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Investigating and documenting the theories behind plain English guidelines

Final report

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Contents

Executive Summary

The following report aims to identify and outline the theories behind the plain English guidelines. In doing so, it offers a theoretical framework from which to critique the current guidelines and provides some recommendations for the extension of the guidelines to include issues of relevance in a modern context, for example, the inclusion of guidelines for the development of information available on the web or in other digital formats. The original plain English guidelines as analysed in this report are rooted in document and instructional design traditions and traditional educational theories. The guidelines were developed at a time when the definitions of literacy pertained mostly to traditional forms of communication, such as print.

The Plain English movement, however, was formed with the intention of making information more accessible to the public which remains a key issue today. The report covers the history of the Plain English movement and discusses other related movements, such as readability, layout and document design, within the contexts of literacy practices and public information. Other concepts and traditions, namely information and instructional design, usability and accessibility, are introduced in an effort to create the theoretical framework on which to analyse and expand the current plain English guidelines.

The main areas of the theoretical framework developed for this report are discussed in relation to public information, literacy and educational psychology.

Information design, with origins in graphic design and instruction, at its most basic aims to allow the user to understand a message. Research on information design outlined in this report covers areas such as typography, layout, colour and graphics while also offering considerations for the design of information for digital platforms.

Instructional design, on the other hand, requires users to learn from a message. It is strongly linked with educational psychology and is seen as the bridge between pedagogical theory and practice. It is concerned with using the three main pedagogical theories, behaviourism, cognitivism and constructivism, to understand and apply methods of instruction. Instructional design is often used to design learning environments; models and theories discussed in this report including the ADDIE model and the Component Display Theory have relevance to the plain English guidelines.

Usability refers to how well a person can use a product for their own benefit and is of particular relevance in terms of modern communication technology such as most obviously, the web. The report outlines some principles of usability including interaction design, universal usability and the User Centred Design Paradigm, which all focus on incorporating the needs of the user in the design process in order to support the way that people access and understand information.

Accessibility, another area of relevance in today's society, relates to the need to reduce the effort required for certain tasks, such as understanding information, and to provide a clear and easy path for access regardless of the environment or task.

The Universal Design concept is discussed as a method of producing content that is available to a wider audience as it acknowledges the differences between how people comprehend information.

Using this theoretical framework, an assessment of the plain English guidelines is offered. The theoretical framework provides a context to evaluate the guidelines within the different learning pedagogies. This assessment is intended to shed light on the possible origins of each guideline and indeed their effectiveness and relevance.

The plain English guidelines as presented by NALA (2005) are as follows:

- Be personal
- Use active verbs
- Have an average of 15 to 20 words in each sentence
- Use everyday words and avoid jargon
- Avoid Latin and French expressions
- Define unfamiliar abbreviations and acronyms
- Remove unnecessary words and phrases
- Avoid nominalisations (nouns made from verbs)
- Be consistent with terms
- Break up dense text
- Make use of colour and graphics
- Space your lines and align your text
- Use a clear font and readable point size
- Use eye-friendly formatting

The initial plain English guidelines concentrate mainly on the layout and design of textual, print information. As is documented in the report however, research carried out in the fields of information and instructional design, cognitive psychology and educational psychology can be seen to facilitate an expansion and revision of the guidelines to meet the demands of the evolving definition of literacy in today's information society. The report makes a list of recommendations, possible additions and caveats based on the theories and research presented in the theoretical framework.

The plain English guidelines were developed to meet the literacy needs of a society very different to today. This report outlines the evolving and complex multi-literacies of today's information society. While there is clearly still a need for plain English guidelines, the existing guidelines would benefit from an examination and revision based on the relevant theories and

research as documented in the theoretical framework. The plain English guidelines appear largely to arise from a more traditional view of literacy and deal almost exclusively with the design of textual information but in the context outlined above, the guidelines may need to take into account other literacies, most notably, media literacy and visual literacy.

The report however, stresses that theories and guidelines often need to be modified and adapted according to the context (Yanchar, South, Williams, 2007). User-testing on an individual basis is paramount; the guidelines themselves are not infallible rules and should not be treated as such. User-testing remains an important tool in determining whether information content fulfils its function and meets the needs of particular target audiences.

Introduction

Plain English is a movement that aims to make public information more accessible by making it easier to understand. The movement was introduced in countries such as the US, UK and Australia in the 1970s and has increasingly been recognised as representing something of a vanguard for an awareness of the need for a number of inter-related language, layout and presentation issues when providing information for assimilation by the general public.

Both the guidelines developed by the initial plain English movement and those promoted by NALA today can be seen to have their roots in the document design, readability and instructional design traditions; they also link strongly to, and may be said to be substantiated by, the broad pedagogical schools of cognitivism and, to a lesser degree social constructivism. Across these fields much research has been carried out as to how optimally to present structure and sequence information to make it accessible to the greatest number of people. This report provides an overview of all of these various related traditions in an effort to provide a theoretical and empirical framework which can then be used to provide a critique of the existing plain English guidelines as well as recommending new guidelines which will extend the existing guidelines to cover digital and other new media-based information sources and services.

Running behind these various discussions is the issue of literacy itself. Traditional definitions relate to competence in reading and writing but contemporary definitions, for example NALA's definition outlined below, expand this rather limited view at least as far as the acts of listening, speaking and numeracy. NALA's definition of literacy involves:

> *"listening, speaking, reading, writing, numeracy and using everyday technology to communicate and handle information. It includes more than the technical skills of communication (reading, writing and spelling): it also has personal, social and economic dimensions. Literacy increases the opportunity for individuals and communities to reflect on their situation explore new possibilities and initiate change".*

As most contemporary definitions include the ability to understand and use information; Dubin and Kuhlman (1992) recognise that literacy "has come to mean knowledge, competence and skills". From a constructivist[1] point of view, Hiebert (1991) believes that people gain meaning from text and other media through active interaction as opposed to some kind of passive understanding of something contained within the text.

[1] Constructivism is a theory of learning whereby the individual personalises learning and actively creates knowledge from experience. It is a more user-centred approach to learning pedagogies.

Rapidly evolving technology in recent history has led to a far greater range of communication methods and channels. The Plain English movement's guidelines, it could be argued, pertained mainly to the mainstream modes of communication and information dissemination at the time they were created. Now, over 30 years later, there may be a need to reassess and augment the guidelines in the context of today's advanced information societies in the first world, societies which are more media-rich and information-abundant than ever before. A result of what is sometimes referred to as the information explosion is that it can actually be more difficult to provide information to an intended target audience; it can equally be more difficult for that target audience to interpret the information around them.

The importance of skills in other literacies then has grown. People in the western world are required to achieve and evidence competence in media literacy[2] and information literacy[3]. Media literacy refers to the ability to function in the digital age and includes a need for critical thinking, enabling people to question, analyse and evaluate information (Livingstone, 2004). Information literacy is critical given the sheer range and variety of methods currently available for presenting and delivering content. Information producers rely more and more on the web and other digital devices to broadcast messages in an effort to reach the contemporary generation who have grown up with information and communication technology, aka the "net gen" or the "digital natives". In order to be information literate, people need to have the skills to enable them to locate, select, evaluate and use information effectively. There is a danger in this context that individuals that are considered literate by traditional standards may be lacking certain new literacies and find themselves shut out from accessing vital public information.

The evolving information society and new literacies give rise to the need to reassess the plain English guidelines, both in terms of their origin and relevance to the modern age. Currently, research into readability, legibility and usability tends to focus not on formulating a set of guidelines for designers to use, but on the cognitive processes behind information assimilation (Clark, Mayer, 2003; Schnotz, Bannert. 2007; Spyridakis, Mobrand, Cuddihy, Wei, 2007; Sanders, Land, Mulder 2007; C.Y. Bartholome, Bromme, 2009).

This report examines the theories behind plain English guidelines, as well as examining the guidelines themselves. It provides a suggested route for expanding and augmenting the traditional guidelines based on current learning theories and research in information and instructional design, incorporating a focus on the multiple literacies of today in the hopes of providing a framework to respond to the challenges these new literacies represent for information providers and content developers alike.

[2] "The ability to access, understand and create communications in a variety of contexts" (Ofcom, n.d.)

[3] "Knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner." (CiLiP, n.d.)

Plain English and Related Movements

The Plain English Movement

Introduction

Plain English, also known, particularly in North American sources, as "Plain Language", is a style of writing which seeks to clarify information in order to make it more accessible. The Plain English Campaign defines plain English as:

> *Writing that the intended audience can read, understand and act upon the first time they read it. Plain English takes into account design and layout as well as language.*

Plain English brings with it a number of specific objectives, and represents a convergence of a number of different disciplines and traditions. This chapter looks at the history of Plain English as a movement – beginning with a 'prehistory' of sorts – and progresses on to spread the net, as it were, ever wider to looking at other movements and traditions which share objectives with the Plain English movement or offer useful perspectives and guidelines in the achievement of these objectives.

Antecedent Traditions

The 1930s saw a number of studies into readability and semantics. (Schriver, 1997.) In 1932 F.C. Bartlett conducted a famous series of studies in constructing meaning from texts, and ultimately influenced the emergence of schema theory as part of the later cognitivist[4] movement. In 1935, educational psychologists William S. Gray and Bernice Leary published what remains from the perspective of the Plain English movement and readability a landmark study, "What makes a book readable". The study investigated what makes books readable, specifically for adults with limited reading ability. The study identified a number of elements that affect readability and grouped them under headings. Their work gave new stimulus to efforts to identify a more accurate readability formula.

