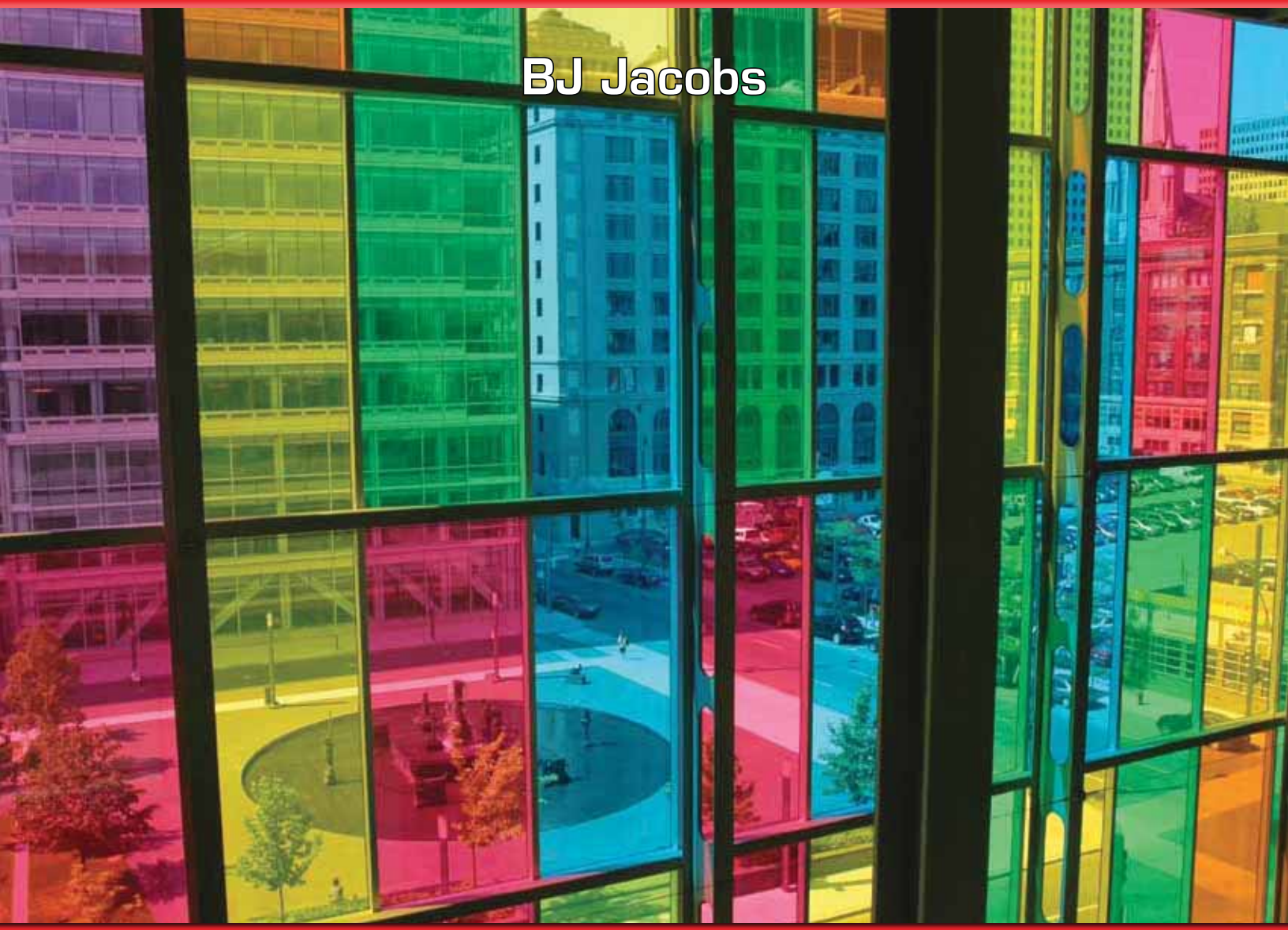
INSIGHT

# TECHNOLOGY AND DESIGN 2



BJ Jacobs

S
Science Press

This book is dedicated to students who love to 'fly' and teachers who want to facilitate the learning opportunities to do so.

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# To the teacher

## Rationale

This book originated as a personal design project when I began teaching Design subjects to Year 9 students. I needed to give specific instructions on details of the design process without interrupting the creative flow of progress in an individualised classroom setting. Although syllabuses have changed and will continue to change, the creative flow of designing will not.

This is Book 2 in the series and it is assumed that teachers and students using this book are familiar with Book 1 in which the design process is introduced.

