Writing for mobile media

The influences of text, digital design and psychological characteristics on the cognitive load of the mobile user

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DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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ABSTRACT

Text elements on the mobile smartphone interface make a significant contribution to the user's interaction experience. In combination with other visual design features, these words curate the path of the mobile user on a journey through the information to satisfy a specific task. This study analyses the elements that influence the interpretation process and optimum presentation of information on mobile media. I argue that effective digital writing contributes to reducing the cognitive load experienced by the mobile user. The central discussion focuses on the writing of text for this medium, which I suggest forges an entirely unique narrative. The optimum writing approach is based on the multi-dimensional characteristics of hypertext, which allow the writer to facilitate the journey without the user losing control of the interpretation process. This study examines the relationship between the writer, the reader and the text, with a unique perspective on the mobile media writer, who is tasked with achieving balance between the functionality and humanity of digital interaction. To explore influences on the development of the relevant writing techniques, I present insights into the distinctive characteristics of the mobile smartphone device, with specific focus on the screen and keyboard. I also discuss the unique characteristics of the mobile user and show how the visual design of the interface is integral to the writing of text for this medium. Furthermore, this study explores the role, skills, and processes of the current and future digital writer, within the backdrop of incessant technological advancement and revolutionary changes in human-computer behaviour.

CHAPTER ONE: INTRODUCTION

People in modern-day society intuitively interact with a range of different media[1] as an integral part of their everyday activities. They watch television, listen to the radio, read magazines, glance at billboard posters, click on websites, scroll through mobile apps, or tap out a friendly text message with two well-practiced thumbs. Each of these media channels is characterised by a specific interactive relationship with the user and satisfies a range of different objectives, incorporating elements of entertainment, social communication and the foraging of information to achieve a specific task (May & Hearn, 2005; Pirolli & Card, 1999).

The mobile phone as a communication medium, however, exhibits a particularly unique range of interactive characteristics and user behaviours (Oksman, 2010). The relationship people share with their smartphones reflects behaviours unlike those associated with other media channels and are characterised by a more personal attachment (Miller, 2015). There is even a recognised form of anxiety associated with the inability to access a mobile phone, referred to as "nomophobia" (King *et al*, 2013). The mobile phone is now established as an "information medium" (May & Hearn 2005:196) and offers a range of functions and capabilities that expands the dimensions of usage beyond conventional communication, evolving into a "pervasive multimedia device" (Oksman, 2010:5). Furthermore, it could be argued that no other single gadget presents such a "convergence of technologies", combining communication tools with games, videos, photography, clocks, calculators and payment facilities (Gordon, 2002:16). The mobile phone is given additional meaning by the user as it assists in accomplishing goals and achieving tasks (Miller, 2015:10). However, the fascinating multi-faceted personality of the mobile smartphone also presents a contrasting usage pattern, which involves "staving off boredom", killing productivity and filling downtime with distraction (Clarke, 2010:37); characterised by the typical head-bent, thumb-typing occupants of a long queue or waiting room.

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[1] Media can be defined as communication channels through which news, entertainment, education, data, or promotional messages are disseminated. It includes newspapers, magazines, TV, radio, billboards, direct mail and the Internet. Media is the plural of medium and both these terms are used throughout this thesis (Business Dictionary, n.d).

The current global surge in mobile phone usage[2], the influential shifts in user behaviour and prevailing "mobile-first"[3] trend in the field of media communication highlight the importance of on-going research in this field. Mobile phones now even influence the way people interact with other media channels, as the ubiquity of the device transforms engagement with traditional media. The influence of mobile also extends to the presentation of information, demonstrated by a trend in web design know as "appification"[4] (Benham, 2012; O'Brien *et al*, 2016).

In this thesis I explore the cognitive effort experienced by the mobile user in the interpretation of information on mobile phones. I argue that the presentation of content and information on mobile smartphones, particularly the written text, influences the cognitive load experienced by the user to satisfy a specific task. This research contributes to the existing theoretical knowledge of cognitive load theory (CLT) and builds on the principles of Fred Paas and John Sweller (Paas *et al*, 1998; Sweller, 1988, 1994; Sweller *et al*, 1998; van Merriënboer, 2005). However, rather than focusing on educational information design and learning material, I relate this theory to the presentation of information on the mobile phone, which I believe presents an original context of analysis for CLT. This research proposes that specific textual factors influence the cognitive effort associated with reading content on a mobile phone. I suggest that the user experience (UX) can be simplified and optimised when the mobile writer possesses an in-depth understanding of mobile interface design and the unique behaviour of the mobile user. The primary type of qualitative methodology for this study is descriptive-interpretative research. This thesis interprets theories from three core topics in the overall presentation of this argument: design, user behaviour and the relationship of the writer and the reader.

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[2] The number of mobile phone users in the world is expected to pass the five billion mark by 2019. In 2017, an estimated 63,5% of the population worldwide owned a mobile phone with 2.7 million smartphone users (https://www.statista.com/statistics/274774/forecast-of-mobile-phone-users-worldwide/).

[3] "Mobile-first" is a term coined by Eric Schmidt, CEO of Google in 2010. It is an approach to digital design, UX and development that puts smartphone devices at the forefront of strategy and implementation rather than desktop web or any other device (Longo, 2012).

[4] "Appification" represents the shift from web-based platforms to mobile apps as the new underlying user interface. Apps "package and define digital media…and engender new kinds of literate engagement and new competencies" (O'Brien *et al*, 2016; Leu *et al*, 2017).

Characteristics of mobile phones and mobile usage

During the last decade there have been significant shifts in the user's engagement with digital technology, most notably the proliferation of mobile phone usage (Arif *et al*, 2016; Gevelber, 2017; Consumer behaviour changing mobile, 2017). Chapter 4 contextualises and situates this research by presenting evidence of this usage growth, globally as well as in South Africa, which demonstrates the importance of mobile as a medium in the current digital communication context. Chapter 4 also discusses the unique physical characteristics of mobile as a medium and the challenges these factors impose on the mobile user.

The features of the physical device and interface elements logically affect the approach to information presentation as content is harder to read and slower on a mobile phone than on a computer (Meyer, 2015). The smaller screen directly influences the brevity of content, as well as the presentation of the text, such as size of type (Budiu, 2018). The practical user interaction with the device is also unique, characterised by the smaller keyboard, thumb typing, pinching, scrolling and swiping actions, and taps to link buttons (Kostromins, 2014). I maintain these practical features play a core role in the way the text should be written, as the content cannot be isolated from the interactive context, unlike the writer of a book who is governed by the predictability of the page.