Such early work led to broader research in document design (Schriver, 1997). On this side of the Atlantic key individuals such as Professor Patricia Wright – now Cardiff University, UK – have

[4] Cognitivism is a learning theory that focuses on internal mental processes. Cogntivists see learning as dependent on processing capacity and memory.

been instrumental in progressing research into the processes underlying the use of printed, and latterly digital, information to achieve various design objectives (Wright, 1979, 1980, 1981, 1982, 1985, 1988; Wright, Hull, 1986, 1988; Wright, Wilcox 1979).

Popular non-academic proponents of plain English include George Orwell (Orwell, 1946), the rules he offers at the end of his 1946 essay, "Politics and the English Language", have more than a passing resemblance – with the single exception of his ironic last rule, "Break any of these rules sooner than say anything outright barbarous" – to many Plain English and Plain language rules.

Early Research and Mainstreaming

The research into plain English and popular calls for its usage led to the provision of more legible texts, at both corporate and governmental levels in the US, two main interventions are often cited in the literature:

- In 1973 Citi (then the First National City Bank) launched a milestone plain language consumer loan document. The popularity of this move is said to have been a catalyst for further implementation of plain English. (Williams, 1999. Mazur, 2000.)

- In 1978 US President Jimmy Carter issued executive orders to make government regulations easy to understand. By 1991, eight states had passed statutes related to plain language (Schriver, 1997).

The Plain English Campaign in the UK was set up in 1979. In 1986, a plain English exhibit was displayed in the House of Commons (Kimble, 1992). The plain English campaign in Australia began in 1976 with the issue of a plain English car insurance policy. Following this, the drive in Australia for plain English documents came from industry, who found the approach reaped considerable cost benefits (Eagleson, 1991).

The plain English movement in Canada became prominent in 1988 when the Canadian Legal Information Centre established a Plain Language Centre in Toronto.

The influence of websites such as http://www.plainenglish.co.uk, http://www.plainlanguagenetwork.org, http://www.clarity-international.net, http://www.writemark.co.nz/mainsite/ and http://www.global-shred.com are today indicative of a global movement that has surpassed a passing trend or fashion. These and other web-based sources and services work towards spreading the usage of plain English, bringing practitioners together, providing guidelines and recognised standard marks for public information (e.g., Crystal Mark, Write Mark).

Criticism

There has been some criticism of the plain English agenda; here a number of criticisms are briefly mentioned and responded to.

- Plain English is sometimes seen as involving a simplification of language which can in turn lead to a loss of accuracy. Case studies suggest, however, (Kimble 1996, 1997), that simplification can lead to a greater assimilation of information for users.
- Plain English has also been criticised as being potentially patronising for users. Defenders of the agenda might reply that it is assertively user-centred. (SEC, 1998)
- Some criticisms are based on a conception that plain English involves absolute rules. While there are indeed a number of plain English guidelines, none of these presume to offer inviolate rules. (Cutts, 1995.)

There is some significant data to suggest the benefits of using plain English. Joe Kimble, Lily Whitman and William Lutz have all put forward popular arguments for the usage of plain English in the fields of law (Kimble, 1998-2000), science (Whitman, 2000) and business (Lutz, 1989).

Other Related Movements

Readability

Readability at its most basic is "reading ease", related in turn to comprehension, learning, persistence etc. There are a number of widely-used formulas for assessing readability. These tend to be based on the number of syllables, words and sentences, as well as average sentence length in a piece of writing. Popular formulas include the Flesch-Kincaid Readability Test, the Dale-Chall Readability Formula and the SMOG index.

Despite a relatively long history of use, readability formulas have been criticised for inaccuracy and a lack of sophistication (Charrow & Charrow, 1979; Duffy, 1985; Klare, 1984; Forms Information Centre, 1985; Redish & Selzer, 1985; Wright, 1988). Readability formulas tend to ignore the meaning of words and texts. Current Plain English literature tends to warn against relying on readability formulas (SEC, 1998; Cutts, 2008).

Document Design

The document design tradition has produced much research into guidelines regarding structure of text, language, format, and aspects of visual design in drafting documents (Redish, 1985;

Burgess 1984; Felker et al, 1981; Jansen & Steehouder, 1984). Document design will be discussed further in the context of information design later in this report.

Style Guides

Style guides supply a set of standards for the writing of a document generally in the context of a specific publication, organisation or audience. One of the earliest and most famous style guides, Strunk and White's *The Elements of Style* (Strunk & White, 1918) is for general purpose however, and contains a rather arbitrary collection of generalised advice on issues such as rules of usages, principles of composition and commonly misused words. Despite its enduring popularity and influence the book has come in for some strong criticism for its inconsistencies and all out atavism (Pullum, 2009).

Beyond Strunk and White's general guide there are a number of other different types of style guides. How regimentally they need to be followed depends ultimately on one's purpose.

- Newspaper and publishing guides
    - Newspapers and publishing houses typically have in-house style guides with the purpose of ensuring consistency in matters of sentence construction, punctuation, spelling, writing bias etc across their publications.
- Technical writing guides
    - Style guides are instrumental in technical writing. An effective style guide ensures that a document that has been collaborated on has no distinct personal style.
- Policy Makers
    - Governmental bodies have also issued style guides in an attempt to make their literature more accessible and to provide a guide to the public. The EU the U.S. Securities and Exchange Commission (SEC, 1998) and the British Colombia Securities Commission (BCSC, n.d.) have all issued these kinds of style guides.
- Web-based style guides
    - Style guides exist specifically for web-based texts. These address or include the elements of other style guides but with added sections with regard to issues such as hypertext mark-up and colour-coding. (Redish, 2007; Wikipedia)

Other Layout Guidelines

Plain English guidelines pertain to legibility and readability. Many of the guidelines listed above concentrate primarily on textual or, at a stretch, graphical content. A significant amount of relevant research also exists which can be drawn on for the creation of guidelines for effective visual design and typography (Wright, 1982; Reynolds, 1988; Schriver, 1997; Boyarski, Neuwirth, Forlizzi & Regli, 1998; Lonsdale, 2007). This literature will be more fully reviewed in the next chapter.

Related Concepts and Traditions

As indicated at the outset, there are a number of other movements which share objectives with the Plain English movement and/or offer useful perspectives and guidelines for the achievement of these objectives. These are examined in greater detail in the next chapter which works towards the development of a theoretical framework to analyse existing guidelines for Plain English and from which to extract further guidelines for a range of other non-print based information and media formats. Those closest to Plain English and the other movements in terms of purpose and/or structure are briefly introduced below.

Information Design

Information design involves the preparation of information so that it can be "used by human beings with efficiency and effectiveness" (Horn, 1999, pp. 15–33). According to Pettersson (2002), information design has its origins in graphic design, instruction and production. Pettersson also suggests that while information design requires a receiver simply to *understand* a message, instructional design requires a receiver to learn from the message. Our working definition of Plain English as "*Writing that the intended audience can read, understand and act upon*" (Plain English campaign, n.d.) suggests, in purpose at least, that it bridges aspects of both traditions.

Instructional Design

Instructional design, more formally, "is the analysis of learning needs and systematic development of instruction" (Instructional Design, n.d.). It refers to the organisation of learning resources and materials to "ensure learners achieve established learning outcomes" (Siemens, 2002). Many models of instructional design have been developed focussing on the need for continuous cyclical implementation and evaluation process (Kemp, Morrison & Ross, 1998; Dick

& Carey, 1996). Perhaps the most well-known of these, the ADDIE model provides guidelines for five phases of instructional design, Analysis, Design, Development, Implementation and Evaluation, ending where they begin again with the process of evaluation. ADDIE and other derived instructional design models can also be seen to be relevant in explanations of good information design (Gustafson, 1991).

Usability and Accessibility

Two closely related concepts, those of accessibility and usability, are often treated as part of both the literature on information design and instructional design and are also continuous with the Plain English movement.

A fundamental belief underlying initiatives for greater accessibility is that when something is made accessible for a certain group of people, it is more accessible for a general audience and thus forms the basis of the universal design concept (Rose and Meyer, 2002). Universal design is the "design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design" (Centre for Universal Design, 1998). Following the 1998 amendment to the US Rehabilitation Act regarding accessibility, the Web Accessibility Initiative (WAI) introduced guidelines in an effort to ensure all websites are accessible and enabling people to "perceive, understand, navigate, and interact with" the web (World Wide Web Consortium).

Usability first emerged from a Human Computer Interaction (HCI) background. HCI is "a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use" (HCI, 1992). As such it is connected with usability, a term that refers broadly to how well a user can "use a product to achieve their goals and how satisfied they are with that process" (Usability website, 2009).

Usability Testing

Jakob Nielsen, a key figure or "guru" ("Jakob Nielsen on e-learning," 2001; Marks, 2001; Richtel, 1998) in the area of usability, insists on the interdependency of usability and accessibility. For example, when ensuring the accessibility of user interfaces, the usability of the system must be considered (Nielsen, 2005). By Nielsen's account usability testing in the form of cognitive walkthroughs, heuristic evaluations, standards inspections, etc., have emerged since 1990 as valid and reliable methods of optimising the usability of systems and applications (Nielsen, 1994; Nielsen, 1992; Mack & Nielsen, 1993). Such methods generally work on the basis of requiring users, novice or expert, to carry out real tasks on prototypes or full versions of systems, searching for usability issues as they go. Such methods can be recommended both in terms of

validity and affordability in the context of the evaluation of the Plain English Guidelines and their implementations.

