration only applies within Australia.

PANTONE® and other Pantone trademarks are the property of Pantone LLC. PANTONE Colors may not match PANTONE-identified standards. Consult current PANTONE Fashion, Home + Interiors Publications for the accurate color.

▶ The identity of the Pantone brand is a registered trademark, indicated by the use of the ® symbol.

DESIGN REGISTRATION

Design registration is required when a design has a commercial focus. Three-dimensional designs that would otherwise be protected by copyright, lose that protection when they go into mass production. Subsequently, to protect a design, it may need to be registered with IP Australia. A registered design is protected under law for five years; it covers protection of the visual appearance of a product and allows for exclusive rights to commercially use, license or sell the design. What a design registration does not cover, however, is the function and materials of a design. In registering a design, there are three conditions that the product must meet.

+ The design must not have been released or revealed to the public.
+ It must have been kept secret and can only be revealed when IP Australia approves the registration claim.
+ The design must be new and distinctive compared to other products, online, internationally and within Australia.

New – it must not be identical to any design previously disclosed anywhere in the world. This includes anything published anywhere in the world or publicly used in Australia.

Distinctive – it must not be substantially similar in overall impression to any design previously disclosed anywhere in the world. This also includes anything published anywhere in the world or publicly used in Australia.

Source: IP Australia

Legal rights to the design are only approved once the registration has been 'certified' by IP Australia. This is the final stage of the registration process.

Works of artistic craftsmanship

For many small-scale product designers and makers, design registration is an expensive and cumbersome process. The Copyright Act states if their work falls under the category of 'works of artistic craftsmanship', they are entitled to copyright protection even when their products may be mass-produced. This classification was designed to protect artisan makers such as potters, furniture makers, jewellers, glass artists and other craftspeople. To qualify for protection under this classification is difficult because there are no clearly articulated rules that define 'artistic craftsmanship' in the Act itself. However, legal sources have established general guidelines.

+ The work should have an element of real artistic/aesthetic quality (as opposed to being overridingly functional or utilitarian).
+ There must be a sufficient degree of skill and craftsmanship involved in the making of the work.
+ 'Craftsmanship' does not necessarily require the article to be solely made by hand (it can be made with the assistance of a machine).
+ Evidence of a conscious intention by the artist to produce a work of art is not essential, but can help.

Source: Sharon Givoni, 2015, *Owning It: A Creative's Guide to Copyright, Contracts and the Law*, Creative Minds Publishing, Melbourne, page 259

Sarah Dingwall

▶ Glass artist Sarah Dingwall produces glass jewellery, homewares and decorative items from her studio in Mornington, Victoria. Her designs are protected by copyright beecause she fulfils the guidelines for 'works of artistic craftsmanship'.

PATENTS

A patent is a legal protection for inventions. Patents can be applied to traditional inventions such as appliances and mechanical devices as well as computer-related inventions, business methods, biological inventions, micro-organisms and other biological materials. Artistic products and ideas are not covered by patents. Patents are usually applied to highly innovative products that are otherwise unique.

There are two types of patents: standard and innovation.

Standard patent

A standard patent must be new, involve an inventive step and be able to be made or used in an industry. An inventive step means that the invention is not an obvious thing to do for someone with knowledge and experience in the technological field of the invention. (The) invention must differ in some way from existing technology.

This difference must be something more than the simple application of published information or standard background knowledge.

Source: IP Australia.

Innovation patent

An innovation patent provides protection for an invention with a short market life that might be superseded by newer innovations, such as computer-based inventions.

Source: IP Australia.

Like design registration, patents require an approval and certification process administered by IP Australia and are only valid within Australia. Patents for innovation last for up to eight years, while standard patents last for up to 20 years. A patent prevents competitors from producing identical products or systems. Patents and patents pending are identified by a reference number, which can be publicised to deter copycats.

CASE STUDY ~ THE FIDGET SPINNER

INVENTED

The fidget spinner, a small handheld toy that gained immense popularity, was invented by Catherine Hettinger in the early 1990s. Recognising its potential, Hettinger filed for a patent in 1993, describing the device as a stress-relieving toy. Her invention aimed to provide a calming and focusing tool, particularly for individuals with attention disorders.