Mobile user behaviour

Chapter 5 examines the unique psychological patterns and expectations of the mobile user, and the impact it has on the interaction experience. I explore the correlation between the interaction with a mobile phone, and the levels of cognitive load experienced by the user in the process of interpreting information. The principles of CLT form one of the core theoretical foundations for my research argument, that the optimum approach to writing text can reduce the mental effort experienced by the user. Analysis of this theory demonstrates that the methodology of presentation has a significant influence on the extraneous cognitive load of the user. By facilitating the construction of schema, the number of elements that need to be processed by the working memory is reduced (Oviatt *et al*, 2004; Sweller, 1994).

The principles of user-centred design (UCD) [5] also illustrate the connection between user psychology and information presentation. By understanding the user's expectations, the designer and writer gain insights into the content and timing of information that is delivered at each stage in the user journey. This process makes the perception of the task more "fluent" for the user as elements of familiarity are included, simplifying the interaction and consequently freeing up mental resources for comprehension and reflection (Oviatt, 2006; Roller, 2011).

The typically distracted mobile user presents a unique range of characteristics, with a strong emphasis on task-orientated interaction, as people primarily use smartphones to accomplish goals. The mobile user experiences a range of "micro-moments" with every interaction, and each is associated with a level of expectation (Gevelber, 2017). These expectations can be predetermined by developing a strategy based on the objective of the mobile app or website (Garrett, 2010). It is integral to my research argument that the writer is involved in this planning process from the initial stages of the design process, as the text plays a fundamental role in *designing* the user experience.

As technology continues to advance, web and mobile users become more technologically mature [6] and consequently more proficient at interacting with these channels, which also impacts the way in which information is processed (Cooper *et al*, 2007; Smith, 2010). When users gain confidence they expect to be able to find information or complete a task without having to work too hard. This theory forms the premise of the book on usability by influential UX specialist Steve Krug, titled *Don't make me think* (Krug, 2005). Assumptions of navigational proficiency can be made to reflect these shifts in competency, such as minimised graphic interfaces. I use the example of the three-lined navigation icon known as a "hamburger" to illustrate this point. This icon has now become a familiar non-verbal symbol of a menu button that assumes the user has an understanding of its representation without explanation (Pernice & Budiu, 2016; Stokel-Walker, 2015).

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[5] User-centred design (UCD) is a concept introduced by Donald Norman in 1988 that places the needs of the user first in product development. This theory is discussed in detail in Chapter 5.

[6] User "maturity" in this context refers to the level of skills and experience with technology, rather than an age-related demographic. Mobile is a core component in the lives of mature users, satisfying multi-faceted expectations that extend beyond the ability to make a call (Gevelber, 2017).

A fundamental principle of effective digital and traditional communication involves insightful knowledge of a relevant audience. Advertising practitioners execute extensive research on brand target markets, and web designers create detailed digital personas before any content is produced (Sullivan & Boche, 2016; Felton, 2013; Redish, 2014). My research, however, extends this analysis to the user's relationship with the actual *medium* of communication. I propose that an understanding of the mobile phone user's unique behavioural patterns is integral to reducing cognitive load during interaction.

The role of digital design

Although the primary focus of this thesis is on *writing* for mobile phones, the text on digital media cannot be analysed in isolation, because the words are most often presented in synergy with visual elements, such as illustrations, graphic icons or photographs (Buchanan, 1990, 1992; Laurel & Mountford, 1990; Preece *et al*, 2002). As a result, the writer requires an understanding of digital design principles to develop content that effectively dovetails with the shape of the presentation space. Chapter 6 discusses the principles of design associated with the visual presentation of information on the mobile interface. I argue that the design of words and images makes a direct contribution to the interpretation of information and consequently influences the cognitive load of the user. In Chapter 6, I also discuss the role of design elements such as graphic icons, and apply some aspects from the theories of semiotics and signs to the interpretation of meaning in the context of mobile media (de Saussure, 1974; Eco, 1976; Peirce, 1974, 1992, 2006).

The principles of writing for mobile media

Chapter 7 discusses the central topic of this thesis, on writing techniques for mobile media. I examine the theories of hypertext writing, with a focus on the ordering of information and the unique categorical narrative experienced by the digital reader. Although the theories of George Landow and Jay Bolter primarily focus on literature, websites, and educational hypermedia, I suggest there are several similarities between the readers of classic literary works and modern digital users. Many of the principles of hypertext theory are therefore also relevant to the presentation of information on *mobile* interfaces (Bolter, 1991, 2001; Delaney & Landow, 1991; Landow, 1992, 2006). Furthermore, I apply the theories of reader-response, linguistic analysis, and literary criticism to explore the relationship between the writer, the

reader, and the text [7] in the interpretation of meaning (Barthes, 1975; Derrida, 1987; de Saussure, 1974; de Saussure *et al*, 2006, 1993; Eco, 1976; Rosenblatt, 1978, 1988). These theories provide a useful segue to the practical principles of digital writing, such as headlines, formatting and hierarchy. I make reference to Jakob Nielsen and Donald Norman from the Nielsen Norman Group on the topics of product design, navigation, UX and usability. I apply their research more explicitly to the context of mobile as a medium, in order to develop writing techniques that contribute to a rewarding mobile user experience (Nielsen, 1995, 1996, 1997, 1999, 2000, 2004, 2006, 2009, 2007, 2011; Norman, 1988, 1999; Norman *et al*, 1986).

Another significant influencing factor on effective information presentation is the actual *process* involved in writing text for mobile media. I therefore analyse the role of the specialist UX writer within the development of content for mobile media. I acknowledge that there is significant overlap in the roles of the writer, designer and developer within this "information space", and concur with Dillon that these relationships should be understood to create a constructive collaboration and integration of skills (Dillon 2015:65). In support of this aspect to my research, and presented as an appendix to this thesis, I conducted several semi-structured interviews [8] with relevant industry role players in Cape Town to determine the current approach applied to writing for mobile media. My questions probed the typical processes that are practised by design teams in the development of content for mobile media, with a specific focus on the writer and the cross-functional integration of specialist skills. The findings of these interviews support the original inspiration for this research regarding the paucity of specialist knowledge in this area of digital communication and human-computer interaction (HCI).[9] Although these findings are not core to the central argument in this thesis, I believe they provide valuable context and present an opportunity for further discussion on the unique criteria and characteristics of the writer for mobile as a medium. The writer who possesses an

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[7] There are many definitions of the "text", as it could refer to a single word such as "slow" on a road sign. It is described as "a stretch of language, either in speech or in writing, that is semantically and pragmatically coherent in its real-world context". Or linguistically text is defined as "any unchangeable sequence of sentences, which has a strong cohesion" (Pavel, 1980:7,19; Carter & McCarthy, 2006).

