Visualizing Research

A Guide to the Research Process in Art and Design

Carole Gray and Julian Malins

ASHGATE
Vehicles for research: inventing new ‘wheels’ for artists and designers!

In the absence of an established and validated set of research methods in Art and Design, we have had to be similarly adaptive and inventive; for example, a participatory 3D ‘game’ as a means of externalizing teaching styles (Gray, 1988); experimental object making in exploring issues of ‘chance’ and ‘choice’ in sculpture (Watson, 1992); site-specific commissioned artworks for investigating the feasibility of architectural ceramics (Wheeler, 1996); curation of a major exhibition on interactive art, and the production of an interactive artwork in order to allow the audience/user direct experience of the research concepts (Graham, 1997). Although these methods have been adapted or invented and may appear idiosyncratic they have been validated, at least within the framework of formal research, and in most cases with user groups. They have all been carefully documented and described, and some of them applied in other research, for example use of exhibition projects (Silver, 1999), participatory action research (Ross, 2001), use of experimental object making (Bunnell, 1998). New methods, as with any new product design, need to be used widely in different contexts and their rigour and robustness tested in order to become a validated research tool.

In summary, the critical considerations for the application of any research method are that the method should be:

• responsive to the research context and appropriate for use in it (relevant and ethical);
• valid – acceptable to other researchers; useful in reality; meaningful to users within a particular context (‘internal validity’); wherever possible generalizable to wider contexts (‘external validity’); as dependable and trustworthy as possible (for details on these issues please see Robson, 1993, part 2, pp. 66-75);
• used with the utmost rigour (applied consistently, with discipline and care);
• documented and described thoroughly and clearly in any report of the research, so that it might be usable by other researchers (accessible, explicit and transparent).

Crossing the terrain: some useful research methods

To date, there is no definitive published single source on research methods for artists and designers. The following methods are drawn from a range of sources, most importantly from validated completed formal research in Art and Design (main sources: ARIAD – www.ariad.co.uk; British Library’s Index to Theses – www.theses.com, Higher Education institutes’ published information), as well as useful examples of research projects in non-formal frameworks (for example, industry, commerce, education, and so on) as reported in various journals and professional publications. An examination of some of these examples would no doubt lead to ‘classic’ references to various ‘design methods’ publications by, for example, Archer (1965), Jones (1980), Cross (1984), and so on; and important research by Cornock (1978, 1983, 1984) on Fine Art methodology. During recent years, many more examples of practice-based research have become accessible. Many have already been cited in previous chapters and more are cited in this one.

These methods are particularly useful if your own practice forms part of the research methodology.

Other methods described come from Social Science research, for example www.sosig.ac.uk (accessed 15 August 2003); Denzin and Lincoln (1994); and some specifically from educational research, for example Cohen and Manion (1994), McKernan (1998). These are particularly relevant for human inquiry related to Art and Design, for example the study of an individual’s practice, and user feedback for designed products. In some circumstances, particular areas of design, for example industrial design, a more scientific approach may be appropriate, in which case ‘design methods’ may be useful. Documented examples of projects using design methods can be found in the journal Design Studies – www.elsevier.nl/locate/destud (accessed 16 June 2003).

The range of methods outlined is by no means definitive or completely comprehensive, and they cannot be described here in any great detail. If you think that a particular method described in this book would be useful in your project then you should discuss it with your supervisor. You should always follow up the references and examples given in order to appreciate the context in which the method was used. As you become more familiar with various methods you will realize the kind of tasks involved in applying them. Once you have identified these tasks, build them into your plan of work. Research methods development relies on researchers (including you!) adding further detail and modifying as a method is tried and evaluated.

The methods information is presented in tabular format and follows a pattern:

• Definition/function: a description of the method and its purpose.
• Context for use: examples of research situations where/when the method has been or could be used.
• Tools: specific equipment, techniques and processes – considerations involved in using the method.
• Advantages: possible benefits and positive aspects of the method.
• Disadvantages: possible limitations and negative aspects of the method.
• Ethical considerations: good research conduct, avoidance of questionable activities.
• Further references: usually key texts/sources, and examples of validated research in which the method has been used.
• Where appropriate, a visual example of the method/tools.

You might like to set up a similar structure for the description of your chosen/adapted methods.