Summary

The objectives of the plain English guidelines are to aid content developers in producing clear and accessible information for communicating effectively with the general public. Plain English guidelines have existed since the 1970's in order to pursue this aim. They can be seen to have developed from traditions such as readability and document design. They have been in currency for a number of decades and are worth analysing in terms of their relevance to today's changed and changing definitions of literacy in today's information society.

There are a number of related concepts and traditions such as usability, accessibility, information and instructional design. These will be used in the following chapter to develop a theoretical framework for the evaluation of the guidelines in a modern context.

A Theoretical Framework

Introduction

The theoretical framework presented here brings together a number of different interrelated theories and concepts from the disciplines of:

- educational psychology, with particular reference to the pedagogical schools of behaviourism, cognitivism and constructivism.
- instructional design,
- information design,
- Usability,
- Accessibility.

These disciplines were chosen because of their relevance to the objectives of the plain English guidelines, that is the promotion of clearer communication and understanding.

The framework is intended to provide an overview of research and theories on how people relate to information. The research and theories presented here will inform the evaluation and reassessment of the plain English guidelines.

Elements of the Framework

Pedagogy and Instructional Design

Ertmer and Newby, in a widely-cited article (1993), conveniently divide modern pedagogical theories, (i.e. theories of teaching and, by implication, learning) into three main schools, those of behaviourism, cognitivism and constructivism, seeing each these as offering valid approaches depending on both the learner and the learning context.

Behaviourism

Behaviourism is based on observable changes in behaviour (Schuman, 1996), influenced or brought about by external stimuli. Ertmer and Newby (1993) simplify the school as seeing learning as consisting in the key elements of stimulus and response and the "association between the two" (pp 55). The tradition is conventionally traced to Pavlov through Thorndike

(who most likely did not regard himself as sharing common cause with the behaviourists); Watson (who coined the term); and B.F. Skinner who introduced the concepts and terms "operant conditioning" and "programmed instruction", based upon it, to the world. A behaviourist approach is generally recommended when the learning at hand involves discriminations (recalling facts), generalisations (defining and illustrating concepts) associations (applying explanations) and chaining (automatically performing a procedure) (Ertmer & Newby, 1993). For example, it may be preferable to adopt a behaviourist approach in the case of initial knowledge acquisition, or when teaching a task that doesn't need a high level of cognitive processing (e.g., teaching a child to tie their shoelaces). In these cases it may be preferable to use short sentences in order to clearly evoke the stimulus / response mechanism.

However, it is worth noting that it has been suggested the automatic performance of a procedure is never preferable, as it reduces the opportunity to improve on that procedure and increases margin of error (Langer, 2007). According to Ertmer and Newby (1997) it is generally agreed that a behaviourist approach is not appropriate when the learning involves higher level skills or a greater depth of processing (Ertmer & Newby, 1993, pp 56).

Cognitivism

The assimilation and application of various kinds of knowledge can be seen as a cognitive process (Merrill, 1987) whereby a learner develops a cognitive structure in support of the desired learning performance. This is broadly a cognitivist approach, one that, by contrast to behaviourism, focuses on internal mental process. Cognitivists see learning as being dependent on "the processing capacity of the learner, the amount of effort expended during the learning process, the depth of the processing" (Craik & Lockhart, 1972; Craik & Tulving, 1975, as cited in Ally, 2004). While the role of memory is not addressed in the behaviourist theory, it is crucially important to the cognitivist position which essentially views all learning as, in some sense, information stored (assimilated or accommodated) in memory. Generally speaking, if the learning is complex a cognitive approach is deemed more appropriate than a behaviourist one. It is worth noting that longer sentences have been shown to be more effective in helping the learner make connections between concepts and knowledge sources (Keenan, 1984; Sanders, Land, Mulder 2007). Thus, while the general guideline which promotes shorter sentences can be seen to complement a behaviourist approach (as outlined previously) it can be detrimental when using a cognitivist approach and so, the guideline can be seen to be approach-based, context-specific and subject to user testing.

Cognitive Load Theory

Cognitive load theory (Chandler, Sweller, 1991) can be seen to provide a framework for research into cognitive processes and instructional design (Paas, Renkl, Sweller, 2003). Cognitive load refers to the load on working memory during the learning process. Instructional designers and educationalists in general need to be aware of the different factors that impact negatively and positively on cognitive processes. These factors include:

- the characteristics and restrictions of working memory,
    - This relates to where conscious cognitive processing occurs,
- intrinsic cognitive load
    - The load related to the degree of interaction between different elements of the information,
- effective cognitive load
    - The cognitive load that is positively impacted on by good instructional design)
- extraneous cognitive load
    - The unnecessary load that occurs as a result of bad instructional design

(Paas, Renkl, Sweller, 2003).

Schema Theory and Mental Models

Schema theory relates to the way people interpret and respond to information presented by the world around them based on some kind of internal model or cognitive map or model. Schemas may be seen as personal catalogues or accounts of how things work, and how to interpret particular situations. These models continue to expand and aggregate new nuances of meaning as the learner gains experience (Widmayer; Merrill; McVee, Dunsmore, Gavelek, 2005).

By one interpretation, understanding and recall can be strongly influenced by our internal schema and may as a result contain less or more detail than the "real" scenario visual and textual information, as the leaner may omit details they see as irrelevant (Schnotz, Bannert. 2003).

A cognitivist approach accounting for cognitive load and schema theory is usually deemed best when the learning involved is more complex and a deeper understanding of the subject matter is needed: for example, when learning a language, problem-solving or information processing (Ertmer & Newby, 1997).

Constructivism

Constructivism in the pedagogical context is generally the position that learners interpret information and the world actively, that they personalise information learned through observation, processing, and interpretation (Cooper, 1993; Wilson, 1997) to produce new knowledge and ideas. Bednar et al. (1991) suggest that learning occurs when meaning is created from experience (as cited in Ertmer & Newby, 1993).

The constructive approach incorporates the belief that it is not possible to categorise types of learning independently of content and context. Jonassen (1991) has described three stages of knowledge acquisition, introductory, advanced and expert and in this context it is recommended that, where a behaviourist or constructivist approach may be suited to the introductory stage, a constructivist approach may be preferable at the advanced stage (Ertmer & Newby, 1997). The *Instructional Design* section will further discuss when it may be appropriate to negotiate content development using a constructivist approach.

Constructivism also incorporates social constructivism, which explores the idea that learning can be facilitated, manipulated and contextualised via social interaction.

The Application of Learning Theories

Learning theories provide instructional designers with verified instructional strategies and techniques for facilitating learning (Ertmer & Newby, 1993). As hinted at above while these theories may form frameworks for thinking about the effective design of information and instruction there are no infallible rules that emerge true or valid for all learners and all learning. The decision as to which broad approach to adopt needs ultimately to be made on a case-by-case basis as it is often based on a number of interrelated and highly-contextual variables.

Instructional Design

As indicated in the previous chapter, instructional design refers to the organisation of learning materials to “ensure learners achieve established learning outcomes” (Siemens, 2002). Instructional design can also been seen as a bridge between pedagogical theory and practical application, being concerned with using learning pedagogies to understand, improve and apply methods of instruction (Reigeluth, 1983, pg 5.). Modern pedagogical theories may, again after Ertmer and Newby (1993), be conceived as revolving around three main schools, those of behaviourism, cognitivism and constructivism. Ertmer and Newby (1993) suggest that all three positions can be seen as relevant to the process of instructional design, depending on the

learning context, a relativist or theory-neutral position that will be returned to at the end of this chapter.

Theories and Models of Instructional Design

Instructional design theory can be seen as providing guidance to those charged with designing learning experiences; it has also been described as a bridge to pedagogical theory (Lisle, 1997). A large number of theories and models have been developed with the intention of informing and guiding instructional design practices (Yanchar, South, Williams, 2007). Some of these can be seen to inform the existing plain English guidelines.

Among these theories and models is M.D. Merrill's Component Display Theory (CDT), which designs "micro-elements", or the smallest effective chunks, of instruction (Component Display Theory, n.d,). This parallels the tendency in plain English guidelines to encourage breaking information into relatively small chunks.

Some instructional design sources have emphasised a move from theories which offer standardised solutions to those that offer customised solutions and a focus on user-centred design (Reigeluth, 1997). This endorsement of user-centred design can be seen to be relevant to those applying the plain English guidelines to their own work in order to make it more effective for the user group.

Prescriptive Models of Instructional Design

Prescriptive models of instructional design consist of guidelines, or frameworks developed to help instructional designers in the process of creating instructional activities (Instructional Design, n.d.). Much like the plain English guidelines, models of instructional design are ultimately intended as an aid in effective communication and learning.

The ADDIE instructional design model is possibly the one most cited today. It has five stages: analysis, design, development implementation and evaluation (Molenda 2003) which are iterative and cyclical so that when the final stage is reached the designer should return to the initial stage and repeat the cycle.

Instructional design models tend to emphasise the importance of an iterative process as well as optimum chunking of information and user-centred design (Siemens 2002).