[8] The semi-structured interview is a method of gathering focused information that follows a general script with a set of topics but remains flexible and open-ended (Bernard, 2000).

[9] HCI can be described as an interdisciplinary field of study that is concerned with the "design, evaluation and implementation of interactive computer systems for human use" (Preece *et al,* 2002:8)

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understanding of HCI is becoming increasingly important in the context of designing meaningful user experiences on various digital touch-points (Berkery, 2018; Bjoran, 2017; Ligertwood 2017; Sanchez, 2017).

In this thesis I demonstrate that the medium of mobile demands a unique skillset for digital writers, as shifts in technology, user behaviour and communication trends create a need for new and constantly evolving skills. If the writing of text is approached with an astute understanding of the device, the context of use, the psychological patterns of the user, and the design of the interface, it becomes possible to enhance the user experience by reducing the cognitive load experienced during the interaction with a mobile smartphone.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter provides a theoretical framework for the central argument; that the cognitive effort experienced by a mobile phone user can be reduced, if appropriate attention is paid to the writing of text for this medium. I draw on the theories of cognitive load and working memory, as discussed by Baddeley (1992, 2007), Paas *et al* (2003), Sweller (1988, 1994), Sweller *et al* (1998), van Merriënboer *et al* (2005) and Wickens (2002, 2008). These theories are situated in the field of educational instruction design, where John Sweller (1988, 1994) identified that learners struggle to interpret the meaning of the content if their minds are required to engage on the external delivery of the information. I apply this rationale to the interpretation of information by the mobile media user. In the chapters that follow, I argue that the level of cognitive load can be minimised with more insightful focus on the presentation of information on this medium, by considering the multi-faceted influences on the writing of text.

One of the core theoretical analyses of this thesis draws on the work of reader-response theorists, Bleich (1975), Fish (1980), Iser (1972) and Rosenblatt (1978) in order to explore the relationship between the writer, the reader, and the text in the interpretation of meaning. Rosenblatt (1978:6) discusses the concept of a "transactional relationship" and argues that the meaning of the text is influenced by the reader's background. Although this theory was developed forty years ago, the principles remain relevant and provide a valuable foundation to this discussion on human-focused communication for mobile media. The theories of hypertext (Bolter, 1991; Canavilhas, 2007; Carter, 2000; Delaney & Landow, 1994; Landow, 1992; Slatin, 1990) are also critical to my discussion, as this non-sequential structuring of information applies to the mobile user's typically interactive behaviour. Landow (1992) claims hypertext shifts the balance of power from the writer to the reader. I build on this thinking by suggesting that a skilled hypertext writer can indeed facilitate the reader's interpretation of meaning with appropriate methodology for each media context. Literary theories also converge with the principles of the hypertext "writing space" (Bolter, 2001:1). I discuss the work of Barthes (1974), Derrida (1993, 1987) and Said (1985) in the context of audience response to mobile information, in order to explore the types, roles, and components of text. Furthermore, I examine the role of graphic icons in digital interface design, with reference to the theories of semiotics

and signs, and the work of de Saussure (1974), Eco (1976) and Peirce (1974).

To satisfy the underlying objective for this thesis, I also include a discussion on practical techniques and processes of digital writing, and apply the theories of usability, UX, interface and interaction design to explore methods of optimising the text on mobile media (Budiu, 2018; Garrett, 2010; Krug, 2005; Nielsen, 1999; Redish, 2014).

The mobile phone as a medium

The mobile smartphone exhibits unique characteristics that are integral to the discussion on the presentation of information. It is now undisputed that the smartphone is seamlessly integrated into many aspects of people's everyday activities (Luce, 2017; Miller, 2015). It has even inspired a new academic field, Mobilology, which analyses the effects of mobile phone use on human behaviour, communities, culture, entertainment, and economics (Brizel, 2012).

The relationship that people experience in their interaction with products was first discussed by Don Norman in his seminal work, *The psychology of everyday things,* in 1988. Norman introduced the idea of a user-focused design approach by establishing the needs of the user to create products that provide a satisfying user experience (Norman, 1988). He later predicted that separate tools would be developed in the future to satisfy each specialist use (Norman, 1999). Although many of Norman's principles remain relevant more than three decades later, current mobile phone usage contradicts this particular theory. The mobile phone is now an indispensable multi-modal tool that extends beyond the basic use of an actual telephone into a wide range of tasks, demands and usage behaviours (Jones & Lindholm *et a*l, 2003; Marsden, 2006; Singh *et al*, 2017; Stinson, 2017).

The relationship people experience with their smartphone is unique, when compared with other human-computer interactions. This relationship is extremely personal and more "intertwined" than any other media device (Miller, 2015:3). Smartphones are more than just tools; they now also define the way people behave (Brown & Green, 2012; Katz & Aakhus, 2002; Townsend, 2002). Phones also make a fashion statement and impact on inter-personal relations and social behaviour (Katz, 2005; Misra *et al*, 2016). The multi-faceted and complex connection that people experience with their smartphones has developed a new set of interaction expectations.

At the core of these expectations is *ease of interaction,* which provides the basis for the theoretical framework I utilise in this thesis regarding the cognitive load experienced by the user. I argue that all these factors demand a new way of presenting information to these unique users.

Role of contextual awareness

Effective information presentation on mobile media is logically influenced by context[10] of use, specifically in relation to the on-the-go nature of the device. In the early nineties, the concept of ubiquitous computing, "ubicomp", was introduced by Mark Weiser (1991:98), who envisioned computing experiences that provide seamless interaction, without disturbing people's natural flow of activities. Weiser suggests that natural user interfaces could be created, based on information from the actual human environment. These principles of "context-aware computing" were discussed before smartphones were invented, but they create an important focus on the influence of situational factors, such as location, people, and the environment (Abowd & Mynatt, 2000:38; Schilit *et al*, 1994; Schilit & Theimer, 1994). I extend this theory to mobile applications because customised contextual information ensures more efficient and relevant interaction for the mobile user – as any tourist looking for directions in a foreign city can testify.