Research methods: from validated completed formal research in Art and Design

It is likely that you will be conducting part of your research through some element of practice, and so we start our description of methods here.

Practice usually initiates research questions, provides the context for investigation, may provide various research methods, and is usually involved in the creative
visualization and dissemination of the research. 'Practice' could have a range of interpretations, for example:

- **practice as individual creative activity, perhaps the most obvious interpretation** - 'making' in its broadest sense;
- **practice as facilitation and dissemination** - activities related to visual arts/design/craft/new media, for example education, administration, and activities such as curating, commissioning, critical writing, and so on;
- **practice as a collaborative activity**, involving other practitioners, participants and professionals from other disciplines, and/or external bodies, for example industry, commerce, voluntary sectors, and so on. This approach could involve making, facilitating, disseminating, as well as negotiating, fundraising, and so on.

Although complex in their own right, the first two interpretations of practice are probably well enough understood: as ‘makers/creators’ (designers, crafts-persons, fine artists, new media practitioners, and so on) and/or as ‘facilitators’ and ‘disseminators’ you can use your practice or aspects of it as a research tool for actually generating new information and gathering and structuring existing information, and use your professional situation for critically evaluating that information.

Increasingly creative opportunities are structured around collaborations of different kinds, and it is almost impossible to carry out research without working with others, to some degree, on some aspect of research. There are some useful examples of collaboration as a research strategy: Ross (2001) examined the changing role of artists operating in various organizational contexts. Working collaboratively with other professionals she used a participatory action research methodology undertaking a number of case study projects. She adopted different participatory roles in these – sometimes as artist, sometimes as observer, reporter, evaluator, consultant. In this research the artist acted as a ‘cultural intermediary’. (See also Scopa’s research in the matrix in Section 1.5.)

### Practice

<table>
<thead>
<tr>
<th>Definition/function</th>
<th>Developing and making creative work as an explicit and intentional method for specific research purposes, for example gathering and/or generating data, evaluation, analysis, synthesis, presentation, communication of research findings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context for use</td>
<td>Research for higher degrees, distinct from ‘practice as usual’ in its use of practice within an academic research framework, which is accessible, transparent and transferable (in principle if not specifics); the work might embody research concepts, provide visual evidence and/or illustrate research findings in some way.</td>
</tr>
<tr>
<td>Tools required</td>
<td>Any of the tools/techniques used in the development and making art/design work; essential to document the process, for example through a reflective journal, photography, video, audio, and so on; may involve a range of methods described later; essential to have explicit criteria for evaluation and analysis, which relate directly to the research question.</td>
</tr>
</tbody>
</table>

### Advantages

- A means of generating new data through real experiential activity – researching and learning through doing to develop ‘deep’ understanding; the practitioner-researcher has an informed perspective on issues relating to practice.

### Disadvantages

- Open to criticisms of indulgence and over-subjectivity if not placed securely within the formal framework, and if lacking in methodological transparency; many debates exist against a submission for a higher degree that attempt to present an argument in a purely visual form.

### Ethical considerations

- Ethical considerations: as research is (usually) a publicly funded activity taking place within an academic framework the practitioner-researcher is morally obliged to make the practice publicly accessible; requires a high degree of integrity and honestly in evaluating and communicating the outcomes from practice (this might be resolved by inviting views from different perspectives).

### Further references

- Design plus Research conference proceedings (2000) – http://pcsiwa12.rett.polimi.it/~phd/uk/01/dpr00/intro.htm
- Recent and current debate on practice-based research, for example http://www.jiscmail.ac.uk/lists/phd-design.html
- British Library Index to Theses – www.theses.com
- Research Training Initiative – http://www.biad.uce.ac.uk/research/index.html – case studies of completed research for higher degrees
- Completed formal practice-based research cited in previous chapters and this one.