Tatiana Popova/Shutterstock.com

CHALLENGES IN SECURING INVESTMENT

Despite obtaining a patent, Hettinger faced challenges in convincing toy manufacturers to invest in her innovative creation. The lack of interest from major toy companies meant that the fidget spinner struggled to find a place in the market during its early years.

EXPIRATION OF PATENTS AND MARKET BOOM

Hettinger's patents for the fidget spinner eventually expired in 2005, opening the door for other manufacturers to replicate and mass-produce the toy without infringing on her intellectual property. In 2017 the fidget spinner experienced an unprecedented surge in popularity, becoming a cultural phenomenon.

MISSED FINANCIAL REWARDS

A lack of clarity on the design and its central bearing design alongside an expired patent resulted in Hettinger failing to gain the recognition and financial reward for the original toy design.

iStock.com/tatyana_tomsickova

IMPACT ON DESIGN OWNERSHIP AND REWARDS

The fidget spinner case highlights the complexities and challenges designers may face in protecting their intellectual property. While Hettinger's invention laid the groundwork for a widely successful product, the expiration of patents exposed a gap in the design's ownership and rewarded those who entered the market later.

21.2 CREATIVE COMMONS

Creative Commons is an international non-profit organisation that provides free licences to copyright owners to allow others to legally share, reuse and 'remix' their material. Creative Commons was created in direct response to the increasing accessibility of materials online and a perceived lack of control that creators have in the digital domain. A Creative Commons licence is identified by a series of symbols, which indicates the context in which the author of the work is prepared to allow others to use the work. When a creator releases their work under a Creative Commons licence, it is made clear what the user can and cannot do with the work. All Creative Commons licences allow works to be used for educational purposes. Teachers and students can copy, share and often modify a Creative Commons work without seeking permission from the work's creator.

▶ Creative Commons logo

CREATIVE COMMONS

The organisation supports Creative Commons in Australia and administers the Australian Creative Commons licences. The website features detailed information about licences, including fact sheets and case studies.

Weblink
Creative Commons in Australia

HOW TO ATTRIBUTE A CREATIVE COMMONS WORK

Attribution of a Creative Commons work requires the following:

+ author name
+ title of the work
+ URL where the work was located
+ type of Creative Commons licence attached to the work
+ any copyright notice attached to the work.

CREATIVE COMMONS LICENCE TYPES

Symbol				
Meaning and letter code	Attribution BY	Non-commercial NC	Non-derivative works ND	Share alike SA
Description	This applies to every Creative Commons work. Whenever a work is copied or redistributed under a Creative Commons licence, the original creator (and any other nominated parties) must be credited and a link to the source included.	This allows others to copy, distribute and perform the work for non-commercial purposes only.	This allows others to distribute, display and perform verbatim copies of the work. The work may not be adapted or changed in any way.	This allows others to remix, adapt and build on the work, but only if they distribute the derivative works under the same licence terms that govern the original work.

HARVARD REFERENCING GENERATOR

The Harvard Referencing Generator is an online tool that can help you to acknowledge your sources easily and quickly. Type in the URL, book title or magazine and the generator will produce a correct citation for you to copy and paste.

Weblink
Harvard Referencing Generator

21.3 ATTRIBUTION OF RESEARCH

Source attribution is an important skill to learn and there are guides to assist you in correctly documenting your sources. The Harvard system of referencing materials is probably the most widely used.

Generally, the following should be included when attributing non-original content:

+   name of the work (if available)
+   author and/or copyright owner's name (Usually this should be the surname followed by initial but some online content may give you only a first name, so use what is available or attribute to Anon. if no author can be identified.)
+   URL of the work if found online
+   origin of the work, if found in a secondary publication (The name of the publication should be identified along with its date of publication.)
+   date of the work
+   date of access or download.