The contextual situations also vary and influence the user's concentration, behaviour and interaction objectives (Dey & Häkkilä, 2008) and each of these different "mobilities" demands different input methodologies (Tamminen *et al* 2004:136; Verkasalo, 2009). Many factors influence the user's mobile interaction experience: location, nature of the terrain, people in the area, social setting, commuting and time of usage (Böhmer *et al*, 2011; Church & Smyth, 2008; Kaasinen, 2003). I emphasise the importance of this context-relevant information as it makes a significant impact on design and writing decisions, which might include relevant shortcuts, use of menus and alternative input methods (Abowd & Mynatt, 2002; Dey & Häkkilä, 2008).

Influences of mobile user psychology and behaviour

The psychological patterns of the user is integral to the interaction experience and should be a primary consideration for the designer and writer before content is

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[10] Context can be defined as the background, environment, framework, setting, surroundings or circumstances that provide additional meaning and understanding to readers or users (Business Dictionary n.d).

developed for any medium, including the mobile phone (Felton, 2013; Redish, 2014; Sullivan & Boches, 2016). I argue that the expectations and behaviour of the typical mobile user influences the manner of interpretation and interaction, which consequently affects the writing approach. The theoretical foundation to this argument is based on the principles of CLT, which I apply to the context of mobile media.

Background to cognitive load theory

CLT is based on the understanding that all human learning uses two types of memory: short-term working memory and long-term memory (Sweller, 1988). Working memory has limited storage capacity and is easily overloaded when trying to process several elements of new information at the same time. The working memory is not capable of complex reasoning or interactions if the elements have not been previously stored in the long-term memory. CLT forms the basis of effective instructional design by reflecting on the relationship between information structure and human cognition, as a "pre-eminent consideration when determining design structures" (Sweller *et al*, 1998:262). By considering the relationship between working memory and long-term memory, as well as the previous knowledge of the learner, it becomes possible to present information with methodology that more effectively contributes in minimising the cognitive load (van Merriënboer & Sweller, 2005). Sweller (1988) claims learners struggle to focus on the intended stimulus during the learning process if their minds are required to engage in activities that are not relevant to the actual content. The interpretation of information requires additional cognitive load, which consequently impedes the comprehension of the text and slows down the process of learning new information (Sweller, 1994; Sweller *et al*, 1998).

An important element of CLT is the concept of "multiple resources", which is of particular relevance to my argument as the nature of mobile phone interaction involves multiple actions. The attention of the user is also always divided because there are distractions from the contextual environment. When there is divided attention or concurrent tasks that need to be performed, a person's attention and processing of information is compromised. I suggest the concept of "multiple resources" which Wickens (2007:160) and Baddeley (2002) discuss is directly applicable to the multi-tasking behaviour of the mobile user, as the reader's processing ability is compromised when concurrent tasks are performed and there is "divided attention". Multiple resource theory, or "workload theory", suggests this "bottleneck" of mental resources increases mental effort and impacts negatively on

performance (Baddeley, 2007; Wickens, 2002:160). Although Wickens' research focuses more specifically on the limitations experienced by the brain when performing multiple *high-speed* tasks, it does also relate to the increase in cognitive load with general multi-tasking.

Types of cognitive load

There are three different types of cognitive load: intrinsic, extraneous and germane, and all three present a unique synergy between the intrinsic content of the material and the ability of the learner (or user) to interpret the information (Paas *et a*l, 2005; Sweller, 1994). Intrinsic cognitive load refers to the elements that exist *within* the learning material, or the actual intrinsic complexities of the content. The intrinsic cognitive load cannot be altered by the method of instruction or controlled by the designer or writer, as it relates more closely to the actual nature of the materials and the expertise of the learner (van Merriënboer & Sweller, 2005:150). Extraneous cognitive load involves the learning skills and *processes* involved in the interpretation of a text, and can be varied by the presentation and instructional method of the information (Sweller, 1994; Oviatt, *et al*, 2004). In comparison, *germane* cognitive load *enhances* the learning process and as with extraneous load, it can be influenced by the instructional design, but the level of germane load will increase with more effective information design.

These three types of cognitive load work in synergy to determine the summative load experienced by the learner, as they are all drawing from the same mental resources. Working memory load can be affected by the intrinsic nature of the learning tasks as well as the methodology used to present this information. More complex information will demand a higher level of intrinsic load, and therefore requires a simpler instructional method to ensure the load remains within the limits of the working memory. Consequently, even in the context of mobile media, if the information is effectively designed, the extraneous load is reduced, which allows working memory to be allocated to germane cognitive load, thereby freeing up the reader or user to learn new material (Paas *et al*, 2004). Oviatt points out that extraneous cognitive load will always be higher in mobile usage as there are unique additional demands in the interaction with this medium (Oviatt *et al*, 2004). This is relevant to my argument, as appropriate instructional presentation can reduce extraneous and germane cognitive load, by limiting the levels of "element interactivity" in the processing of information (Chandler *et a*l, 1991; Sweller, 1994:295). An example of ineffective instruction design can be seen with "split-source" information, such as separate text and

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diagrams. This method requires the reader to utilise additional cognitive resources to integrate the two elements mentally before being able to interpret the meaning (Chandler *et al*, 1991). I suggest this principle also applies to the conceptual integration of visuals and text in mobile interface design, which can enhance or detract the interpretation process, and consequently contribute to the cognitive load.

The role of schema in reducing cognitive load

The concept of schemas is another important aspect of CLT as they enable the human mind to manage a vast number of complex tasks by organising information into separate units of knowledge, thereby reducing cognitive load (Paas *et al*, 2003; Sweller, 1994; van Merriënboer & Sweller, 2005). As expertise develops in the reader, complex ideas are combined skilfully into simple "schemas". Schemas can be defined as "cognitive constructs that incorporate multiple elements of information into a single element with a specific function" (Paas *et al*, 2003:2). Such schemas act as a "central executive", and help to organise and store the information, thereby reducing the load on the working memory, as each schema is viewed as a single element. The concept of schemas as a basic unit of knowledge enables transferral of new information to a reader. The number of interacting elements depends on the level of expertise of the individual reader, as a person with more experience and knowledge will possess schema with more complex elements. Learners instinctively organise information into schemas based on previous knowledge of a subject, as this helps to determine how to classify the new information. For example, the description of a tree would be based on previous knowledge of a general "tree schema", rather than detailing the specific leaves and branches of an individual tree. It becomes possible to remember the schema of the tree rather than the thousands of unique characteristics of every tree (Sweller, 1994:296). The act of reading also illustrates this point, as humans develop the ability to derive meaning from an infinite combination of letters and appropriately categorise them into words with meaning (Gobet *et al*, 2015; van Merriënboer & Sweller, 2005:159). The game of chess provides an additional example, as expert players are able to combine simple moves into many complex schemata (Cross, 1999; de Groot, 1966; Gobet *et al*, 2015). Oviatt (2006) builds on this theory in the context of mobile media by suggesting that UCD presents an effective way of dividing content into schemas at appropriate stages in the user's journey. Krug (2005) focuses on reducing effort levels by simplifying the interface and avoiding the need for the user to relearn navigational elements rather than process information.