A Behaviourist Approach to Instructional Design

There are different recommendations pertaining to the structure of information depending on which pedagogical stance the material is designed from. For example, it is recommended that if a behaviourist approach has been selected as the most suited to the learning at hand, the information designer should focus on developing a stimulus and providing opportunities to respond appropriately to that stimulus (Ertmer & Newby, 1997).

A Cognitivist Approach to Instructional Design

As earlier stated, when acquiring more complex knowledge, a cognitivist approach may be the most suitable. There is more of an emphasis on understanding the subject matter, therefore instructional designers should make knowledge meaningful by relating it to existing schema and facilitating the development of effective mental models, as well as taking care to avoid cognitive overload (Ertmer & Newby, 1997).

Cognitive overload pertains to working memory. There is a certain amount of information that can be contained in short-term memory before information loss occurs. The practice of breaking information into these digestible units is known as "chunking". When formatting text for instance, chunking is the process of breaking into optimum meaningful units for learning. Research indicates however that merely shortening sentences is not the most effective way to do this (Sanders, Land, Mulder, 2007). Studies have shown that structural cues such as "because" and "therefore" help the learner construct meaning from text and create a mental representation of the information, as well as speeding up the processing time taken for information immediately following (Kamalski, Sanders, Lentz, 2008; Martins, Kigiel, Jhean-Larose, 2006).

A constructivist approach to Instructional Design

If a constructivist approach is chosen for the development of learning materials, the emphasis is more fully on learner activity and "meaning-making" than with either of the previous two approaches. It is the task of the information designer to design for the learner certain learning experiences and to provide the relevant support materials with regard to how to correctly interpret presented information or experiences in order to facilitate appropriate knowledge acquisition. (Ertmer & Newby, 1997)

Text and Graphic Design from an Instructional Design Perspective

Research from the fields of educational psychology and cognitivist-based pedagogy may be seen to inform effective instructional design practices associated with textual and graphical design.

Mental models for instance may be enhanced through the use of graphics, assuming the graphics are identifiable with the content and if they are presented closely in space and time (Mayer, 1997; Bartholome, Bromme, 2009).

When processing an image, the learner creates a visual mental representation through perceptual processing. This involves the selection of task-appropriate information, and the rejection of that information not deemed necessary to achieving the learning outcomes (Ullmann, 1984; Schnotz, Bannert. 2003). Research indicates that extraneous detail can prolong processing time, while the omission of relevant details, those that make the task more apparent, can add to the cognitive load of the learner (Houts, Doak, Doak, Loscalzo, 2006; Schumacher, 2007).

Designers of a range of content needs therefore to be aware that while relevant graphics can help the learner, more abstract graphics or those where the connection to the content is tenuous, can hinder the learning process, and should be avoided (Mayer, 1997; Mayer 2001).

The combination of text and graphics can be problematic, however, when dealing with novice learners (Ainsworth, 1999). Learners may fail to make the connection between different sources of information. This may imply a need for instructional support during cognitive processes (Bartholome, Bromme, 2009). The designer/instructor needs in such cases to strike a balance between providing adequate help and allowing for the internal processing demands required for effective information assimilation.

Mayer and Moreno (2002) based on extensive empirical data lay out some principles for the combination of pictures, words and other media.

- The multiple representation principle.
    - This principle states that explanations in words and pictures are more effective than those relying solely on words,
- the contiguity principle
    - Stating that corresponding words and pictures should be displayed together,
- the coherence principle
    - Stating that there should be few extraneous words and pictures,
- the modality principle

- Stating that auditory narration is better than on-screen text where possible

- the redundancy principle
    - Stating that on screen-text is unnecessary when a presentation includes the same text as a narration.

Effective design can serve to create attention cues. The use of images can positively or negatively alter the learner's perception of meaning (Tourangeay, Couper, Conrad, 2003). Three functions of cues have been identified: selection (i.e. cues to guide attention to specific areas), organisation (i.e., cues to emphasise structure) and integration (i.e., cues to indicate the relation between specific elements) (De Koning, Tabbers, Rikers, Paas, 2009).

It is interesting, however, to note that according to David Kirsh (2004), while the structure of visual cues can facilitate cognitive and metacognitive[5] processes, page layout, navigational appearance, visual and interactivity design are not viewed as major factors in the metacognitive process. While attention needs to be given to the structure, detail and placement of graphics, typical design concerns may not impact as much on metacognitive processes, as these as seen as predominantly internal processes.

Instructional design theories and models, which have much of their foundation in pedagogical theories, can be seen to inform any guidelines for those developing information sources. Instructional design sources promote a cyclical, iterative development process, whereby for example solutions are tested on user groups and developed further on the basis of results from this testing. Furthermore while a number of models and pedagogical positions with varying empirical support exist, there is no "one size fits all" model or framework, that is to say, theories need tailoring for each individual case (Yanchar, South, Williams, 2007). The emphasis is on knowing the theories and models, being able to choose appropriately relative to each individual context, and then, based on those choices, to inform and tailor learning experiences to context-specific requirements and outcomes (Yanchar, South, Williams, 2007; Reigeluth 1997). Instructional design can be seen to inform any application of the plain English guidelines. Content developers wishing to optimally structure information in order to best facilitate learning should have an awareness of both the plain English guidelines and information design models, principles and research results.

Information Design

Information design is an area of research focusing very much on the design principles behind effective communication and is in general more rooted in graphic and visual design than educational psychology. As such, there is not a defined catalogue of established theories and

[5] Knowledge related to one's own cognitive processes leading to a more self aware learning experience.

models to garner results from, as is the case with the instructional design tradition. The following is an overview of research findings and conventions within the context of information design.

Typography

Font type, size, style and colour contribute to legibility by distinguishing levels of importance and units of meaning. (Frascara, Ruecker, 2007)

There have been studies into the semantic properties of type. (Bartram, 1982; Rowe, 1982; Lewis, Walker, 1989; Walker et al, 1986. Van Leeuwen, 2006) Typefaces were shown to have an innate tone which can reinforce textual content if it corresponds to the tone of that content. It was found that users comprehension can be negatively impacted on when the font chosen does not correspond to the type of information represented (Lewis, Walker. 1989). When designing data displays for patient files, the typeface *Bitstream Bell Centennial* was chosen. This typeface was developed for use in telephone directories and so works well for mixtures of words of numbers (Powsner, Tufte, 1997). This is an example of the properties of type matching the textual content,

Boulton (2005) points out that the graphical representation of the content should match the mental model of the reader, that is that the tone implied by the typeface should correspond to the perceived tone of the content, it would be confusing to use a casual font (for example, Comic Sans) for a very serious topic.

According to Wright's empirical research (1979), lowercase vertical type – as opposed to uppercase / bold / italic type – were found to be easiest to read. An overuse of capitals or italics can slow readers and too many typographical variations are confusing. Redish (2007) found that when emphasising text, users responded more positively to the use of bold rather than italics.

There are a number of studies that indicate that there is no difference in legibility between sans serif and serif fonts, either in print or on the web (Poole, 2005). The proliferation of sans serif fonts on the web can be seen to be rooted in convention rather than any explicit usability or readability concern.

Research indicates that conflicts can exist between what users say they like and how they perform in tests. (Boyarski, Neuwirth, Forlizzi, Regli, 1998.)

There is some criticism of the available research on typography, primarily to do with its real-world relevance. Critics point to the questionable fidelity of testing environments. On the other hand, it may be argued that research is still valuable but users need to be aware of the experimental conditions from which data was derived. (Lupton, 2003; Schriver, 1997.)

While studies such as those outlined above can provide guidelines to content developers in how to use typography, user-testing is recommended in each case, as is a degree of informed intuition in the case of experienced content developers.

Layout

Layout refers to the positioning and style treatment of content on a page or screen, including ratio of white space to printed space, spacing between elements, headings, paragraph breaks etc. Layout can be used to signal the hierarchical structure of a text (Schriver, 1997). The layout can impact on the meaning the user constructs from the text (Tourangeau, Couper, Conrad, 2003). That is, the layout can indicate to the user the importance of different parts of information and their relevance to each other, if the layout is not constructed well it can impede the user's progress through the content.

Research indicates that information should be chunked into units of meaning to improve assimilations. (Frascara, Ruecker, 2007) Research has shown that keeping sentences short may not be the most effective way to chunk information. (Keenan, 1984; Sanders, Land, Mulder 2007). No standard sentence length emerges from empirical research. Optimum length can be determined on a case by case basis and is dependant on various cognitive differences and an individual's ability to chunk information into meaningful units. Again, user-testing is advised to determine the appropriate "chunk" size on a case-by-case basis. This research has found no specific basis for the plain English convention of limiting sentences to 15 – 20 words.

Blank space has been shown to increase legibility and to attract readers' attention. (Nova Research Ltd 1986; Lonsdale, 2007).

An over-populated layout design can be seen to negatively impact on user performance, confusing the user. (Halber, 2007)

Colour

Colour can be instrumental in enhancing legibility and ease of use. For example, the redesign of printed communications to medical doctors showed that colour was fundamental in helping users identify and memorise information. (Frascara, Ruecker, 2007).

According to cognitive psychologist Kosslyn (1994), any sharp contrast will attract the attention of the reader. This concurs with Wright (1979), who found that the most significant factor when choosing a colour is contrast. However, colour alone cannot be relied on to indicate structure (Wright 1979).

There is also the psychological impact of colour. For example, studies have found that the use of colour can make documents "more approachable" in the eyes of users. (Firth, 1980; MIL Research Ltd, 1982).