Research	Source	Attribution	Example
Images	Online, e.g. Google Images	Avoid annotations that simply state 'Google Images' or another search engine. Navigate to the source site of the image and copy the URL. The attribution should state: + owner (if known) + \<URL of the image> + [date it was accessed/downloaded].	Image by Jones, J. available from \<www.greatbuildings.com/ image_033> [13 May 2018]
Images	Print sources	Include the publication title and date if it originates from a print source. The attribution should state: + owner + title image and/or the article from which it was sourced + name of the print publication + date of publication.	Image by Mavis Davis, 'Australia's ten best photographers', *Design Journal*, Issue 12, 2018 (When annotating an attribution in handwriting, you can emphasise the source by an underline rather than italics, e.g. *Design Journal*.)
Stock images	Online stock photo site	Free stock photo sites will vary in the level of attribution required but most will require the name of the owner of the work. The attribution should state: + owner (if known) + ID (#) number of the image + \<URL of the image or stock site> + [date it was accessed/downloaded].	Image copyright Dani007 #0436721 \<http://sxc.hu> [4 June 2018]
Text	Digital sources, e.g. blogs, Wikipedia articles	Quotes or references directly taken from online sources such as blogs must identify the author and origin. The attribution should state: + author + title of the blog post or article + [date of the blog post or article] + \<URL of the blog> + [the access or download date].	Feagins, L., Interview with Illustrator Dawn Tan [12 September 2011] \<thedesignfiles. net> [30 June 2018]
Text	Books	When using research from a secondary source such as a book, you must also add the publisher name and location of publication. The attribution should state: + author + date of publication + title of the book + publisher, location.	Martin, B., & Hanington, B., 2012, *Universal Methods of Design*, Rockport Publishers, USA (The title should be italicised if using a computer but can be underlined when handwritten.)
Text	Magazines and journals	The article name must be mentioned and depicted in single quotation marks. The attribution should state: • author • date of publication • title of the article name of the publication issue or volume number and date.	Banham, Stephen, 2012, 'The Typeface: Newman', *Desktop Magazine,* No. 279 (Italicise the name of the magazine if using a computer, but underline if handwritten.)
Creative Commons materials	Refer to Creative Commons on pages 292–293 to read about online content that is covered by the Creative Commons' licence structure.		

21.4 USE OF IMAGES

Print media often uses images that have been altered, and software such as Photoshop is often used to retouch and alter the appearance of individuals.

There have been many well-documented cases of celebrities seeking compensation from publishers for overt and exaggerated manipulation of their images. Although there is no specific legislation in Australia that protects people from having their likeness altered without their consent, there are areas of law that offer some protection. Defamation law offers recourse if an individual believes that the alterations to their image cause ridicule, contempt or a loss of reputation, while consumer law protects against deceptive or misleading interpretations of an image. It is important that designers are aware of relevant legislation about image use.

▶ Image of a female face before and after Photoshop retouching

Elena Rudyk/Shutterstock.com

CHAPTER REVIEW

1 You have created illustrations and typography to be used on the album cover for a friend's band. You did not accept financial payment for the design but accepted a number of complimentary albums in return for your work. Who has copyright protection for the album cover?

2 Creative concepts and ideas are protected by copyright law in Australia. True or false?

3 You find that an image of your face has been used in an online advertising campaign without your permission. What are your rights under Australian copyright law?

4 In working for a large graphic design studio, you create the cover of a new textbook. The cover design is your own work and features illustrations in your distinctive personal style. Who owns copyright under Australian law?

5 In designing a website for a client, you wish to use a photographic image from a 1926 book about Art Deco architecture. What are your copyright obligations?

6 Walking through a market, you see a stall selling T-shirts that feature a clear image of an illustration you created and posted on social media. What steps can you take to address this issue?

7 An image you wish to use in a design is labelled 'royalty-free', which means payment is required to use the image. Do you still have to acknowledge copyright?

8 In your schoolwork you wish to use images of the Nike 'swoosh' logo. What are you required to document in your folio under Australian copyright law?

9 You allow a close friend to use one of your designs in their online blog, and you shake hands in agreement. Do you still own copyright of your image?