The interpretation of information also evokes a *feeling* of ease or difficulty, which is known as "perceptual fluency" (Jacoby & Dallas, 1981:308) or "cognitive fluency" (Roller, 2011:2). It is believed that people have a more positive evaluation of a stimulus when it *feels* simpler and offers a sense of "processing ease" (Winkielman *et al*, 2003:4). One of the cues for positive fluency is familiarity, which Roller claims is a strong motivator for human behaviour as it avoids having to relearn what is already known (Roller, 2011). In Chapter 7, I discuss factors that the designer and writer can consider to establish a positive sensation of interaction ease; such as the font style, the number of clicks in the user journey, flow of information, navigation, formatting, and vocabulary (Halarawich, 2016; Redish, 2014; Song & Schwarz, 2008; Whitenton, 2013).

CLT provides a relevant theoretical foundation to determine the level of mental effort involved in mobile user interaction. However, the *measurement* of cognitive load doesn't form part of this thesis. Performance-based measures are more relevant to the context of user experience compared to physiological measurements (Oviatt, 2006; Paas *et al*, 2003) but I suggest there is opportunity for further research on the specialised measurement of cognitive load related to text on mobile media.

The psychological characteristics of reading on a digital screen
The user's mind-set is affected by every element in the interaction experience with a medium, including the experience of reading text on a digital screen. The way in which people interpret information on a digital screen is distinctly different from the experience of reading books, or other printed material (Wästlund *et al*, 2005). Andrew Dillon (1992) compares reading on a digital screen with printed text, and documents several associated shortcomings: speed of reading, comprehension and in-depth understanding of concepts. The long-term memory and recall of the content read on digital media is reduced (Jabr, 2013; Noyes & Garland, 2008:1370). The screen reader also suffers from eye-strain, which is now an officially recognised condition known as Computer Vision Syndrome (Common causes of eye fatigue, 2013). Furthermore, reading on a digital screen can be challenging because it lacks a standard structure or recognised format, compared with the traditional layout of a book. Jakob Nielsen discusses this in "*Jakob's law of the internet user experience*", which suggests users prefer websites with standard features and design conventions (Nielsen, 2004). I present these findings to further my argument that the relationship with every aspect of the medium needs be considered when presenting and writing information, to compensate for the additional interactive challenges on mobile

smartphones.

A further consideration involves the manipulation of text on the screen compared to the physical turning of the page in a book. This lack of tactile sensation when reading text on a digital screen, known as "haptic dissonance", creates a disconnected, unrewarding feeling (Gerlach & Buxmann, 2011:3; Tanner, 2014). The role of real-world elements in digital interaction is often overlooked in the design of computer interfaces (MacLean, 2008), but there are ways of compensating for the missing tactile experience (Kaaresoja, 2006) and I believe the text on the interface can play a role.

Frequent digital-screen reading results in an inability to concentrate attentively for extended periods of time; it has been shown that people's brains are even physically changing in response to consistent interaction with digital media (Small & Vorgan, 2008). Online reading involves more decision-making activity, which causes a stimulus overload while attempting to concentrate and interpret text, and read from start to finish (Carr, 2011; Manjoo, 2013). However, there is also a more positive perspective on the increase in human-computer interaction. Thompson (2013) believes it actually enhances the brain and influences how people respond to information. Mobile phones are now one of the tools humans use to augment cognitive problem-solving processes, as well as generate, store, and transform information (Clark, 1998). However, Carr's (2011) research presents a significant insight into the increased challenges that users face when reading information on a digital screen. The previously negative associations related to reading on a screen are now shifting, as users are becoming more comfortable with digital devices, and familiar with web navigation (Nielsen, 1999). There are also notable improvements in screen technology (Kozlowski, 2018). Digital users are now also more willing to read long-form[11] content on a phone (Mitchell, Stocking & Matsa, 2016)

Characteristics of the digital user

It is argued that that digital users display unique behavioural patterns compared to readers of print media. I suggest that each of these characteristics plays a role in the manner in which information is interpreted, and are essential for the mobile writer to observe. Digital users are distracted (Gazzaley & Rosen, 2011), impulsive, cynical (Kilian, 2001), and demanding (Gevelber, 2017; Malin, 2016; Verkasalo, 2009). As a

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[11] Long-form content refers to online articles that consist of more than approximately 1200 words (Shewan, 2017).

result they don't want to work too hard to find the desired information or achieve a specific goal (Nielsen, 2011), and will typically leave a site if their objective isn't fulfilled (Garrett, 2010). They also expect a level of familiarity between their real-world experiences and digital interactions (Smith, 2008). These arguments present users as having a high level of expectation and a desire for familiarity in every stage of their interaction experience. The theory underlying this concept is known as the "*Principle of least astonishment*" (POLA), or as Geoffrey James (1984) describes in a book on coding, the law of least astonishment. The mobile designer and writer are able avoid elements of surprise in the interaction with digital interfaces by better understanding the expectations of the user (Brandall, 2016; Fitzpatrick, 2016; James, 2009; Keene, 2001; Saltzer & Kaashoek 2009; Seebach, 2001). Effective design prevents users from having to re-learn interactive behaviours, which would result in a higher level of cognitive load (Berkun, 1999).

Users demonstrate even more demanding expectations when interacting with mobile phones compared with desktop computers, because smartphones are now taken for granted as a source of easy access to information. Amy Schade suggests that the mobile phone isn't just a smaller computer, but rather a medium that presents its own unique methods of use (Schade, 2017). The unique multi-functionalities of the smartphone, and the personal relationship experienced by the user have created new sets of expectations (Sonderman, 2014). Google researcher, Lisa Gevelber suggests that typical mobile experiences are made up of "micro-moments" involving "want to know, do and buy" information (Gevelber, 2017). I suggest that this integral link between technology and people's everyday activities has made users of all ages more proficient at engaging with their mobile phones. I also support the view of Bruce Tognazzini, designer of the first Apple interface, who claims the level of the user's proficiency with mobile interaction impacts the way content should be presented. He stresses the need for convention and familiarity in design, as illustrated by the controversial removal of the Apple scroll bar (Tognazzini, 2013). There are certain "prototypical" elements that users now expect, and symmetrical, prototypical stimuli have been proven to result in a higher level of processing fluency (Winkielman *et al*, 2003:8). Experienced users demand more personalised interaction and designs that recognise their level of understanding (Miller, 2014; Smith, 2010; Walker, 2017).