Depending on an individual's cultural background and societal norms, different colours will have different connotations. It is necessary to assess the user group before indicating the nature of information through colour.

Illustrations

It is well researched that illustrations are useful if they are relevant to the subject matter and presented closely in space or time, and can be detrimental if the link to the subject matter is not apparent (Clark, Mayer, 2003; Campbell Kegan Ltd 1986; Communication Research Ltd, 1984; Cragg, Ross and Dawson, 1983; Firth, 1980; Harris Research Centre 1985; Cragg, Ross and Dawson, 1983; Firth, 1980; Harris Research Centre 1985; MIL Research Ltd, 1982; Research Business 1986; Schnotz, Bannert, 2003).

Information can be seen as being augmented by appropriate images, and so providing more opportunity for cognitive strategies, such as dual-coding (Scaife, Rogers, 1996; Mayer, 1997). Dual-coding says that graphical and textual information are processed using different "channels" in the mind. It is more effective to engage two channels than just one. Images can affect the meaning the user derives from the textual content (Tourangeau, Couper, Conrad, 2003).

However, it has been found that users with little experience of visuals may find them incomprehensible (Cripwell 1989).

The creation of illustrations is also culturally sensitive. It is recommended that illustrations are developed locally using an artist from a similar cultural background as the user group. (Houts, Doak, Doak, Loscalzo; 2005)

Research has found that best practice guidelines cannot be readily applied in all scenarios, the iterative process of design, testing and redesign is essential (Schumacher, 2007).

Other Graphics

There has been research into using lists and flowcharts as alternatives to text (Holland, Rose, 1981; Jansen, Steehouder 1984; Wright 1982). Empirical research has indicated that these formats are sometimes processed more quickly by the user than purely textual representations (Holland, Rose, 1981). However if the user is unfamiliar with the format it may slow down processing time. This indicates that it is always necessary to provide explanatory notes to accompany lists and flowcharts.

According to Tufte (2002) representations of data should strive to be clear portrayals of complexity. While supplying principles and theory for data graphics, Tufte states that these principles need not be applied rigidly, and should generate design options. (Tufte, 2002)

In the case of icons and symbols, care should be taken that they remain true to their purpose. That is, they should remain focused on guiding users through information and representing tasks, resisting any deviation into a decorative function. (Follett, 2006)

Considerations for Digital Design

There are extra considerations to be taken into account when designing information for digital platforms.

Typography and Layout

The w3c supplies guidelines for developing standard-compliant layouts, as well as recommendations for typography based on readability and usability for screen (World Wide Web Consortium, 2009).

Layouts that have typically worked well in print medium in the past (e.g., newspaper publishing) do not necessarily translate to the web. This is due to considerations such as the difference in resolution, screen aspect versus typical page aspect (that is, horizontal versus vertical), (Rutledge, 2007).

The ability for digital media to be hyperlinked has implications for layout and structure (Spyridakis, Mobrand, Cuddihy, Wei, 2007; Djonov, 2007). The allowance for levels of information to be hidden until such time as a user selects them (for example, drop-down menu options) could possibly impact on how users process that information. According to Tourangeau, Couper, Conrad (2003), users may prioritise information that is immediately visible while ignoring equally important information which may not be as immediately apparent.

Redish (2007) provides an extensive amount of guidelines for tailoring text and layout for the web in her book *Letting go of the Words.* Redish' guidelines pertain to developing content and the, target audience, more specifically they deal with developing homepages and pathway pages, writing information, focusing on essential messages, usability issues, sentence construction, the use of lists, tables and illustration, layout, links and the creation of style guides.

Colour

As with printed materials, colour can be used to attract users and signify structure in digital media. Gabriel-Petit (2007) provides guidelines on how to use colour effectively on screen.

Graphics and Illustration

In the case of digital media, graphics and illustrations can have the added characteristic of animation. This does not mean that animated graphics are always superior to static graphics, the utilisation of animation should be considered on a case-by-case basis and as a result of user-testing. (Lowe, Pramono, 2006)

UI design

User interfaces are a mediator between a user and digital information. They are any medium by which a user interacts with a system or machine. Typical examples include websites, game interfaces and mobile phone interfaces. A number of guides exist to help designers develop effective user interfaces (Apple Human Interface Guidelines, 2009; Nielsen, 1994; Padilla, 2006)

Usability

Usability has already been said to broadly refer to how well a user can "use a product to achieve their goals and how satisfied they are with that process" (Usability website, n.d.). Usability is of particular importance in the areas of ICT (Information and Communication Technology) and the web as it is mainly concerned with the interaction of people with computers. When attention is not paid to the usability of a system the user's access to important information can be impeded, as such public information websites such as government, finance or health websites should be created using usability standards and principles which will be discussed later in the chapter.

Gould and Lewis (1985) identify three principles of designing for usability: early focus on users and tasks, empirical measurement, and iterative design. Iterative design is an important development methodology used in instructional design models, which involves a cycle of designing, testing and re-designing. These principles can be seen as relevant to any content developers looking to provide clear and accessible information and as such can be seen to complement any utilisation of the plain English guidelines.

Usability testing is carried out with the primary aim of verifying that the product meets expectations for "usefulness and satisfaction" (Armstrong, Brewer & Steinberg, 2002). Dumas and Redish (1994) outline the characteristics of usability testing:

- participants constitute real users
- participants carry out real tasks
- what participants do and say is observed and reported
- the data is analysed, real problems are diagnosed and changes are recommended to fix these problems.

This approach to testing can be shared by plain English practitioners and content developers alike.

Usability Background

As previously mentioned, usability comes from a Human Computer Interaction (HCI) background. Ben Shneiderman, founder of the Human Computer Interaction Laboratory, outlines some principles of HCI design which are relevant when designing content for computers and the web as they aim to target all web users, both novice and experienced. These principles include the need to strive for consistency; offer informative feedback; permit easy reversal of actions; and reduce short term memory load. (Shneiderman, 1998)

Usability can also be seen to be concerned with the principle of Interaction Design; and the concept of Universal Usability has since emerged as an important consideration in the design of information for the public.

- Interaction Design
    - Interaction Design involves designing interactive products or spaces to support the way people communicate and interact in their everyday and working lives. (Sharp, Rogers & Preece, 2007; Winograd, 1997) Interaction design is central to usability and incorporates the same fundamental idea of “user-centred design”,
- Universal Usability
    - Universal Usability, a term introduced by Shneiderman (1999), “refers to the question of how information and communications products and services can be designed so that they can be used by every citizen” (Waloszek, 2007).

User Centred Design Paradigm

User-centred design (UCD), as mentioned above, is an iterative process in which the needs, interests and limitations of the user dominate the planning, design and development of a

product (Norman & Draper, 1986; Karat, 1996). UCD, a principle of usability, acknowledges the importance of the user in the design process in order to create flexible, intuitive, usable interfaces. When designing content which will be viewed in a digital environment like the web, CD, etc. the way in which the user interacts with the content is key to their ability to access and understand the information. For example, if a user cannot navigate a website, or important information is not displayed clearly they may have difficulty in getting the information they need.

Overview of Current Usability Guidelines

- The US Government's Research Based Web Design and Usability Guidelines (Usability, 2006) cover design, optimisation, accessibility, usability testing, layout, navigation and writing web content.

- The European Commission defines web usability as "the measure of the quality of a users experience when interacting with a particular site. A site's usability affects both the physical and mental work users have to complete in order to reach and make the best use of the information contained in it."

These guidelines are quite similar in content as they all aim to incorporate the main usability principles as outlined above. Usability guidelines share a similar goal as plain English guidelines; that is, content should be clear and understandable and allow users to utilise information to achieve specific goals. This is of particular importance in terms of plain English and public information. Regardless of whether information is written in a clear manner, if a website does not have a clear path to that information the public could still be unable to access it.

Accessibility

Accessibility has become a fundamental aspect of design. In order to make a system or interface accessible and easier to use it should "decrease the effort needed to comprehend the information and provide a clear path through material that aids in skimming, quick reference and easy access" (Watzman, 2003, pp. 332).

Accessibility and Disability

Research suggests that accessibility measures benefit all people, regardless of ability (Paciello, 2000; Sloan, Heath, Hamilton, Kelly, Petrie & Phipps, 2006). By redefining the widely held definition of the user, "a much wider range of users can be accommodated without significant

extra effort" (Vanderheiden, 1992). From this perspective accessibility also as a common charter as the plain English guidelines. The Universal Design concept was introduced as a result of this research (Rose & Meyer, 2002).

The Universal Design Concept

The argument for universal design is that while traditional design was for average users, "average is by definition exclusionary, because the average user is a fictitious construct" (Bergman & Johnson, 1995). The concept aims to create products and information sources that all people can access and benefit from (Johnstone, 2003). The Centre for Universal Design (CUD) has outlined their principles of universal design:

- equitable use;
- flexibility in use;
- simple and intuitive;
- perceptible information;
- tolerance for error.

(Centre for Universal Design, 1997)

The third principle, "simple and intuitive" is of particular relevance to Plain English as it requires the design or content to be "easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level" (Centre for Universal Design, 1997; Bowe, 2000).

By applying principles of UD one can aim to produce content that is accessible to the widest possible range of users by communicating information effectively and minimising hazardous or inaccessible elements.