10 As an industrial designer you have created a visually unusual and innovative vegetable peeler. The appearance and shape of the peeler is unlike any other product on the market. How can you protect the uniqueness of your new design under Australian law?

11 Architectural plans are not protected under Australian copyright law. True or false?

12 If you pay someone to use an image that they have created, who owns copyright under Australian law?

13 If you change 20 per cent of an image by using Photoshop, it is no longer covered by copyright law. True or false?

14 If you are prepared to pay enough money, it is possible to purchase the moral rights to an artwork. True or false?

DESIGN TEAMS

CHAPTER

22

No one can whistle a symphony. It takes a whole orchestra to play it.

H. E. Luccock

In this chapter:

Learn the language:

+ clarifier
+ communication

+ troubleshooter
+ workload distribution

Design is rarely a solitary endeavour; rather, it thrives in the collaborative environment of a design team. Professional designers understand the value of diverse perspectives when tackling complex design problems. By working together, designers and makers combine their unique insights and skills to generate innovative solutions.

The role of designers within teams has evolved significantly. Much of the design industry identifies the importance of integrating design expertise into their operations, hiring in-house designers to drive innovation and problem-solving. However, this integration can present challenges, as designers must navigate the intersection of creative vision and commercial objectives.

Setting clear timelines and deadlines helps maintain momentum and focus. Regular meetings provide opportunities for communication and alignment. Assigning clear roles and responsibilities ensures that team members understand their contributions. Additionally, fostering an open and inclusive culture encourages sharing ideas and input from all team members, both formally and informally.

▶ Regular team meetings provide opportunities for communication and alignment.

22.1 WHY DESIGN IN TEAMS?

Collaboration within a team environment is highly valued across industries for many reasons.

+ *Diverse perspectives:* Teamwork brings together individuals with varying ideas, skills and knowledge, fostering inspiration and creativity through collective brainstorming sessions.
+ *Idea exchange:* Team members can share and bounce ideas off each other, leading to more informed decision-making and quicker responses to challenges.

+ *Workload distribution:* By distributing tasks among team members, the workload is effectively managed, accelerating project timelines and improving efficiency.
+ *Motivation:* Team interaction generates a sense of energy and enthusiasm, boosting motivation levels and combating monotony through shared goals and achievements.
+ *Mutual support:* Team members support each other, leveraging individual strengths and skills to overcome obstacles and achieve success collaboratively.
+ *Skill development:* Working in a team environment provides opportunities to practise presentation skills, articulate ideas and engage in effective communication.
+ *Skill enhancement:* Teamwork fosters the development of problem-solving, critical thinking, cooperation and active listening skills, contributing to personal and professional growth.

Overall, teamwork cultivates a collaborative culture that promotes innovation, efficiency and mutual support, ultimately driving success in achieving common objectives.

▶ Design teams will often come together to share and generate ideas.

22.2 TEAMWORK CHALLENGES

Teamwork is a challenging skill that needs to be practised and mastered. In the classroom, student members of a team may have differing abilities, ways of working and motivation that lead to frustration. Highly motivated students may fear their grades will be reduced by others, while students with more relaxed attitudes to their work may resent pressure from their colleagues to perform at a higher level. Sometimes high-performing students find it difficult to relinquish control to team members, something that makes them less effective collaborators by being less open to other viewpoints. Balancing expectations and establishing productive group norms can be challenging for teachers and students alike, but it is worthwhile. Teamwork should be treated as a skill to be studied, practised and improved.

CASE STUDY ~ RIP CURL: WETSUIT DEVELOPMENT

The Rip Curl business was founded on wetsuits and they are still one of the core products, along with surfboards and apparel. At Rip Curl, all the design and development team of the wetsuit division are passionate surfers who care deeply about surfing and wetsuits. They constantly compare, share, make suggestions and confer about how to create the best solutions. Prototypes are made in the same building where the designers work, and superb surf is only minutes away, which means it's quick and easy to share the information, and trial and test the product, with almost immediate feedback.