### Examples of the role of practice in research for higher degrees – some ‘models’

- For example, practice – through action and reflection – provides a means of:
  - Investigating the subject/content and context of one’s own creative activity in order to advance or innovate; understanding one’s own creative process (in relation to others); making explicit the practitioner’s tacit knowledge; as a result of greater self-knowledge being able to contribute to the wider development and understanding of research methodology involving practice.
  - Discovering new practices or methods/processes/techniques and materials by experimentation; re-discovering/revitalizing/revising traditional practices in new/contemporary contexts; reconstructing artwork/artefacts to bring about new understanding/insight through the experience of making/re-making.
  - Understanding a range of different practices – using one’s own practice to contrast/compare those of other practitioners.
  - Being a catalyst in participatory action research where creative practice can actively involve, inform and inspire others.
  - Using the skills of the artist/designer to visualize and understand complex processes (perhaps in other fields) – making the invisible visible.
  - Providing knowledge transfer of mutual benefit between different ‘worlds’ of practice and research, for example art/design higher education and industry.

All/any of the following methods could be part of practice-based methodology or independently used as a research method.
**Observation**

<table>
<thead>
<tr>
<th>Definition/function</th>
<th>To watch something/someone/an environment/situation closely and accurately record in some way the activities/situation in order to capture data relevant to the research project issues.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context for use</td>
<td>A classic research method in Science, Social Science and Art and Design. In Art and Design, objective, analytical drawing is a core skill and an important method for acquiring primary data in order to understand the world. Artists/designers have observed themselves making work (usually through video) in order to become more aware of their creative processes (self-observation – SO); in Social Science there are two kinds of observation: non-participant observation (NPO) and participant observation (PO). In NPO, the researcher attempts to remain objective (neutral), and detached from the object/person/situation being observed. In PO the researcher engages in the very activities he/she sets out to observe; becomes involved, empathizes, observes through the experience of engagement.</td>
</tr>
<tr>
<td>Tools required</td>
<td>A diverse range of qualitative and quantitative techniques including analytical and expressive drawing, mapping and/or making diagrams of what is being observed, video, photography; taking notes, counting objects/instances, timing events/movements; using checklists/schedules, scorecards, rating scales, and so on; augmented by various instruments for enhancing vision (and also other senses) or experience of the situation/context, for example optical devices such as binoculars, telescope.</td>
</tr>
<tr>
<td>Advantages</td>
<td>Direct visual experience and capture; relatively easy and unobtrusive; makes use of developed visual skills.</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>All kinds of observation, especially PO and SO can both suffer from being obtrusive to 'natural' activities, perhaps causing changes in behaviour because of the act of being observed (that is, the Hawthorne effect); PO requires trust to be gained from other participants; self-observation can be too self-conscious, unless it is carried out regularly.</td>
</tr>
<tr>
<td>Ethical considerations</td>
<td>Possible invasion of privacy – obtain permission/authorization before you observe; ensure confidentiality; ensure permissions have been given for public use of data. Should be used with integrity and care.</td>
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</table>

**Visualization**

<table>
<thead>
<tr>
<th>Definition/function</th>
<th>Visual thinking: making visible ideas through a range of techniques in order to explore research project issues and/or present research findings.</th>
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</thead>
<tbody>
<tr>
<td>Context for use</td>
<td>In practice-based research, making use of visual expertise to externalize and communicate concepts, interpretations, evaluations, and so on; in collaborative research as a means of sharing information, gaining feedback and generating new ideas.</td>
</tr>
<tr>
<td>Tools required</td>
<td>Drawing (in all forms, for example objective/analytical, expressive), diagrams, concept maps/mind maps, flow charts, storyboards, matrices, network displays, and so on; employing colour, tone, line, plane, shape, scale, symbol, and so on; the use of metaphor and analogy can stimulate visualization, for example practice-based research is like an elephant: increasing use of computer-aided visualization, for example Inspiration (<a href="http://www.inspiration.com">www.inspiration.com</a>) and through interactive multimedia and other applications, for example collaborative mind mapping using whiteboards.</td>
</tr>
<tr>
<td>Advantages</td>
<td>Visual overviews of complex material (a picture is worth a thousand words!); encourages discussion between people; encourages creative response, for example brainstorming/lateral thinking; use of a range of graphic techniques for making visible all stages of the research process; the increasing importance of the visual in 21st century life.</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Lack of technical and aesthetic expertise may hinder the communicative power of a visual; the possible or deliberate ambiguous nature of some visual material, for example abstract work!</td>
</tr>
<tr>
<td>Ethical considerations</td>
<td>All images are socially and technically constructed – visualizations should not deliberately mislead; should be used with integrity and care.</td>
</tr>
</tbody>
</table>
| Visual              | See Figure 4.3.
**Photography**

**Definition/function**
Technology for capturing and producing a static image of an object/person/environment; providing evidence of particular significant features related to the research project issues.

