Design Guidelines...an unacceptable constraint on creativity or good design practice?

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Design Guidelines...an unacceptable constraint on creativity or good design practice?

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Abstract
A programme of research was motivated by an identified training need within the School of Design at Staffordshire University. There was a specific requirement to develop computer based training materials for software tools used in multimedia development. Guidance was required to maintain a standard design approach for producing such materials.

Initial investigations found that present 'how to do it' guides were insufficiently focused. The research centred on compiling a focused set of guidelines and related design techniques and heuristics to construct an appropriate guide. This paper discusses some of the findings and emerging issues of the research project, for example:

- *generic (ambiguous) and emphatic (context specific) forms of guidelines*
- *ineffective and effective published guidelines in the context of modern multimedia*
- *a negative attitude by designers to present forms of guidelines*
- *the need for a more focused approach to offering guidance for specific domain contexts*
- *as multimedia has no widely accepted conventions, guidelines could help to establish principles of good design practice.*

What are design guidelines?

The introduction of powerful personal desktop computing enabled designers to experiment in using electronic technology to produce various kinds of new media products. The computer industry, educational institutions and some designers have realised the need to establish design guidance for the development of such products. The aim is to aid designers of computer based products in addressing the needs of users, and to ensure that the product is fit for its purpose.

There are well established design principles for integrating text and pictorial information on the printed page. Dynamic media (film, video animation and sound) have their own distinct craft based design traditions which underpin them.

The combining of different media types within a computing environment is a recent event and the design principles, techniques and heuristics underpinning the individual media do not necessarily transfer without modification. However, research into this area has identified that there are no widely accepted conventions for developing multimedia and hypermedia

artifacts (Hogges & Sasnett 1993, Adsit 1992, Lynch and Jaffe 1990). McKerlie & Preece (1993) suggest that poorly designed multimedia systems are dangerously easy to make and often result in uncoordinated media which cause divided attention and memory overload for the users.

In the main, authors of design guidelines have extracted them from the basic principles, techniques and heuristics that underpin different media traditions. They have been developed through psychological theory, experimental research, expert judgment and practical experience. Design guidelines are essentially advice offered to designers in a wide range of very different contexts. Authors offer such advice based on their expertise, the experience of others, research reports and accumulated practical experience. However little, if any, evidence is usually documented.

There would seem to be two forms of guidelines offered:
- generic (widely applicable)
- emphatic (context specific)

Generic guidelines are by nature widely applicable, but rather ambiguous and woolly.

An example of a generic guideline for computer interface design might be... *reduce the user's cognitive load wherever possible.* Unless there are comprehensive examples of how this can be achieved, then this kind of advice is superficial and offers the designer no meaningful, concrete way of applying it. Emphatic forms of guidelines are more specific to particular design contexts, for example... *reduce the user's cognitive load by using at least one blank line between different instructional statements* or... *reduce the user's cognitive load by keeping the line length of text short, between 8 and 10 words.*

Emphatic forms of advice give the designer the *how*, but authors often forget to communicate the *why* and in *what* context the advice could be applied. Designers need to understand and integrate into their terms of reference the logic that supports *why* a particular guideline should be applied. The meaningfulness of the communication can often be the difference between acceptance or rejection, the application or non-application of the advice offered. Examples of in *what* context a particular guideline should be used is rarely offered. Most authors offering lists or compiled collections of guidelines fail to suggest appropriate uses or fail even to outline the originating context. Instead, they side-step the issue, warning that great care should be exercised in the selection and application of guidelines outside the original context.

Guidelines and designers

The development of computer systems was once the domain of people with a background in the sciences. The introduction of Graphical User Interfaces (GUIs) and more user friendly software, opened up the domain to some educationalists and a few interested graphic designers. The convergence of multiple forms of media in computing systems now attracts designers with a background in the arts. There is little tailored support for these designers in this new computing environment, for there has been little time to establish widely accepted conventions or principles of good design practice. In order to meet the immediate needs of the end users of their products, designers will have to rely on what

advice can be extracted from established psychological theory, traditional media and previous computing contexts. Generally, most of this advice can be found in:
- academic research reports, papers and journal articles
- large paper based documents of compiled guideline statements
- holistic 'how to do it' publications.