Based on these theories on the psychological patterns of the mobile user, I demonstrate the complexities involved in writing for this medium. I suggest that it should be an integral part of the mobile writer's job to understand the user's

knowledge of navigation, level of experience, expectations, attitude to digital screens and mind-set at every stage of the journey.

The influence of digital design on writing for mobile media

The text on a mobile interface often works in synergy with the visual presentation of information (Cooper *et al*, 2007; Jones & Marsden, 2006, Preece *et al*, 2002). I argue that the *design* of information also contributes to the level of cognitive load experienced by the mobile user and should be integral to the writing process.

Types of design and navigation

The concept of design for "user experience" was first introduced by Don Norman in 1986 (Norman & Draper, 1986). Although UX is now a recognised discipline in the field of digital design, there isn't an accepted definition in literature (Zimmerman, 2008). It is agreed that UX is a subjective, ephemeral field that incorporates emotive, hedonic, and aesthetic variables, which makes it challenging to measure and consequently open for critique from human-computer scientists (Forlizzi & Battarbee 2004; Hassenzahl, 2003; Law *et al*, 2008; Saarijärvi, 2017). The definition by Hassenzahl and Tractinsky presents a universally accepted summary of UX design: "a consequence of a user's internal state, the characteristics of the designed system…and the context (or the environment) within which the interaction occurs" (Hassenzahl & Tractinsky, 2006:95). The common feature of all UX research is that it utilises a human-oriented design perspective, which I consistently present as a method of improving usability and reducing cognitive load.

Digital *interface* design has been analysed from a range of different disciplines, which provides valuable insights into text on this medium. In the field of applied user psychology, the interface is viewed as a user contact point from a physical, perceptual and conceptual perspective, beyond the simple aesthetics of the screen (Moran, 1981). In the context of HCI, the interface represents the integration of two language models: action language and presentation language (Satzinger & Olfman, 1998:169). Foley and Van Dam (1983) present the user interface concept in a four-level model: conceptual, semantic, syntactic and lexical.

The field of *graphic design* also contributes to the presentation of information on the digital interface. Buchanan (1992:12) claims graphic design presents visual communication as a form of "persuasive argumentation…by means of a new

synthesis of images and words". Swiss graphic designer, Josef Müller-Brockmann (1996) discusses the grid in his influential book, *Grid systems in graphic design* as a method of obtaining a sense of balance and order on a page. Fundamental graphic design techniques, such as size, position, font application, colour and contrast are relevant for mobile media as they contribute to the hierarchy of information, which I argue is one of the core elements in simplifying communication and reducing processing effort (Fleming & Koman, 1998; Pettersson, 2010).

The ultimate objective of the digital interface is to guide the user on a determined journey to achieve a specific task. Garrett (2003) suggests there isn't a defined route and the user might not always arrive at the home page, which makes it important to orientate users with clear navigation (Cardello & Whitenton, 2014; Krug, 2005). Effective interface design should simulate the real-world interaction, such as the layout of a department store (Liang & Lai, 2002), as users in an e-commerce setting are unlikely to make a purchase if the online shopping experience doesn't share the familiarity of a physical store (Bernard, 2002). Farrell (2015) also stresses importance of navigational indicators to orientate users and compensate for the missing signposts in their journey. Digital navigation therefore facilitates a seamless flow through a website or mobile application, and minimises the cognitive load required to achieve a goal. Effective navigation design improves usability, avoids unnecessary steps, indicates what is available on the site, guides actions, encourages further browsing and also indicates where the user has already been (Cardello & Whitenton, 2014; Cooper *et al*, 2007). Redish (2014) claims well-designed navigation should eliminate the need for a back button.

Design principles for mobile media

Many of the principles of digital design are relevant to both desktop and mobile media, but I extend the analysis to focus more specifically on the unique demands of the smartphone. The smaller size and vertical format of mobile phones require customised design strategies to solve navigation challenges, such as global navigation[12] bars and the "breadcrumb trail", which aren't effective on mobile interfaces (Aggarwall, 2016; Babich, 2016; Cardello & Whitenton, 2014; Cooper *et al*, 2007; Malin, 2016; Nielsen, 2007; Preece *et al*, 2002). The use of "hidden

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[12] Global navigation is the bar that appears at the top of a web page with links, search bars and buttons and provides the highest-level navigation tool across all different sections of a user interface. It allows the user to move from one set of content to another (Esser, 2018).

navigation", such as the three-lined hamburger, is a common mobile design technique as it saves space by providing menu icons or text links to represent additional information (Budiu, 2018). The menu provides a valuable shortcut to the contents of a site in a single glance and allows the user to select from a list of items to accomplish a task (Shneiderman *et al*, 2016; Whitenton, 2015; Origins of the menu as we know it today, 2010).

There are three options for an interface designer to efficiently transfer content from desktop to mobile and maximise the features of each platform: mobile stand-alone design, responsive design and adaptive design (Gregory, 2016; Jones, 2018; Marcotte, 2010; Soegaard, 2018). I highlight these different formats to illustrate that design decisions influence the writing of mobile media, as each format influences the hierarchy of the headings and position of the text on the screen. The synergy between each design discipline also affects the presentation of information on digital media. The effective integration of information architecture, interaction design, user interface design, graphic design, UX design – and digital writing collectively navigates the user on a rewarding journey through a website or app, thereby reducing cognitive load (Garbade, 2018; Zimmerman, 2008).

The influences of mobile media on desktop web design
The increasing use of smartphones has initiated a logical focus on mobile-focused design. However, there is an interesting reverse in this initial trend, as mobile design is now also influencing the design of desktop websites. This trend is known as "appification" and refers to websites becoming more "app-like" in the way they function (Aggarwal, 2016; Behnam, 2012). However, it is apparent that many of these app features, such as hidden navigation, are not effective on website design (Cardello & Whitenton, 2014; Pernice & Budiu, 2016).