Peter Coles is the Global Research and Development/Production Manager in the wetsuit division. All the wetsuit design and development happens in Torquay in Victoria, and Peter's role is to assist with the development of new ranges of wetsuits.
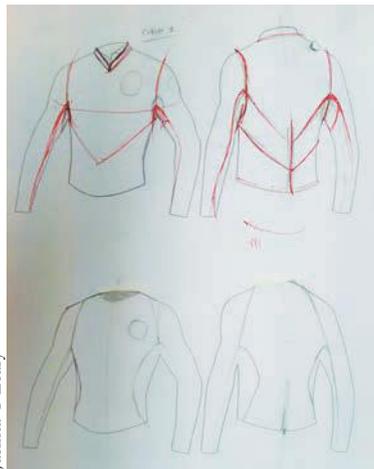
Hand sketches for initial ideas

TEAMWORK

Getting a new wetsuit right and ready for market involves a chain of people – it is a great example of collaboration. Apart from Peter, the team in the wetsuit division consists of the chairman, a product manager (responsible for sales in the Australian region) and product managers in the northern hemisphere. John Pyburne, or 'Sparrow', is the pattern maker, and two designers, Jay and Maddison, look after wetsuit design and graphics, but there is significant input from the whole team. The team needs to approve concepts and ideas at various stages, and sign off before development continues.

Lines are often drawn straight onto the mannequin in the Rip Curl design room.

FIELD TRIPS FOR NEW IDEAS

Field trips for Rip Curl designers might be as far afield as Indonesia, Manhattan, Sydney or Tokyo, where they do a lot of in-store checking. They check competitors' products and other types of sportswear, looking for new ideas that they might be able to bring into the wetsuit division, such as colour combinations, interesting seam lines, shape of the garment, construction techniques, finishings and trims. The team analyse these together to benefit from one another's insight.

The pattern maker cuts out pieces from neoprene.

DESIGNING AND PATTERN DRAFTING

Jay and Maddison often do hand sketching for initial ideas, and draw by hand straight onto a mannequin to see where the seam lines of a design lie on the body. Adobe Illustrator is used to refine and digitise those ideas.

The design is then marked out (drawn) onto an existing wetsuit for the pattern maker. Sparrow,

the pattern maker, who has been working at Rip Curl for years, will create the pattern pieces on large pieces of brown paper (his workroom is filled with shaped pieces). A prototype is made in the 'factory' workroom next door and given to a staff member to wear and test in the surf. Each team member uses their expertise to make these rapid prototypes in as little as one day.

After the prototype has been used in the surf, feedback is given about:

+ the fit – wetsuits need to be tight to be effective, but not too tight
+ the neck – is the collar too high and choking, or too low and letting in too much water?
+ flexibility in the elbows and knees
+ the ease of getting it on and off.

▶ Layers of pattern pieces that have been cut from neoprene

Once the pattern is graded, 'fit samples' (equivalent to final prototypes) have to be constructed to check that the design 'works' and all the bits fit together in every size. When all the graded pattern pieces have been finalised, the designs are emailed to the factory in Japan or Taiwan, where the majority of the wetsuits are made. This is a much faster system than was used at Rip Curl up until the early 1990s, when paper patterns with all their graded sizes for one design were rolled up and sent by normal post.

THE MACHINISTS

Rip Curl rash vests are machined in Torquay. It's important to have continual production work, so that the machinists are skilled up to make the prototypes and 'fit samples' when they are needed. Rash vests involve minimal labour, so it makes sense that they are the product to be made in Torquay, where labour costs are much higher than in Asia.

THE MAIN MATERIAL: NEOPRENE

The most expensive component of a wetsuit is the raw material, which is neoprene. Neoprene (chloroprene) has been used extensively in the footwear industry and in the automobile industry (as trims of doors and windows, car tyres and gaskets in the engine block) for decades.

If the team can see on a prototype that the patterns are not interlocking as well as they could, they will go back to the designer. Even though the design looks great, they might suggest adding a seam somewhere to get an extra 5 per cent efficiency in the use of fabric. They might suggest that instead of having a bump on the elbow, it could be tucked in a little bit to improve the yield.