Accessibility Guidelines

The Web Accessibility Initiative (WAI) of the World Wide Web Consortium (WAI, 1997) developed a set of guidelines and checkpoints in an effort to ensure web content is accessible to all users. The US Government and the UK's Central Office (COI) of Information have adopted the WAI guidelines to be followed as standard for all government and public sector websites (WAI, 1997; Section 508, 1998).

Accessibility and usability guidelines offer real world benefits to all users by helping designers to produce clear, consistent content. By following accessibility guidelines, users with low literacy skills and those whose native language is different to that of the content have improved chances of retrieving information efficiently and effectively. From this perspective, a good understanding of accessibility and usability can help inform the decisions made by those wishing to utilise the plain English guidelines in their work.

Summary

The three main branches of pedagogical theory (behaviourism, cognitivism and constructivism) provide the designer with three approaches to developing content and well researched guidelines as to the application of these theories, depending on which approach is deemed best in a particular case (Ertmer & Newby, 1993).

Instructional design can be seen to have its theoretical foundations in pedagogy. The discipline offers the designer models with which to develop content. Instructional design also provides research-based guidelines as to the structure of text and images.

The underlying recommendation in all applications of instructional design models is that, decisions regarding the approach adopted and the subsequent structure and format of content need to be made on a case by case basis and should be subject to rigorous user testing.

This chapter is a review of research from the information design discipline which can be seen to inform any guidelines relating to typography, layout, colour, illustrations and other graphics.

In terms of typography, care needs to be taken with font type, size, style and colour. A layout can indicate hierarchies of meaning by how it chunks information and the use of blank space, headings, bullets etc. Colour can be used to attract attention as well as indicate the nature of the information. Illustrations and other graphics can help the user derive meaning from content, however user testing and an iterative development process are recommended.

The recommendation of user-testing appears in research in areas of pedagogy, instructional design, information design, usability and accessibility. It can therefore be seen to be advisable in the design and delivery of any information source which aims to make itself accessible to the greatest number of people and to optimise the information provided through effective information design and instructional design practices. It follows that any application of plain English guidelines should be made on an individual basis and be subject to iterative user testing.

HCI incorporates the idea that intuitive and consistent designs help to reduce cognitive load; shortcuts can be provided for experienced users while not impacting negatively on novice users; and error handling helps users and systems to recover from mistakes. User-centred design and interaction design are central to the concept of usability in that during the design and development process, the focus is continually placed on the user.

Accessibility measures benefit all people by making designs more flexible and intuitive. Universal Design aims to produce content for a wider audience by acknowledging that people differ in their interactions with systems and their comprehension of information. Most of the accessibility guidelines currently available are based on the guidelines set by the Web Accessibility Initiative. These guidelines offer conventions for three levels of accessibility, making it easier for designers to create accessible content.

Research into pedagogy, instructional design, information design, usability and accessibility can be seen to contribute to a theoretical framework in which to critique the plain English guidelines. The following chapter aims to offer a reflection and assessment on the current Plain English guidelines based on this theoretical framework.

A reassessment of existing plain English guidelines

Introduction

A number of recognised national and international bodies provide plain English guidelines for those wishing to make their publications more accessible to the general public (NALA, 2005; The Plain English Campaign, n.d.)

In an Irish context, the plain English guidelines provided by NALA (National Adult Literacy Agency, 2005) are as follows:

- Be personal
- Use active verbs
- Have an average of 15 to 20 words in each sentence
- Use everyday words and avoid jargon
- Avoid Latin and French expressions
- Define unfamiliar abbreviations and acronyms
- Remove unnecessary words and phrases
- Avoid nominalisations (nouns made from verbs)
- Be consistent with terms
- Break up dense text
- Make use of colour and graphics
- Space your lines and align your text
- Use a clear font and readable point size
- Use eye-friendly formatting

Using the theoretical framework introduced in the previous chapter, an assessment of these guidelines is offered below.

Be Personal

Mayer outlines the benefits of the personalisation principle, i.e. people learn better when information is presented in a conversational style. (Mayer, 2005) Whether printed or in audio format, information presented informally lends itself well for pedagogical and broad communication purposes by virtue of engaging learners and improving the chances of it being retained and recalled. The personalisation principle is consistent with cognitive theories of learning as it helps in creating a sense of dialogue and facilitates the sort of cognitive processing this implies. Reeves and Nass (1996, cited in Clark & Mayer 2003, pp 136), note that people understand material at a higher rate when they feel they are in conversation with a partner, as the experience "resembles human-to-human conversation" (Clark & Mayer, 2003, pp 134). It could also be argued that this guideline articulates well with the tenets of social constructivism, an expansion of constructivism whereby learning is seen as a social-determined process. The creation of a sense of dialogue by means of the personalisation principle in this context may help to ensure a deeper processing of the information and approximate a socially-mediated knowledge construction process.

Methods for achieving more personalised content include using first and second person pronouns such as I, we and you.

Use active verbs

Wright (1979) notes that the use of passive verbs, also known as the passive voice, can cause comprehension difficulties. One of the problems with using the passive voice is that agents are often removed from the text, putting a strain on the cognitive load as the reader must try to decipher the meaning of the sentence from other cues in the overall context. By using the active voice instead, especially when including an agent (LoMaglio & Robinson, 1985), it is possible to enhance a person's reading comprehension by making the sentence clearer (Abrahamsen & Shelton, 1989). While using the active voice results in longer sentences generally these are easier to interpret: as Charrow (1979) notes, it is the complexity of a sentence rather that its length which reduces its readability, however the following guidelines should also be noted.

Have an average of 15 to 20 words in each sentence

Cognitive load theory states that the working memory can only process so much information at a time. This is the reason behind the effectiveness of "chunking" information into more digestible units. What may be classed as a digestible unit varies from individual to individual and case by case based on a number of variables. For instance if the user is already advanced in their knowledge, over-simplification can lead to them underestimating the relevance of the

information to them, and so they can miss out on new, important information. Ideally then, user testing should be undertaken on a case by case basis is necessary.

Studies have shown that reducing a sentence's length by removing linguistic connectives (such as "because", "and", etc) can be detrimental to learning as it increases cognitive load, in terms of forcing the user to make the connections themselves (Kamalski, Sanders, Lentz, 2008; Martins, Kigiel, Jhean-Larose, 2006). This also serves as a caution against following the guideline regimentally and reinforces the need for user testing.

As previously stated, studies do not indicate any standard sentence length. Optimum sentence length is dependant on a number of different factors in each case, including content being addressed, complexity of language used, individual cognitive differences and ability to chunk information. User-testing and an iterative content development process are advisable in order to determine optimum sentence length in each circumstance.

Use everyday words and avoid jargon

The use of jargon is generally unnecessary and impedes the communication of information by confusing and sometimes misleading a reader. If a reader does not know the meaning of a word or phrase it can cause them trouble when trying to understand the sentence, or the entire context of the information (Wright, 1979). Including explicit cues to the meaning of a sentence when using jargon can increase a reader's chance of interpreting the information correctly, but may in turn, force the reader to rely heavily on their working memory.

Stahl and Jacobson (1986) note that the difficulty of the vocabulary used can affect the reader's comprehension of information.

Assessing this guideline in the context of schema theory would also indicate that using everyday words is beneficial. If information does not easily coincide with the learners existing schema, that is, their previous knowledge of the subject, the learner will have more difficulty understanding the new information, and runs the risk of rejecting it altogether. Using unfamiliar words unnecessarily increases the risk of this happening.

Avoid Latin and French expressions

This guideline is related to the guidelines, *Use everyday words and avoid jargon* and *Define unfamiliar abbreviations and acronyms*. Public information should be understandable for all, including those with low literacy skills and those who do not have English as a first language. To reduce the impact on cognitive load, these phrases should be replaced by their common everyday English equivalents. While consequently lengthening the sentence, the replacement of

these phrases increases the readability of the information and the reader's chance of making sense of the content (Charrow, 1979).

The same argument regarding correlating information to the users existing schema as much as possible can be seen to be applicable here, unnecessarily clouding the information with expressions foreign to the learner should be avoided so as not to further remove the information from existing schemata.

Define unfamiliar abbreviations and acronyms

By defining abbreviations and acronyms, as with removing jargon in the guideline, *Use everyday words and avoid jargon,* the writer does not exclude or present a cognitive load for readers who are unfamiliar with the meaning of such terms. Defining these phrases also prevents possible ambiguity where the same acronym could stand for more than one term. Abbreviations should be used sparingly in order to maximise clarity. Confusion occurs when the abbreviated word is used infrequently in the remaining document or the reference to the term changes between full and abbreviated (Smith & Bernhardt, 1997). This puts extra pressure on the working memory to recall the term and increases overall processing time.

Again, this guideline can be seen to have it's foundations in cognitive theory, in terms of minimising working memory load. It can also be seen to be related to schema theory for the same reasons as previous guidelines relating to jargon and foreign language expressions.

Remove unnecessary words and phrases

This guideline can be seen to be related to the previous *Have an average of 15 to 20 words in each sentence*. The logic again relates to cognitive load theory as well as to component display theory and elaboration theory. All of these theories pertain, at base, to chunking information in order to optimise their assimilation by the user. A cautionary note, however again needs to be added: there is a balance the designer must strike between minimal writing and over-simplification. If the information is over-simplified it runs the risk of losing meaning, losing perceived importance and actually adding to the cognitive load (the load placed on working memory during the learning process) of the user and increasing processing time (Schnotz, Bannert, 2003; Houts, Doak, Doak, Loscalzo, 2006; Schumacher, 2007).