**Context for use**
In practice-based research or other research situations/environments for: acquisition of visual data, storage/management of visual information, analysis of visual data, and the presentation of research findings; involves the selection and framing of a particular section/aspect of the activity/environment; for research purposes photos need to be annotated, identifying the kinds of data presented in order to be useful evidence, for example textual information (as appropriate) on who (specify key people), what (specify focus of frame/action/event), where (context), when (date/time), how, why?

**Tools required**
35 mm SLR camera and/or digital still camera; tripod essential for long exposure shots; appropriate type of film/output media, for example colour slides to give greater sense of space; print for drawing on and display purposes; digital for image manipulation and projection, and for inclusion in multimedia documents/web pages; proforma for annotation (standard proformas can help to make comparisons across a series of photographs – see Chapter 3 topic on Managing Research Project Information).

**Advantages**
Ubiquitous technology – relatively easy to use and cheap; can present complex detail and realistic representation.

**Disadvantages**
As a research method, needs to go beyond the ‘happy snap’! Therefore, as an acquisition method (and to aid later analysis) annotation is essential.

**Ethical considerations**
Possible invasion of privacy – obtain permission/authorization before you take photographs; ensure confidentiality; ensure permissions have been given for public use of data; all images are socially and technically constructed – edited work should not deliberately mislead (editing can present an extremely selective, and possibly distorted, view); should be used with integrity and care.

**Further references**

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**Figure 4.3** Mind map providing an overview of methods discussed in this section

**Figure 4.4** Annotated photograph from a PhD project in progress
**Video**

**Definition/function**
A visual technology that enables the capture of dynamic information, for example simultaneous movement and sound and emergent qualities such as 'atmosphere', relevant to the research project issues.

**Context for use**
In practice-based research where dynamic information is required/available, for example kinetic artwork, performance, collaborative working. Like photography, can be used for data acquisition, storage/management of visual information, and analysis of visual data. By editing and the use of spoken commentary and captions, a way of presenting complex and dynamic research findings, for example interactions, sound/noise, environments, installations, dynamic visual qualities.

**Tools required**
Video camera; tapes/memory cards; tripod essential for most situations to eliminate camera shake; additional lighting and microphone useful in some situations; playback equipment and/or access to editing facilities/software.

**Advantages**
In its raw state yields more 'objective' data, that is captures data straight, including things we may unconsciously 'filter out' of our perception, for example ambient noise, background actions, and so on. Date and time coding is possible. Play and replay possible of both sound and vision, even frame by frame, forwards and backwards – a good analytical tool, especially digital video; multiple sound tracks available (for combined audio information, for example ambient noise, background actions, and so on).

**Disadvantages**
Ease of use may lead to the collection of large volumes of visual data, which requires time to review, log and edit (2 minutes of video may take 2 hours to edit!).

**Ethical considerations**
Possible invasion of privacy – obtain permission/authorization before you use video; ensure confidentiality; ensure permissions have been given for public use of data; all images are socially and technically constructed – edited work should not deliberately mislead (editing can present an extremely selective, and possibly distorted, view); should be used with integrity and care.

**Further references**

**Sketchbook**

**Definition/function**
A portable book or bound collection of sheets that contain the development of ideas over time, and subsequent reflection and analysis; may include a range of visuals and notes, and other contextual references; a 'digital sketchbook' may be more appropriate for some practices.

**Context for use**
In practice-based research, to capture and store a range of visual ideas, data and information, but not necessarily in an ordered, sequenced way; to encourage visual thinking (ref. Leonardo's 'pensieri'); dating input useful; could be seen as the artistic/designerly equivalent to a laboratory log book for recording experiments.

**Tools required**
Ready made book and various mark-making tools; small computer notebooks, for example PalmPilot, iBook, and relevant software, for instance Painter, Illustrator, and so on.

**Advantages**
Availability/accessibility in most situations (handiness); non-preciousness – a space for experimental thought; capacity for tracking developments over time; reflective/analytical space.

**Disadvantages**
Some practitioners may prefer a more haptic/hands-on approach through 3D 'sketching' with actual material – there are limits to two dimensions and sequential structures!