▶ Various cutters are used on the neoprene.

RESEARCH AND DEVELOPMENT

Rip Curl works very closely with the neoprene suppliers in Asia (where the bulk of neoprene comes from) for continual improvement and development.

E1 neoprene was introduced in about 2000; it was roughly 2 millimetres thick, weighed 200 grams per square metre (gsm), and stretched at 100 per cent at 1 kilogram of force. Rip Curl is always working with the suppliers to push the material to the next level: to weigh even less, to stretch more and to provide more warmth. Suppliers work with the parameters and present several versions before it is 'right'.

Sheets of the 'new material' are sent to Torquay and wetsuit samples are made up. Rip Curl will test the materials internally with lab equipment and, more importantly (being near to Bells Beach and being keen surfers), staff will wear the wetsuits out surfing. They will closely document the number of hours in the surf and do an appraisal on the material. In-surf test results are stacked up against the lab tests before a decision is made to commercialise the material or not.

Jacinta O'Leary

▶ A modulus machine for stretching neoprene

The R&D performed at Torquay headquarters with the company's own lab equipment includes the following:

+ UV is applied from a tungsten filament lamp to test the effect of sunlight on fabrics.
+ A Rip Curl–engineered machine tests the endurance of fabrics in salt water. First, a sample is fixed at either end between two moving parts. They swish back and forth in a salt-water mix for a set amount of time or number of movements to continually elongate (and return) the fabric. This machine can be used to see how screen prints, laminated fabrics, glues and trims withstand this treatment.
+ A modulus testing machine checks the elasticity of different laminates and fabric weights (in gsm). Samples that are tested are clearly labelled and filed.

QUALITY CONTROL

It is important to have quality control at the factories in Asia. Once the quality checklists and standard operating procedures are in place, there is usually less need for stringent checking.

TEAM FEEDBACK

Throughout the entire process of design, prototyping, pattern grading and production, team feedback is most valued. Most of the team have years of experience in surfing and in manufacturing, and are enthusiasts who have a tactile understanding of the fabrics from working with them and an intimate and experienced knowledge of what is required in the water. This is what sets Rip Curl above new companies in terms of 'fit for purpose' and quality.

Jacinta O'Leary spoke to Peter Coles in 2017 and 2023.

RIP CURL

To see more about Rip Curl wetsuits, go to the Rip Curl website. To see real-life testing of Rip Curl's wetsuits by some world champions, watch the video *Behind the Scenes: The Making of Rip Curl's E-Bomb E7 Limited Edition Wetsuit* on the company's YouTube channel.

Weblink
Rip Curl

Behind the Scenes: The Making of Rip Curl's E-Bomb E7 Limited Edition Wetsuit

22.3 DESIGN TEAMWORK GUIDELINES

These are some general guidelines to assist with smoothing over some common problems that can arise with teamwork.

ESTABLISH CLEAR AND SHARED GOALS

+ Define clear objectives and outcomes for each project.
+ Ensure that all team members understand and align with these goals.
+ Regularly revisit and communicate progress towards achieving these objectives.
+ Foster mutual trust and support.

OFFER AN INCLUSIVE, SAFE SPACE

+ Create a safe and inclusive environment where team members feel comfortable expressing ideas and opinions. Encourage open dialogue and constructive feedback, with respect and empathy.
+ Cultivate a culture of support and collaboration, where team members feel valued and empowered.

PROMOTE OPEN COMMUNICATION

+ Encourage transparent communication channels that facilitate sharing of ideas, concerns and updates.
+ Foster a culture of active listening, where team members attentively engage with each other's perspectives.
+ Emphasise clarity and conciseness in communication to minimise misunderstandings.

EMBRACE DEMOCRATIC PROCESSES

+ Involve all team members in decision-making processes, allowing for diverse viewpoints and contributions.
+ Use consensus-building techniques to reach agreements and resolutions that reflect the collective wisdom of the team.
+ Ensure that decision-making processes are transparent and accountable for all team members.