**When you see the symbol it means: Turn to that topic in Book 1 to find out where the story starts.**

Designing in the real world is a fluid process fraught with problems of organisation, funding, management, understanding of materials, skills and techniques and consideration of attitudes and human impacts.

This book guides the teacher and student through this fluid process and explains in detail some of the processes often taken for granted by teachers and not fully understood by either teachers or students.

It also aims to extend student thinking more laterally as they progress through their design projects.

Teachers can use the book to present students with selected topics as a class, using a group setting to inform and discuss implications arising from each topic. A different teaching strategy is to provide students with this handbook and refer them to the relevant topics as a first step when issues arise. They can then discuss specific questions with their peers, parents or the teacher based on informed understanding.

To have this book in the hands of each student allows for progress through any design project in an informed way.

## How to use this book

Unlike Book 1, this book does not focus on specific design projects. It has a broader focus. No matter what design focus area your students are working in or what design project they are involved with, each part of the book will be helpful.

As one of my mentors said: 'It should be compulsory reading for everyone!'

**When you see the symbol or it means: Turn to that topic in Part 3 of this book to find out more about it.**

**Part 1 – Design projects** helps your student designers to choose a project.

**Part 2 – The design process** leads them through their project. The steps followed here reflect those from Book 1 but also develop further skills in each area of the process.

**Part 3 – Technology for design** provides details, support and background information as students progress. The material in Part 3 builds on the Technology for design section in Book 1.

**Part 4 – More design projects** has nearly 200 project suggestions.

**Part 5 – Design folio worksheets** has worksheet examples that can be modified for the needs of your class. Parts 2 and 3 of this book also have some worksheet and folio suggestions.

## Managing activities

As with Book 1, throughout this book there are various suggestions for research and extension activities for students. These are of three types – post-its, webquests and workstations. These activities add depth to design projects and technology content. They also examine the issues, values, historical and cultural dimensions of designing.

### Post-its

Post-its are activities that:

- *prompt technology literacy, e.g. a research task that requires a written, oral or graphic outcome*
- *extend students – deeper, more broadly, laterally – beyond the immediate project but within the focus area*
- *provide homework options or group work possibilities within the focus area*
- *provide related activities to complete 'while the paint dries'.*

Post-it activities can use paper or web-based sources of information or even interviews and visits.

### Webquests

**Webquests require students to search the World Wide Web for information and develop it into an outcome that usually requires analysis and synthesis. Searching tips and activities are outlined in Part 3.**

Webquests

Webquests are excellent for finding up-to-date information about innovations and emerging or specialised technologies. They can also be used for case studies of designers, products or focus areas. Webquests are integrated into many topics in this book.

These webquests are not fully developed in this book but by searching for the topic of the webquest (and include the word webquest) in double inverted commas a search will often lead to a fully developed webquest for your students to complete (e.g. try searching for "our indigenous garden webquest"). However, sometimes a search for the topic without the word 'webquest' will work best. You can then outline what you would expect your students to find and do or suggest some sites for them to visit.

Webquests

### Workstations

Workstations can be set up in the classroom to display items in a particular theme or to manage resources for research or even tools to be shared by all. A more complete description is given in Part 3.

Workstations

# To the student

This book is about designing. It is not a book to read from front to back. It is a book to refer to continuously as you work through any design project. Design projects are like a 'pick-a-path' story. This is Book 2 of a series. When you need information from Book 1 you will find the symbol.

**When you see the symbol it means: Turn to that topic in Book 1 to find out where the story starts.**

## Designing versus doing

The whole point of learning to design is to learn how to work your way through a challenge to get the best possible solution rather than just settling for the first solution that pops into your head.

As a student designer you will be presented with challenges and shown how to work through each one using a process called a design process. This will guide you to learn the skills needed for designing, making and evaluating as well as skills for selecting and working with the materials, systems and information related to your project.

The way you work through each design project is very important. What you do and when you do it will help you find the best possible result.

As you design you work through the steps of the design process. However, you might not necessarily complete these steps in a set order and you might even repeat some steps. If you think you are going around in circles you are probably doing it the right way.

This book is divided into five parts:

**Part 1 – Design projects** outlines the variety of areas or contexts in which you can focus your design and gives suggestions for design ideas (design briefs). Here you will find help if you cannot find a suitable design project.

**Part 2 – The design process** guides you through the steps of the design process. The steps look similar to those in Book 1 but you will also develop more skills as student designers by following the links to Part 3.

**Part 3 – Technology for design** gives you more detail of what you might need to do at each step. The topics in Part 3 are in alphabetical order.