**Ethical considerations**
Possible reluctance to make accessible such a personal document; but if used as a research method must be accessible; should be used with integrity and care.

**Further references**

**Visual**
See Figure 4.5.
Figure 4.5 Example pages from a sketchbook exploring possible three-dimensional forms (Q)

<table>
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<tr>
<th>Definition/function</th>
<th>Tools required</th>
<th>Advantages</th>
</tr>
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<tbody>
<tr>
<td>Three-dimensional experimentation of the research project issues with materials and processes (3D 'sketching', envisioning) that may result in a range of 'approximations' (various versions of maquettes) towards a more resolved construction/object; in some instances a scale model may be required. Increasing use of technology allows sophisticated computer modelling.</td>
<td>Any relevant material and process, for example paper/card, metal, stone, wood, clay, plastic, and so on; construction, carving, modelling, rapid prototyping, simulated modelling using computer software, such as Amapi, Rhino, FormZ, ProEngineer, Autocad, and so on.</td>
<td>Allows the exploration and presentation of spatial and tactile data, for example actual material qualities, surface texture, weight, and so on. Virtual models can be animated, stored in databases and shared over networks, digital information can be re-purposed both to document objects and make real objects using rapid prototyping technologies.</td>
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</table>

<table>
<thead>
<tr>
<th>Context for use</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>In practice-based research, where two-dimensional information is insufficient for understanding and communicating complex ideas, structure, form, texture, and so on. For example product design, architecture, sculpture, fashion, craft. Increasing use of technology, for instance computer-aided design and manufacture (CAD/CAM) for experimentation with forms impossible to derive by other methods, and for visualizing large scale objects.</td>
<td>Models/maquettes take up space! Almost always needs to be documented (photo, video). Virtual modelling often requires a steep learning curve and specialist training in order to manipulate the software confidently; some software and output technologies can be very expensive.</td>
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<th>Further references</th>
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The following are practice-based methods that encourage and enable reflection.

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<tr>
<th>Reflective journal/Research diary</th>
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<tr>
<td>Definition/function</td>
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</table>
In practice-based research, to help capture the dynamic and reflexive nature of practice, for example for planning (reflecting for action), for capturing action (reflecting in action whilst doing something), and describing and evaluating (reflecting on action). Invaluable for the regular documentation of the application of methods and evaluation of their outcomes.

Tools required

An off-the-shelf large format diary (at least one A4 page a day), or a home-made version; alternatively a digital version may be more appropriate, for instance a web diary or some other format, for example a ‘video diary’, a large folio, a wall map/chart, for example a ‘cyclogram’, a 3D ‘container’. The ‘journal’ may contain different types of information to provide you with a whole range of evidence and examples: for example activity and development log (fact, precision and detail through material samples, diagrams, charts, numerical data), diary (descriptive and discursive writing), documentation of work in progress and completed (a sequence of visuals, including ‘failures’, 35 mm transparencies), contextual references (visual examples of other artists’ and designers’ work as postcards and magazine cuttings and details about the work, and its significance to your research), information about the pace and progress of work (as a ‘peaks and troughs’ chart), video/audio transcripts, key points from evaluation and analysis, and any other kind of relevant ‘life’ information. It is essential that all the contents are labelled, dated, sequenced, and sufficiently ‘contained’ so that nothing is lost.

Advantages

A comprehensive store of practice-based thought and action, with evidence and example. Could form an important part of a ‘portfolio’ of research evidence/learning.

Disadvantages

An idiosyncratic (and probably very personal) set of information, possibly of little use to others in specifics, but of value as an example of a reflective tool.

Ethical considerations

Should provide an honest picture of development and progress.

Further references

- Chapter 2, section 2.5, A Reflective Journal.

Audio reflection

Talking out loud to yourself whilst making work/thinking about it, especially in relation to research project issues.

Context for use

In practice-based research situations, in order to capture reflection-in-action and spontaneous spoken thoughts (stream of consciousness, reflection in action); can capture expressive qualities of voice – intonation, phrasing, pausing, reactions (for example gasp, laugh), and so on – all possibly useful data; needs to be done regularly so that the process becomes as ‘unconscious’ and natural as possible.