Design advice that originates from empirical research, for the most part, is seen by many design students and practising designers as being often contradictory, difficult to interpret and generalise into contemporary design contexts. Foley, Wallace and Chan (1990) for example, report that they are a mixture of ad hoc experiments that are difficult to generalise beyond their specific contexts, hard to locate, usually couched in disciplinary jargon and inconsistent terminology. Large guideline documents often contain hundreds of guidelines. They are compiled from academic publications, accumulated practical experience and authoritative opinion. They encompass a wide range of design related guidance. However, most of it needs to be interpreted or modified to suit contemporary contexts. These kinds of documents often present difficulties in searching for and finding appropriate advice. The holistic 'how to to do it' approach to design guidance for multimedia artefacts is based on expert opinion and practical experience. The advice offered is usually very generalised and is rarely referenced to empirical evidence. The main problem with this form of guidance for designers is that it rarely considers the different design constraints and strategies needed within specific domain contexts. (ie. publishing, education, marketing and entertainment etc.)

There has been some research into the use of guidelines by practising designers. Smith and Mosier (1986) found that only 58% of the users of large guideline documents found the information they were looking for and an additional 36% only sometimes found it. Galtiz (1989) has reviewed research findings into the use of guidelines by designers. He reports that guidelines are often ignored, designers have difficulty in easily finding and interpreting them and they exhibit a preference for pictorial

examples often ignoring any accompanying text. He suggests that the situation could be improved if guidelines were communicated through:-

• concrete *examples* of design screens
• explanation of the *reason* for the guideline, especially if the guideline is a deviation from a previous design practice
• a description of the *conditions* under which various design alternatives are appropriate
• quick and easy *access* to any design guideline within a document through appropriate mechanisms such as indexing, contents table, glossaries and checklists

These suggestions would go some way to enable designers to access, understand, interpret and apply established design guidelines. However the problem is more complex. Design guidelines are developed through looking at the needs, expectations and enjoyment of end users. Designers should design for these user centred concepts. However, designers mostly design for themselves and reluctantly compromise some aspects of their design for a few identified user needs. Paul Heckel (1991), author, software consultant and pioneer of the card and stack computer metaphor, highlights this persistent attitude within the designerly personality:

> We select computer functions and data structures according to how interesting the programme we build will be. Only as an after thought, if at all, do we think about communicating our concept to the user. We base our designs on our own knowledge rather than the user's....the user of that product will have a knowledge base very different from the designers' and will likely find the product difficult to understand and use (Heckel 1991)

Many designers are very suspicious of those outside the design community who, as they see it, are trying to constrain their creativity by imposing rules veiled as design guidance.

Designerly personality

Generally, a designerly personality employs intuition, imagination, a bias toward divergent, randomised exploration supported by a convergent, step-by-step approach to solving problems (Durling, Cross & Johnson 1996). Intuition in a designerly personality seems to be linked with creativity. A study of Royal Designers for Industry (RDIs) showed that they know when the right solution presents itself when choosing from many probable ideas, but they found difficulty in communicating why this should be so (Davies & Talbot 1987).

In part of a questionnaire using a 1 (least) to 7 (most) tick box scale, design students within the University were asked ...To what extent in your design work do you:

• use trial and error until it looks and feels right?
• find it difficult to explain why it looks and feels right?

Most of the students marked the scale at 4 and above for both questions. Intuition is not well understood, but this process could be a comparison between information held in working memory and long term memorised rules or templates. We build and store templates (schemata) in long term memory. They are based on our experience and knowledge of the world. Preece (1994) outlines schemata as behavioural and procedural rules that help us to deal with every day events, make sense of new situations and automate procedures that we do on a regular basis. Designers construct schemata, unique to them, based on their experiences, skills and interests which influence their approach and actions to particular situations.

Principles of good design practice

There are well established traditional design principles for text, graphics and dynamic media (film, video, animation and sound). The training of designers in these fields not only encourages creative thinking but is comprehensively underpinned with naturally evolving but relatively stable principles of good design practice. The problem in training designers, using new combined media technology, is that there are no widely accepted design conventions on which to establish such design principles. Students in this new design field are left to develop and realise their creative thought processes without firm theoretical foundations or widely

accepted design principles on which to base their design decisions. Tutor input and assessment of their work is frequently seen by students as largely subjective and mostly centred on encouraging dynamic and novel graphics and interactivity. As our knowledge and experience within this new design environment increases then more widely accepted design principles can be developed. But at present there is a vacuum in which the design community has to rely on what design advice is available. A more focused approach to communicating design guidelines does have the potential to help form theoretical foundations and establish some design principles of practical use to design students, tutors and practising designers.