Avoid nominalisations (nouns made from verbs)

Research conducted by Wright (1985) shows that readers find nominalisations slower and more difficult to comprehend than verbs and their use is discouraged. Nominalised sentences lend an ambiguity to information and tend to be longer and more difficult to follow and process.

Readers are inclined to process verbs easier and a study by Haberlandt and Graesser (1989) shows that reading times of nouns is higher than those of verbs. When a reader can process and understand a sentence quickly it puts less strain on their working memory.

Be consistent with terms

For the purpose of clarity in information it is best to keep terms consistent. While there is a tendency to try to avoid using the same term continuously in a document, by repeating the term when referring to the same thing throughout the text, a clear reference is made. The reader avoids becoming confused by trying to figure out if synonyms refer to the same thing and as such, there is less impact on cognitive load for the reader.

Break up dense text

Extensive research has been carried out in the area of instructional design into sequencing and chunking of information.

Studies have found that individuals are likely to reject a text out of hand if it is presented as a solid block, as opposed to carefully broken up using, for example, headers, blank space and bullets.

It is generally deemed best policy to carefully break down bodies of text into more digestible chunks. This facilitates the reduction of cognitive load. If the text is chunked into sections that are easily handled by the working memory of the user, the effort needed to understand and digest the information is lessened. The different pedagogies of learning provide guidelines as to how and when to chunk text (Ertmer & Newby, 1997; Van Patten, Chao, Reigeluth, 1986).

User testing should be employed to approximate what is an effective chunk of information in each particular case.

Make use of colour and graphics

Studies into the use of colour and graphics abound in the fields of instructional design, document design and information design. Across these disciplines practitioners and researchers

alike appear to be broadly agreed that proper use of colour and graphics does indeed enhance the assimilation of information and the correct application of that information in new contexts.

As outlined in the *Theoretical Framework* chapter, a number of research-based principles and heuristics exist as to when to use colour and how to effectively use graphics (Wright, 1979; Frascara, Ruecker, 2007; Mayer, 2001; Mayer, Moreno, 2002), for example the Mayer/Moreno principles of multiple representation, contiguity, coherence, modality and redundancy. Again user-testing is emphasised: for instance, if the users are unfamiliar with the style of graphics, or the graphical content, the graphics may work increase the user's cognitive load (Schnotz, Bannert, 2003; Houts, Doak, Doak, Loscalzo, 2006; Schumacher, 2007).

Designers also have the option to use graphics, not as an accompaniment to text, but as a replacement for the text itself. Some empirical research has been conducted into the use of flowcharts and graphs in this regard (Holland, Rose, 1981; Jansen, Steehouder 1984; Wright 1982); findings indicate that while in some cases this form of conveying information works very well, there need to be instructions as to how to interpret the graphics in the case of users who may not be familiar with that format.

Edward Tufte, a noted author in the field of information graphics warns against any prescriptive application of guidelines pertaining to their usage. User-testing is again advised in the development and application of such graphics.

Research indicates that graphics combined with text can help the learner create mental models to facilitate the assimilation of this new information. These results further argue the case for including relevant, well developed and tested graphics in content.

Space your lines and align your text

With regard to this guideline, research indicates that the spacing and layout of information can assist in the cognitive processes of the user in that it can signal the hierarchy of information (Schriver, 1997).

Studies have shown that when information is well spaced, it can increase legibility, users are better equipped to correctly interpret the information given to them and can make successful choices based on that information (Lonsdale, 2007).

If the layout of the information is over-crowded, this can lead to a cognitive overload, again increasing the processing time for the user (Halber, 2007).

In terms of alignment, it is generally considered best practice to align the main text to the left (Lonsdale et al. 2006). Research has indicated that people read unjustified text more quickly than text where the right hand side has been aligned vertically. However, it is interesting to

note that the research sometimes arrives at conflicting results. A study by Kempson and Moore (1994) found that adult readers of public documents read text more quickly when it was justified at both margins

Again, an iterative design process and user-testing is recommended to determine how best to format lines and text in each individual circumstance.

Use a clear font and readable point size

Font type, size and style all impact on legibility and influence the users perception of information hierarchy.

Empirical research has indicated that individuals partaking in studies found lowercase typefaces are easier to read. In terms of the font face, the type chosen can influence the user's perception of the meaning of the information. Cases where the typeface did not reflect the tone of the information led to confusion among users (Lewis, Walker. 1989). To use the previous example, it is unadvisable to use a casual or overly decorative font face (such as comic sans, or giddyup) when dealing with very serious content. The use of a casual or childlike font face implies the content is of an informal and light nature. These perceptions relating to the characteristics of typeface could possibly relate to an individuals prior experience.

It is worth noting that the ideal size for body text was found to be between 6 and 12 points (Wright, 1979). This research relays the results without offering any premise as to why the optimum font size was between 6 and 12 points.

Again, the importance of user testing at every stage of the design cycle needs to be emphasised.

Use eye-friendly formatting

Developing careful and considered formatting, in terms of time spent examining and testing the formatting, and use of blank space has been shown to aid in attracting the attention of users (Nova Research Ltd 1986)

Studies have shown that the layout and spacing of information can influence what meaning the user derives from the text, as well as influencing what level of importance the user attributes to each section of information (Tourangeau, Couper, Conrad, 2003).

Redish (2007) notes that underlining important information for emphasis is not recommended as it can make reading a slower process in print and can be confused for hyperlinks when the information is displayed on the web.

Again, it is important to stress the need for user-testing. What may work effectively in one context may not work in another.

Recommendations

A move towards more cognitive and indeed constructivist approaches to designing information have led to calls for a new paradigm of instructional design, moving away from standardised development of information to customised development, and orientating the learning around the learner (Reigeluth, 1997).

There follows a list of possible additions and caveats to the guidelines. These arise from the *theoretical framework* chapter and follow from that review of relevant academic sources pertaining to effective content design and development. The following is not a further set of guidelines as such, but recommendations as to directions further guidelines may take. A number of media are addressed, beginning with print, then working on to audiovisual materials, ICT-related content and the World Wide Web. The thought is that each successive media subsumes, as it were, the principles for the media before it while also bringing with it a need for new principles and guidelines, for example, much that can be said with regard to the effective structuring of text for print-based sources applies to the web, but the web is also an interactive medium and can support moving image, animation and so on. This indicates a requirement for further guidelines with regard to these affordances.

Print

Effective structure of text

Poor readers can be unaware of the structure of a text and this can impact on their ability to understand the content (Crandall, 1985; Horwitz, 1985). Layout, typography and colour can all help signal out and cue this structure. For simpler texts, structuring along the lines of "issue – discussion – action" is recommended, as is the avoidance of narration (James, 2007). Effective use of headings has also been found to greatly help indicate structure and guide the user (Stark, 1988; Wright, 1979)

Writing style

Continuity in writing style is advised. Users will better understand content if the concepts, tone and choice of words remain constant throughout the piece. It is useful in some situations to use linguistic connectors, such as "and", "because" and "therefore", to facilitate an unbroken thought process and allow for the user to make connections between points of information (Sanders, Land, Mulder, 2007).

Reducing bias in the language

The guidelines would also benefit from specifying strategies to reduce bias in writing, and as such increase perceived relevance. As mentioned in chapter four, the guidelines could explicitly provide methods to avoid bias in terms of gender, sexual orientation, racial and ethnic identity, disabilities and age. Ways to do this include carefully choosing words that are accurate when referring to a person or persons; for example, "they" or "them" should be used rather than "him" or "her". It is also important to keep informed as to the current preferences people have in terms of designations, or labels.

Structure of forms

Some research has been undertaken into how people navigate forms. It has been found that people will read only what they think they have to read to complete the form. There is a tendency to miss important information when routing instructions are not read or understood. The reason for this was found to be a discrepancy between routing instructions and the structure of the text as signalled by typographic elements (Frolich, 1986). Routing instructions that inform the user as to the importance and relevance of each section should correspond to the structure hierarchy as signalled by typography and layout (in terms of headings and white space). It may be beneficial to develop a guideline stating this.

Including questions and answers can be beneficial in engaging the user and also to break up information.

Wright (1981) reviewed the theory underlying form design relating to overall structure, legibility, questions and answers and adjuncts to the text. Wright developed a heuristic for form design based on this review, again advocating a cyclical evaluation and editing process.

Typography

A guideline relating to typography could advise care when choosing a font face. As previously outlined, if a casual tone is appropriate, the typeface may also be casual, a font such as *Bitstream Bell Centennial*, developed for use in telephone books, is appropriate when dealing with letters and numbers, if the tone is serious, a formal type face such as Helvetica or Times would reflect this.

Colour

While the guidelines do advise making use of colour, they would benefit from some enlargement of this. Colour has been shown to indicate structure and hierarchies of information, as well has making documents generally more attractive. Sharp contrast can be recommended if the content developer wants to attract the attention of the user to certain areas of the content.

Graphics and illustrations

The guidelines do advise the use of illustrations where appropriate. As detailed in the *Theoretical Framework* chapter, research into educational psychology has provided a number of guidelines (such as the Mayer/Moreno principles) for the inclusion of illustrations to text.

- Related text and pictures should be presented together.
- Redundancy, in terms of the inclusion of unnecessary graphics, should be avoided.
- Graphics that are included should be carefully assessed to avoid including irrelevant information, or indeed omitting crucial information.
- Instruction on the link between graphical and textual content should be provided.