LEVERAGE DIVERSE SKILL SETS AND PERSONALITY TYPES

+ Recognise and value the unique strengths, skills and experiences that each team member contributes. Encourage cross-functional collaboration and knowledge sharing to leverage diverse expertise.
+ Foster an environment that celebrates diversity of thought and encourages innovation through different perspectives.

By adhering to these guidelines, design teams can create a supportive and collaborative environment that maximises creativity, productivity and effectiveness for achieving shared goals.

⬤⬤⬤ Learn more about using the design studio in Chapter 2.

COLLABORATING ONLINE **FYI**

Design teams are increasingly using online spaces to collaborate and work flexibly across different time zones and locations. These platforms allow team members to access project materials and discussions at their convenience, facilitating collaboration despite geographical barriers. Digital platforms enable groups to achieve their goals more efficiently and expedite project timelines. If you are working online within your teams, ensure everyone has access and is regularly backing up project data to maintain productivity and prevent potential setbacks.

Redpixel.PL/Shutterstock.com

22.4 TEAM ROLES

Organising design teams and defining team roles creates effective collaboration and project success. Here are some key roles commonly found in design teams:

+ *Coordinator:* Is responsible for overseeing the overall project and ensuring that tasks are assigned, deadlines are met, and communication flows smoothly between team members.
+ *Goal setter:* Sets clear objectives and milestones for the project, ensuring that the team stays focused on achieving its objectives and delivering results.
+ *Troubleshooter:* Identifies and resolves any issues or obstacles that arise during the project, finding creative solutions to overcome challenges and keep the project on track.
+ *Clarifier:* Ensures that everyone on the team understands their roles, responsibilities and the overall project vision, clarifying any ambiguities and addressing any misunderstandings that may arise.
+ *Opinion seeker:* Encourages open communication and collaboration within the team, actively seeking input and feedback from team members to generate new ideas and perspectives.
+ *Encourager:* Provides support and motivation to team members, fostering a positive and collaborative team environment where everyone feels valued and empowered to contribute.

By assigning specific roles and responsibilities to each team member, design teams can work more efficiently and effectively, taking advantage of the diverse skills and expertise of each individual to achieve their goals.

If you have some classroom design teams, you may need to take on more than one of these roles. Think about individuals' strengths and who might be best suited to take each role.

DESIGN TEAMS AND ASSESSMENT

When working in a design team at school, alongside defining roles, it is important to consider how you will recognise each member's contribution. If the team brainstorms and everyone contributes, it is a good idea to identify that all members of the team helped produce it. You could add initials or the names to the bottom of the work.

Your teacher might have some simple rules to recognise the contribution of all members in shared work. Remember, it is an advantage to have a team; you can divide the research and have multiple points of view when creating new ideas.

DESIGN TEAM STRUCTURE IN INDUSTRY

FYI

Design teams are often led by head designers, who may oversee both internal teams and external design groups. In a centralised structure, the design team operates like an internal agency, with a clear hierarchy and reporting system to a head or creative director. Tasks are allocated based on requests from other departments, promoting design unity but potentially leading to isolation from other departments. On the other hand, a decentralised structure, also known as embedded or cross-functional, integrates designers into multi-disciplinary teams alongside professionals from various departments. This model enables faster decision-making and collaboration, although it may risk resource overuse. In both structures, the role of the head designer is crucial in ensuring all groups understand and work towards the project goals, providing a unified solution.

CHAPTER REVIEW

1 In the design industry, the head of a design team will often have worked in a range of design roles before leading a team. Why do you think this is?
2 Working in small groups, take five minutes to create a Pokémon-style card about each of your team. Write their strengths, staying power and special design move. Have fun!
3 Consider the available team roles. Give yourself a 5-star rating based on how you think you would perform each role, and justify your rating. You could also do this for one of your team members: Coordinator/Goal setter/Trouble shooter/Clarifier/Opinion seeker/Encourager.

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Learning that puts you at the centre.

Develop your understanding through the wide range of videos, weblinks and design resources.

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