Conventions and consistency in design
Consistency is an integral factor in digital design and the field of human-computer interaction, as users prefer predictability and familiarity; Jakob Nielsen lists consistency as one of his renowned "ten usability heuristics" (Nielsen, 1995). Kellogg (1989) theorises that consistency is not only present in the visual elements on an interface, but also metaphorical and communicational. Consistency allows users to process information faster, more intuitively and more accurately. The application of design conventions helps to facilitate user interaction and avoids the need for re-learning (Garrett, 2010; Krug, 2005; Murray, 2011; Satzinger & Olfman, 1998). This

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discussion is further extended in order to differentiate between internal consistencies of the interface and external consistencies, based on the user's previous knowledge (Garrett, 2010; Saarijärvi, 2017). I suggest this thinking presents an interesting correlation with other major theories presented in this thesis, such as the extraneous and intrinsic types of cognitive load (Paas *et al*, 2005; Sweller, 1994), as well as the importance of the reader's previous knowledge in reader response theory (Rosenblatt, 1978).

The role of icons and signs in interface design

I contend that the relationship between the text and the reader is further contextualised by examining the role of graphic icons in mobile interface design. The subject of visual icons is integrally linked to the history of Graphic User Interface (GUI) design (Horton, 1994). Engineer and inventor, Douglas Engelbart is attributed as the designer of the first user interface in 1963. His seminal essay, *Augmenting human intellect,* envisioned the computer as a means of enhancing "intellectual effectiveness" (Engelbart, 1962:3). He discusses the manipulation of symbols to organise the processes of human comprehension, which foresaw the current prevalence of icons in visual communication. Icons have played an integral role in interface design from the original Xero Alto to the Apple Macintosh (Reimer, 2005). Designer of the first Apple icons, Susan Kare claims that good icons are more like road signs than illustrations, as they always have a communicative function (AppSee, 2018; Lange, 2017). Users have become comfortable with the language of graphic icons and these visual elements are now ubiquitous features on mobile interfaces. They work in synergy with text, but at times even replace the need for words (Loungekat, 2010).

Icons feature as a core element on the mobile interface and function as symbols of ideas and actions to provide communication shortcuts. Yvonne Rogers (1989) discussed the role of icons before the invention of smartphones, but I maintain the underlying psychology of their value remains relevant. Users are familiar with a spatially organised environment and comfortable with this visual language, which makes it viable to present information with visual cues. Icons are effective because they enable quick communication on the smaller screen, can be easily targeted with a finger tap, and add aesthetic appeal (Harley, 2014; MacDougall & Reppa, 2008). However, for icons to be successful in minimising cognitive load they must be visible, legible and comprehensible (Babich, 2016b; Gatsou *et al*, 2011; Mullin, 2017). Icons are more easily understood if they symbolise familiar items from the physical world

and are based on users' past experiences (Lidwell *et al*, 2013). Effective interpretation is influenced by factors such as previous knowledge of a specific field, cultural background, age and digital experience (Caplin, 2001; Gatsou *et al*, 2011; Gittens, 1986; Shneiderman *et al*, 2016). However, some researchers suggest that the icon's actual symbol is not as important as the meaning and functionality it represents (Harley, 2016). Icons do present the risk of ambiguity, as unlike verbal language, pictorial language does not feature specific syntactic and semantic rules that underlie its comprehension (Rogers, 1989). However, the comprehension of icons is enhanced when combined with a text description (Harley, 2014; Harris, 2005; Rossi & Querrioux-Coulombier, 1997; Tognazzini, 2013). Location on the page plays a role in the icon's interpretation (Spool, 2006). Ineffective or confusing icons result in increased cognitive load, but I suggest this outcome can be avoided if the design is approached with a clear understanding of users and their frame of reference (Alvarez, 2015). I build on these theories to once again highlight the importance of the writer's role in the effective visual presentation of information on mobile media.

Theories on the meaning of signs

In order to provide a theoretical foundation for the discussion of icons as pictorial representations of meaning, I refer to the studies of signs and semiotics, drawing primarily on the theories of de Saussure, (1974 *et al*, 2006), Eco (1976) and Peirce (1974).

Ferdinand de Saussere (1974:106) considers a sign as the basic mental "linguistic unit" of meaning which combines the "signifier" and the "signified". He claims that signs have no intrinsic nature, and the signifier is entirely arbitrary – it is only given meaning through its relation to other signs, just as letters in the alphabet depend on relations for meaning. The theory of Charles Sanders Peirce (1974) includes three inter-related parts: a sign, an object, but also an "interpretant" (Peirce, 1974). This unique element refers to the cognitive understanding of the relationship between the sign and the object, which suggests the meaning of a sign is only manifested in the way the reader interprets it (Yakin & Totu, 2014). Peirce's theory presents an accurate representation of the digital user experience, as the meaning of an icon is only manifested by the user's interpretation. I apply these theories to the context of icons in digital interface design, as many of these symbols are arbitrary with no meaning other than the context in which they appear. For example, the three-lined

hamburger menu icon is only given meaning by its position on the interface (Bradley, 2016).

User-centred design and writing

The principles of UCD form a core theoretical foundation for my argument on reducing cognitive effort in the interaction with mobile devices (Norman, 1988; Norman & Draper, 1986, Oviatt, 2006). UCD can be described as a problem-solving process that envisions how consumers interact with products to enhance usability (User-centred design, 2018). The user is the protagonist in every stage of the design process, as relevant human insights influence many factors of computer technology usage, including psychological, organisational, social and ergonomic (Abras *et al*, 2004; Pea, 1987). These factors ensure the user remains in control, by providing levels of familiarity and predictability; even with minor usability features such as the ability to cancel an operation (Gove, 2016).

The term "user-centred design" originated in the 1980s by Don Norman. Norman (1988) placed the focus on the user's needs and conceptualised product design as a means of improving the interaction experience – from opening a door handle to pushing a lever on a toaster. Early literature on the topic focuses on analogue products (Buchanan, 1985), but I suggest the principles of putting the user first certainly also applies to digital applications, including mobile media. Norman's four basic principles of product design illustrate these parallels. Firstly, it is important to follow the natural mappings between the user's intentions and the required actions. Secondly, these actions should always be easy to perform at any stage in the interaction. Thirdly, there should be visible signals that give the user a conceptual model of how the system works, such as the design of a scissors. And lastly, it should be easy to evaluate the system by providing clear feedback on the result of the actions (Norman, 1988:188).