These findings inform the guideline pertaining to the use of illustrations. It is recommended that the guideline be enlarged to accommodate these findings.

It may also be beneficial to include a guideline pertaining to iconography and symbolism in documents. Icons and symbols can be used to guide users through information a denote structure.

There is some research into the area of cultural differences in the perception of images. Where people come from seems to affect their understanding of certain types of graphics (Houts, Doak, Doak, Loscalzo, (2006). For example, there is some research to suggest that people from less developed and more rural communities dislike straight lines and shapes, whereas people from more industrialized communities tend to be attracted to straight lines and shapes (Pettersson, 1982). Based on this research it is recommended that a guideline pertaining to awareness of cultural issues and rigorous user-testing to adjust for cultural differences be included in a list of guidelines for the development of effective information sources.

Displaying Data

The guidelines as they are do not include recommendations for the utilization of graphical data displays over textual representation of data. However, communicating data in text is not always the most efficient or accessible approach. Empirical research shows that data displays are sometimes processed more quickly by the user (Holland, Rose, 1981). Following *Dual Coding* theory, the inclusion of a visual representation of information can enable more cognitive strategies for processing that information. Two channels (for graphics and text) are being engaged, thus offering the learner more opportunity to effectively assimilate the information. Data displays should be designed with the reader in mind. Place items that have to be compared next to each other and clearly label the different elements of the display. It is necessary to include explanatory notes in case the user is not familiar with the format. All the information needed to understand the graphic should be included and extraneous detail should be avoided.

Layout

Blank space has been shown to help facilitate a user's correct interpretation of a text (Nova Research Ltd 1986; Lonsdale, 2007). It may benefit the guidelines to include a recommendation to incorporate blank space into content layout.

The layout should facilitate skimming, quick reference and easy access, thereby making a text more accessible (Watzman, 2003, pp.332).

Testing and revising print documents

Research indicates that any set of guidelines as to how to more effectively design content should include the caveat that iterative user testing is the most effective tool in producing accessible and usable information sources. While the guidelines are based in learning theories and research results, they need to be evaluated case-by-case. Preferably content will always undergo a cyclical testing process whereby the suitability and effectiveness of any particular guideline will be assessed on an individual and contextualised basis.

Audiovisual

Guidelines recommended for print media are also applicable to audiovisual media but extra considerations need to be made in this area in terms of applying existing and proposed guidelines. Information that is available on radio, television or film is static and cannot be

interacted with by the user. Broadcasters use text and image combinations as in the print medium while also incorporating audio and animation in order to portray a message.

Audio

Instructional design research has also produced results that are relevant to broadcast information. Mayer and Moreno (2002) found that including narrated information is better than static, on-screen text if possible and that when presented in conversational style, has greater impact for the user. This idea incorporates the personalisation principle (Mayer, 2005) whereby it is easier to absorb information presented in this way, rather than a very formal style. This has implications for radio and television scripts.

In addition, on-screen text becomes redundant when the narration repeats the printed information exactly.

Graphics

When creating content for television or radio, one must remember that these media are transient and information cannot be repeated straight away (Fiske & Hartley, 1989). While this is an important factor for information designers to consider when creating content, considerations from the areas of visual literacy and the contiguity principle (i.e. presenting words and graphics close together) should also be incorporated, for example the use of symbols, images or sounds that are clear, relevant and appropriate.

Animation

Television has extra allowances for information dissemination. The addition of moving picture, be it animation or film, can be an attractive element of informative content. However, studies have shown that animated graphics are not always superior to static graphics (Lowe, Pramono, 2006). Any guideline pertaining to the use of animation or film should include this caveat. Again user-testing is advised.

ICT

Much of the above information can also be applied to information and communication technologies such as computer, mobile and game content. Content created for ICT has benefits in the fact that it can be interactive. Users can not only have information presented in a

combination of audio, text, graphic and animation but can also pause and rewind the information lending more control to their learning.

CD/DVD

Content designed for CD or DVDs have the advantage of being able to hold larger file sizes so multimedia presentations of audio, graphics, text and animations can be used effectively. Designers should create content for this medium by applying style and usability guidelines that are used in web design. Font styles, colours and layouts that are typically used in print need to be optimised for readability and usability on screens with a lower resolution than in print.

Mobile content

Web usability and accessibility guidelines have always been beneficial in the design of content for mobile devices and with continued improvements in technology, the new generation of mobile devices provide better internet access. Content designed for the web should be presented in a manner that allows for easy scanning of information. Older mobile devices have limited display capabilities in terms of images, animations and layout.

Fonts used in mobile content design should be lightweight and scalable to suit a variety of mobile screens. Text should be arranged into chunks and hyperlinks included to maximise space and prevent excessive scrolling.

Game based content

Gee (2003) notes that, in relation to game based content, good games often incorporate good literacy practices and cognitivist theories. Information such as that which is usually found in manuals is spread throughout the game and supplied when needed to reduce the impact on the user's cognitive load. This is often done by supplying context related hints, help options or brief, concise tutorials before levels, as seen in many Nintendo Wii games. "People are quite poor at understanding and remembering information they have received out of context or too long before they can make use of it" (Gee, 2003, pp 2).

Web content

Guidelines should also take into account the design of information that is available on the internet. Cognitive overload can be an issue for people reading online content as due to the

non-linear and often complex structure of most of the sources readers must both understand and navigate the information (Conklin, 1987).

Web

Navigation

Spyridakis, et al. (2007) outline some methods of helping to lessen a reader's disorientation as such reducing the impact on their cognitive load resulting in more positive comprehension of online information. These methods include providing clearer and more explicit navigational links to improve information retrieval and search accuracy (Spool, 1999; Spyridakis, 2000; Lee et al., 1984; Dumais & Landauer, 1983); including textual previews (Cress & Knabel, 2003); and structural cues (Potelle & Rouet, 2003). Content creators should avoid emphasising information by underlining text as this can be confused with hyperlinks.

Layout

As with print information, chunking content on the web into more manageable sections makes it easier for people to process. Users scan text for the information they need and due to the amount of content on the web, considerations must made when laying out the text. Some of these considerations include using bulleted lists, layering information and providing summaries.

Centred text is more difficult to read on the web as the reader has to move back their eye to the start of each sentence which is different every time (Redish, 2007).

Consistency

As outlined in the *theoretical framework* chapter, by making something accessible it holds benefits for all people and as such, elements of the Web Accessibility Initiative's web accessibility guidelines should be considered in terms of aiding the improvement of media literacy. Consistency in navigation and layout is important to guide the reader through the information and for the acquisition and retention of information (Polson, 1988). The consistency refers to the visual presentation, the language, layout of objects, and behaviour of links and interactive content which should remain the same throughout a site.

Communication and Collaboration

New literacies include a focus on social skills which can be taught through the collaborative environment that is the web. Media literacy and information literacy acknowledge the ability to read and write, to communicate, collaborate and to understand information presented using graphics, text, audio, video, etc.

Conclusion

As mentioned earlier, NALA defines literacy as involving the "integration of listening, speaking, reading, writing and numeracy". The definition also goes on to include developmental aspects such as "social, economic, emotional", factors associated with "improving self-esteem and building confidence". Dubin and Kuhlman (1992) refer to a changing definition of literacy, whereby it is now applied to a range of other skills and competencies, beyond the traditional, to denote a particular competence in certain domains, for example "computer literacy". Such uses of the term also imply of course a certain role these literacies play in society and in our lived experiences of the societies in which we find ourselves. The change can be traced through from the UN's original definition of literacy which referred strongly to a level of understanding necessary to be considered literate and their current view which, along with UNESCO and the US National Institute for Literacy, approves a definition related to the level of competence required to function effectively in work or the community (UNESCO, n.d.).

The guidelines in a modern context

The Plain English guidelines appear largely to arise from a more traditional view of literacy and deal almost exclusively with the design of textual information but in the context outlined above, the guidelines may need to take into account other literacies, most notably, media literacy and visual literacy. The Ofcom definition of media literacy suggests it is the ability to "access, understand and create communications in a variety of contexts". Visual literacy is defined by Debes (1969, as cited in Avgerinou & Ericson, 1997) as visual competencies developed by people that enable them to "discriminate and interpret visible actions, objects, symbols," that they encounter in their environment and as a result enable them to communicate. This modern approach to literacy has implications for the plain English guidelines and suggests a need to augment and expand the existing guidelines based on a sound theoretical framework as outlined in previous chapters.

The document design tradition has brought forward studies that question the value of guidelines. It has been claimed that there are exceptions to every rule; that a lack of specific knowledge may not be remedied by written guidelines; and that generally accepted guidelines are regularly broken even in good writing. Research indicates that theory and guidelines often need to be modified and adapted according to the context (Yanchar, South, Williams, 2007). User-testing and the use of heuristic evaluations is advocated for all steps of the design process, during the users interaction with the information and changes in the user's behaviour after assimilation of the information (Kempson & Moore, 1994). Advocating user-testing at all stages of the design process is also part of both instructional design and information design traditions, this would indicate that the application of guidelines is subject to user-testing in the development of any successful, accessible information sources.

The initial Plain English guidelines which derive largely from the document design tradition bring with them a concentration on layout and design of textual, print information. As has been documented in previous chapters however research carried out in the fields of design, cognitive psychology and educational psychology may profitably be drawn on to expand and deepen the applicability of the guidelines as outlined in the reassessment and recommendations chapters.

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