**Part 4 – More design projects** has nearly 200 project suggestions just in case you need some ideas.

**Part 5 – Design folio worksheets** has worksheet examples that you can use to guide your written work for your project. Feel free to modify them to meet your needs.

Each time you start a new design project, work through the design process outlined in Part 2. The guidelines and instructions given in Part 2 will help you answer questions like:

What am I supposed to be doing now?

What should I do next?

The steps in Part 2 remind you of a number of things you should understand more fully or for which you may need instructions.

**When you see the symbol or it means: Turn to that topic in Part 3 of this book to find out more about it.**

When you turn to a topic always read all of it before you turn to any new topic, then continue to the next topics as directed. It is like in a 'pick-a-path' story.

As you flip through the book following the arrow symbols, it might be helpful to use bookmarks to mark the place you came from so you can find your way back easily.

# PART I
# Design projects

## Real needs

Designers usually work for a client. They compete with other designers to get the job by presenting previous work in a folio and perhaps by submitting ideas for the design task. When they win the contract they develop a number of alternative design ideas (roughs) from which the client can then choose.

Designing is always about meeting needs.

Who is your client?

What do they need or want?

Clients and needs might include:

- something your brother or mother needs
- the needs of a group of people (like those who use wheelchairs)
- the needs of a community (better traffic flow or a pedestrian mall)
- needs found in a commercial or industrial setting (a more efficient assembly line flow or an inviting shopfront display)
- a global need (an advertising campaign to reduce the overuse of fossil fuels at the family level)
- the needs of pets
- the needs of native animals in bushland near you or in remote areas
- the needs of an ecosystem supporting a variety of living things
- or something you need!

Needs and opportunities for design are all around us. We just have to look for them.

## How to find a design project

To find an opportunity for design you could do a case study and/or analyse a situation you have found and develop your own design brief to meet a need in that situation.

However, choosing a particular need around which to base your design project can be difficult.

## Project ideas

Many design project ideas could be broad and use a variety of technologies within more than one focus area. Some examples are outlined on the next page.

Other design project ideas and suggestions are listed in the table in Part 4 of this book. The suggestions can be selected according to the focus area and/or the major material type used in the design. These ideas might stimulate you to think of a different idea. That's great, keep thinking! You might need to take a general idea and make it more specific to meet a need you have found and to use the resources available to you. Negotiating design specifications should always happen before you start designing.

If you cannot find your own design project, you can even go back to Book 1 to find a design project idea that meets a need you can relate to.

Before you write your design brief you should decide:

- Does the project idea meet a real need?
- Who is the client?
- What facilities and resources are available to you: space, time, materials, tools, skills?
- Which project will allow you to demonstrate your mastery of new skills, materials and/or technologies or an improvement you have made?
- Are you making a model, the real thing, and/or a design presentation?

# PROJECT IDEAS

Design and make an interactive computer fact file or card file about the history, technologies or products specific to a focus area, e.g. types of glues available and the situations in which they are most suitable. Enter a design competition, there are plenty around!

Work as a class or even a larger group to design and present:

- a theatre production
- a market day or fete
- a party and entertainment for the elderly people in your area
- an overnight camping trip
- a restaurant evening at school for parents.

Work in small groups or as an individual to:

- Design for a problem encountered on a bushwalk or outing.
- Choose a reading text and redesign it as a children's story or theatre production.
- Design a promotional package for the tourist market to highlight Australia's historical, multicultural, technological, or environmental qualities and developments.
- Design a product that reduces overdependence on commercially manufactured goods.
- Design a product that incorporates a traditional skill with a present-day technology.
- Find a product, process, system or environment we use every day. After considering appropriate technology concepts (cultural issues, environmental issues, ethics, gender issues, historical issues, legal issues and quality), redesign the product, process, system or environment.

# Design focus areas

Your choice of design project and client will lead you to work in one of the following focus areas. Each focus area has its own issues, technologies, knowledge and skills associated with it. You will need to go to Part 3 for a more detailed look at the particular focus area in which you are designing by following the ➔ symbol.

## Built environments

Architecture
Engineering
Environment
Furniture
Interior
Landscape
Structures

➔ Built environments

## Communication

Communication systems
Digital media
Graphics
Information systems
Promotion

➔ Communication

## Engineering

Aeronautical
Engineering
Environment
Medical
Software
Structures
Transport systems

➔ Engineering

## Lifestyle

Accessories
Fashion
Jewellery
Food
Medical
Software
Transport systems

➔ Lifestyle

## Living things

Agriculture
Environment
Food
Landscape
Marine
Structures

➔ Living things

## Manufacturing

Industry
Packaging
Software
Transport sytems

➔ Industrial focus