Focused design guidance

In accordance with McKerlie & Preece (1993) we identified that unorganised deployment of different media on screen can cause divided attention and memory overload for users. A search for comprehensive guidance identified holistic 'how to do it' guides for multimedia but no focused approach that could answer our specific research context. However, it was identified that there was potentially a large corpus of fragmented information available in the form of design techniques, guidelines and heuristics. The hypothesis was formed that a focused set of these procedures could help designers to organise different media on screen.

Probable guidance items will result from craft based experience or narrowly focused research. To establish context reliability, these should be rigorously tested, however the scale of such testing quickly becomes unmanageable. Within the time frame of this project, this was an unrealistic approach to the problem. The methodology adopted selected items based on the weight of published authoritative opinion supported by empirical evidence (where possible) together with pragmatic judgment. The research identified what authors had to say on the subject of text, colour, still images, dynamic images, sound and interface design in the context of...

- Instruction
- Human-Computer Interaction (HCI) usability
- Media

The material was analysed in relation to identified support, then interpreted and adapted where necessary to fit contemporary contextual needs. By this method, diverse but cognate statements were synthesised into manageable guidelines.

A prototype training package was built to assess the resulting set of guidelines. The design of this prototype itself adhered to the advice contained in the guidelines. The prototype was evaluated by six experts with current experience in HCI, Instructional Design and Electronic Media Design. The evaluation pointed positively to a usable system.

Satisfactory responses	89.5%
Neutral responses	1.5%
Unsatisfactory responses	9%

Further evaluation concentrated on the use of the set of guidelines in working with groups of student designers. During the research process, it became clear that we had a future problem as to whether designers would ever willingly accept and use guidelines. A questionnaire on awareness and application of design guidelines indicated little positive interest in the subject. One response reflects what seems to be a commonly held attitude towards design guidelines.

Multimedia, mercifully, has no set of guidelines. Given time, guidelines will be imposed by the lugubrious sequence of librarians, cognitive scientists and other dullards.

Talking to design students and teaching staff, it is clear that the very mention of the phrase "design guidelines" can bring about some very negative responses. Only a few individuals recognise the need for effective guidance. The most common response expressed by both students and teaching staff was that "guidelines are a constraint on the creative process".

Guidelines and student designers

Design guidelines are tools which have the potential to expand designerly skills. However, the acquisition of any skill requires practice, experimentation and a period of consolidation before it can be applied intuitively. The process is like learning to use different tools within a software application. The user initially concentrates fully on the interface and the mechanics of how to use tools to do a particular task. Repeated practice forms procedural templates (schemata) and eventually recognition of specific situations automatically calls upon appropriate templates. The interface gradually becomes invisible. The users actions become more intuitive, enabling them to focus on their work.

Experiments were conducted with first, second and third year degree design students over varying timescales and complexity of project. Generally, students were required to design an instructional artefact and to assess their product in relation to the guidelines. Some groups were required to reevaluate their product and make improvements to see what effect (if any) the guidelines made.

Students were at first suspicious about guidelines restraining their creativity. Things that conflicted with guidelines were changed, but the issue was often fudged. Some students were allowed time to deconstruct the guidelines and to internalise them. This led to them working more intuitively.

However, there were several worrying findings arising out of working with these students:
- very limited experience as to what HCI is about
- limited appreciation that dynamic graphics and humour are not always appropriate
- limited understanding of user centred design
- lack of understanding that guidelines may help them produce products which minimise dissatisfaction in users
- failure to appreciate the importance of justifying their design decisions in terms other than aesthetics

Conclusions

Initial indications seem to support a view that given time to experiment and understand guidelines, the principles seem to be absorbed and used almost intuitively. Guideline principles applied in this way appear not to constrain a designer's creativity to the same extent as having to reference guideline documentation. However, the main barrier to achieving a situation where guideline principles are used intuitively is one of attitude. There are several issues that need to be addressed in order to help create an atmosphere for change:
- a more focused approach to compiling and communicating design guidelines
- involvement of designers in research and meaningful debate aimed toward developing widely accepted principles of good design practice
- much more practical work needs to take place involving those entering the field of design to heighten their awareness and develop thinking in this area

This research project is contributing a small step towards addressing the first issue. Perhaps because of it, design guidelines might be a little more valued by some in the design community and not thought of as just. 'an unacceptable constraint on creativity' but an essential step to developing principles of 'good design practice'.

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