Tools required

Small wearable/pocket audio recorder, ideally digital (for high quality) and voice-activated; tapes/disks and batteries.

Advantages

Capable of capturing spontaneous thoughts ‘on the move’ at any time.

Disadvantages

Too self-conscious; could generate hours of tape to review and/or transcribe; people may think you are mad!

Ethical considerations

Should not deliberately mislead/misrepresent.

Further references


'Sweatbox'

The ‘sweatbox’ is a studio-based video set-up, used by architects and artists to capture ‘master class’ presentations, that is an eminent practitioner talking about and reflecting on their practice and/or solving a particular problem, using various visual means, for example drawing, mapping, models.

Context for use

In practice-based research (in action, perhaps in response to a particular task) in order to capture reflection-in-action and on-action through the sharing and description of process and spontaneous spoken thoughts, sometimes augmented by drawing/sketching ideas.

Tools required

Video studio; two video cameras – one focused on the reflecting practitioner, and one mounted directly over a drawing table to capture visual outputs; wearable microphone to capture audio clearly; mixing desk to inter-cut material from both cameras.

Advantages

Although a formal situation, it does encourage ‘off-loading’ (ref. McAleese, 1999, Chapter 2, Section 2.5); captures valuable examples of process, perhaps not usually accessible.
There are no doubt other methods that you use as part of your practice and the reflection on it. These should be written up and illustrated as part of your research project. Once the project is examined and validated the method(s) should be publicly disseminated. Other researchers may then adopt/adapt or extend the method, thus adding to the body of knowledge on research methods related to practice.
Within a case study many different methods may be used, for example:

<table>
<thead>
<tr>
<th>Interview</th>
<th>Questionnaire</th>
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<tbody>
<tr>
<td><strong>Definition/function</strong></td>
<td>A key method in seeking the particular opinions of others about an identified research topic. A purposeful conversation initiated by the interviewer and focused by him/her on content specified by research objectives.</td>
</tr>
<tr>
<td><strong>Context for use</strong></td>
<td>In case study research where a particular and in-depth view is required; helpful in the exploratory stages of research to elicit views, identify variables, important factors as a method of structuring further research.</td>
</tr>
<tr>
<td><strong>Tools required</strong></td>
<td>Recording equipment, for example audio, video, plus tapes/disk(s); a quiet space; interview schedule (identified questions or prompts); notebook or schedule proforma for taking notes on responses (verbal and non-verbal). Several types of interview, for example structured, semi-structured, unstructured, focused. Various types of software for content and discourse analysis, for example NUD*IST, ATLAS (visual analysis), NVivo, HyperRESEARCH (text and multimedia data) – all by Sage publications.</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>A good way of finding out a person's values, preferences, attitudes, beliefs and feelings; opportunity for direct verbal interaction, encouraging in-depth response – a discursive method, can be done at a distance using telephone or internet 'chat' tools.</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>Could be prone to subjectivity and bias (leading questions!); the setting for the interview can influence the quality of the responses, for example formal or informal; time-consuming (event itself and transcription); if recording tools and notes are not used the interviewer could have poor recall.</td>
</tr>
<tr>
<td><strong>Ethical considerations</strong></td>
<td>Participant(s) must have given permission/authorization before recording; ensure confidentiality; ensure permissions have been given for public use of data; edited work should not deliberately mislead – editing can present an extremely selective, and possibly distorted, view; should be used with integrity and care.</td>
</tr>
</tbody>
</table>
  - Used in many practice-based research degrees, for example Scopa (2003), Wheeler (1996) |
| **Definition/function** | Paper-based (or increasingly web-based, linked to a database) proforma for questions and responses (fax/e-mail back a good way of eliciting response); most simple form is a tick box or 'yes/no', 'true/false'; always take the opportunity to seek clarification/extension on a simple answer by including a 'further comments' section; design should be simple but engaging; sampling and size important – who are involved and why? |
| **Context for use** | In Social Science research, the questionnaire is one of the most commonly used descriptive methods; useful for identifying trends in large populations; can yield good generalizations. In Art and Design research, it has been used, for example, in longitudinal studies to track national graduate career development. |
| **Tools required** | Paper-based (or increasingly web-based linked to a database) proforma for questions and responses (fax/e-mail back a good way of eliciting response); most simple form is a tick box or 'yes/no', 'true/false'; always take the opportunity to seek clarification/extension on a simple answer by including a 'further comments' section; design should be simple but engaging; sampling and size important – who are involved and why? |
| **Advantages** | Capacity for a large and widely distributed sample; more economical in time and money than interviewing; anonymity of respondents may encourage greater honesty; allows for quantitative data to be collected. |
| **Disadvantages** | The larger the sample the more generalized the response; the larger the sample the more time it will take to analyse; low return rates (20% is considered good); no clarification of responses possible; responses may be questionable either because of poor question design or as a result of 'questionnaire fatigue' on the part of the respondent; if quantitative data are selected then statistical analysis is often required in order to establish whether the results are statistically significant. |
| **Ethical considerations** | Questionnaire must include information about the purpose of the research and how the resulting data will be used; ensure confidentiality; should be used with integrity and care. |
Personal constructs

Definition/function
Developed by George Kelly in the 1950s, personal constructs are dimensions that we use to conceptualize aspects of our day-to-day world and make sense of ourselves in our world(s). Events are only meaningful in relation to the ways that are construed by the individual.

Context for use
In psychology, a sensitive approach in the evaluation of personality or an individual's perception of their environment, or to map personal relationships.

Tools required
Personal construct Repertory Grid Test (RGT, Kelly) is a method of quantifying the relationship between elicited constructs and illustrating the internal structure of an individual's repertoire of constructs – the individual's phenomenal world is left intact (the idiographic approach) and no attempt is made to slot him/her into categories determined by a researcher. Various techniques have been developed from Kelly's initial RGT, for example Hinkle's Laddering technique. In clinical psychology drawing has been used to visualize personal constructs and relationships between people – 'personal sphere models' (Schmiedeck, 1978).

Advantages
An adaptable method of encouraging people to externalize their understandings of the world or whatever the focus is, for example artistic identity, collaborative relationships, design values, learning styles, and so on.

Disadvantages
Use of bi-polar constructs (good-bad, rich-poor, engaged-detached) could be seen as simplistic, reductive and positivist!

Ethical considerations
Participant(s) must have given permission/authorization; ensure confidentiality; ensure permissions have been given for public use of data; should be used with integrity and care.

Further references
- Hall, E. (1978) Using Personal Constructs: Rediguide No.9 (University of Nottingham School of Education).

Research methods: Sciences

There are many established and validated research methods in the Sciences. It is beyond the scope of this book to describe such methods in detail. We simply refer you to a few key texts that provide philosophical and practical information. It will be clear from an examination of early examples of completed formal research in Art and Design that more positivist methods have sometimes been used (for example, quasi-experimental methods in Stonyer's 1978, PhD The development of kinetic sculpture by the utilization of solar energy). Indeed, there are design research areas that require more scientific methodologies and methods, for example industrial design. However, it is important for you to be aware of the different paradigms of inquiry and what the methodological implications are for each (you may wish to re-read Section 1.3, A route map: the importance of methodology).

Further references

Convoy! The use of multiple methods

In Chapter 1 (Section 1.5) the concept of 'triangulation' was described as a way of achieving a more meaningful and balanced understanding of a research issue by the use of two or more research methods. Triangulation helps us to get a 'fix' on something in order to understand more fully the complexity of issues by examining them from different perspectives, and generating data in different ways by using different methods. The more information we have from varying perspectives, the more able we are to test our ideas and eliminate bias that might arise from each method.

The concept of multi-method also suggests multi-media, not only in its information technology sense (multimedia/hypermedia), but its value in using and integrating different kinds of media to provide different kinds of sensory information. The involvement of practically all our human senses, as well as other independent sensory instruments, is more likely to give us a comprehensive and 'rich' perspective on the research issue being explored.

It is important to state the rationale for using several methods, and to describe clearly how they interrelate. Some research projects might use a developmental methodology where one research method prompts the next in a simple sequential order. Others might use several methods almost simultaneously. In both cases, in addition to thoroughly describing in text the use of each method, it is useful to visualize the use of various methods within the methodology as a whole (Figure 4.8).

This visualization describes four key methods in a developmental research methodology (Burt, 2000). There are two versions of this - a static 2D version presented here and also a multimedia version with a spoken commentary on the book's website.