Jesse James Garrett (2010) formulated an influential conceptual framework on UCD that features five layers of thinking and decision-making for the interface and UX designer. He stresses the importance of taking the user into account at *every step* of the user journey. The five layers include: strategy, scope, structure, skeleton and surface, with each layer depending on the one below. If a user-centred approach is followed the organisation of information can anticipate the user's expectations. This approach impacts on the integration between interface design and navigation, which ensure a seamless user journey when working in synergy (Gove, 2016; Krug, 2005;

Pea, 1987; Vredenburg *et al*, 2001). For example, the visual aesthetics or textual content won't enhance the experience if the navigational architecture hasn't been designed to suit the user's abilities and objectives. This framework is also of relevance to the process of *writing* content for digital media, and stresses the importance of including the writer in the initial stages of the development process when planning information architecture for websites and mobile apps. If the writer and designer both follow a user-centred approach, the *structure* of the information is more accurately based on both the objectives of the site *and* the needs of the user. Garrett maintains that it isn't sufficient to create content, it has to be presented in a way that users are able to consume and understand (Garrett, 2010:14). In the Apple style guide for application design, the concept of "user control" features as one of the underlying principles. It states that people rather than technology should be in control when interacting with digital devices and the technology shouldn't take over the decision-making process (Apple Human Interface Guidelines, 2018). I maintain that a user-centred approach impacts on many levels of human-computer interaction, including psychological, organisational, social and ergonomic factors (Abras *et al*, 2004).

In the current design climate, a focus on users rather than technology now appears to be a logical and obvious approach, but this wasn't originally a priority in digital design. UCD is time-consuming and costly as it involves gathering data about the needs of the user, questionnaires, partnerships, consultations and usability testing. This research was often not conclusive either as users are not always sure how interaction performance can be improved (Gould & Lewis, 1985; Norman, 1988; Norman & Draper, 1986). However, I suggest there is an increasing understanding that meaningful user experiences are achieved by gaining an understanding of the behaviours and emotions of the people involved in the interaction, rather than extensive features and functionality, or large quantities of content. Oviatt (2006) extends the context of this theory to educational interface design and the role of UCD on cognitive load levels. I use this point to develop my theory that a user-centred approach is not only applicable to design but is also of significant importance in the writing of text for digital media

Principles of writing for mobile media

The focus of this thesis is to determine the factors involved in writing for mobile media, as well as the influences on the development of text within this context. This

section discusses the theoretical principles underlying arguments about how effective writing techniques are able to reduce the cognitive load of the mobile user.

The reading patterns of digital users

Users read text on digital screens differently to books and typically follow a pattern that requires the least amount of effort. This reading pattern on website screens is known as the "F-shaped pattern" and typically follows the shape of the letter F, when reading text from left to right (Babich, 2017; Nielsen, 2006). Pernice (2017) claims the F-shaped pattern is limiting because it forces users to default to predictable areas of the page, which means other important content might then be missed. Jerry Cao contrasts this view, and suggests this pattern makes sense because it mimics the way people naturally read, and prevents unnecessary reading effort (Cao, 2015). Eldesouky (2013) proposes that users only follow instinctive reading patterns if there is no established visual hierarchy, which I argue can be achieved with an appropriate user-focused approach to the presentation of information.

Nielsen claims users *scan*, rather than read, in order to economise the time spent on interpretation, as well as to determine, at a glance, whether the page contains relevant information (Nielsen, 1997). Furthermore, readers continually maximise the reward of satisfying a specific task, or finding the right information, for the "interaction cost"[13] or effort invested in reading (Lam, 2008:1; Budiu, 2013). This concept of "scannability" can be achieved with relevant writing and formatting techniques to maximise the amount of time the user needs to spend on each page to achieve a specific objective (Goldstein, 2015; Lui *et al*, 2010). In the chapters that follow, I examine the relevance of the F-shaped pattern, and the technique of scanning text rather than reading, in relation to writing and formatting of text for the mobile smartphone. The reading patterns of the *mobile* user are distinctly different to those of the desktop reader, which is logically influenced by the demanding on-the-go usage context (Hanes, 2016; Nielsen, 2011b). The F-pattern is not as rigidly followed, and the focus is more on the centre of the mobile screen (Biedert *et al*, 2012; Patel, 2011). Users are required to slow down when interacting with text on mobile phones in order to achieve the same level of comprehension as on a desktop. This phenomenon is known in psychology as the "speed-accuracy trade-off" (Nugent,

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[13] The interaction cost cost can be defined as is the "sum of efforts, both mental and physical, that the users must deploy in interacting with a site in order to reach their goals" (Budiu, 2013).

2013). However, it has been shown that mobile user performance is continually improving, with technological advancements and user familiarity (Moran 2016; Singh et *al*, 2011). It is noteworthy that there is a difference in performance between interacting with task-focused apps compared to linear narrative mobile pages (Paradis *et al*, 2003). I use these arguments to further the claim that the mobile phone has unique demands and therefore requires an understanding of user's expectation to ensure tasks can be achieved with the least amount of effort (Komninos, 2018).

Factors contributing to "scannable" mobile text

There are several techniques that can be utilised by the designer and writer in order to facilitate the mobile user's scanning behaviour when reading text on a screen. In the chapters that follow, I discuss the importance of formatting text to create visual "hooks", which influence the way users read words on digital screens and draw attention to key parts of the information (Clarke, 2006; Loranger, 2017; Redish, 2014:53). The role of headlines also plays a core role in structuring text and creating hierarchy to guide the user in finding the most relevant information with the least amount of effort. I suggest that writing with formatting techniques is a valuable approach to presenting information in a way that accommodates the typical scanning behaviour of the digital user.

Headlines play a crucial role in formatting and structuring text. Specialists in writing for advertising, digital media and journalism, including my work on website writing (Pritchard & Sitto, 2018:102-129), emphasise the fundamental role of the headline to draw in the reader and communicate the core message or concept (Felton, 2013; Sullivan & Boches, 2016). Headlines play an even more critical role in the context of mobile and website text. They are required to function as hyperlinks, prioritise content, create scannable formatting, and contribute to search engine optimisation (Carroll, 2014; Redish, 2014). Loranger claims that the task-focused nature of the digital headline demands simple, familiar, and functional use of language. The ideal length of a headline is also debated in the literature, but it is agreed that the choice of wording is more important than length (Carroll, 2014; Charlton, 2016; Crompton, 1987; Morgan, 2017; Redish, 2014).

Visual hierarchy is acknowledged as one of the fundamental elements of graphic design because the arrangement and presentation of elements influences the order of what the human eye sees (Petterson, 2010). The principles of hierarchy can be

linked to the Gestalt psychological theory, among others (Cherry, 2017). One of the founding theorists of Gestalt theory, Max Wertheimer, claims that the "whole" influences the meaning of the individual "parts", as factors such as proximity, similarity, and association of elements affect the user's perception (Wertheimer, 1923). This principle is of particular relevance to mobile interface design as the strategic relationship of elements on the reduced small screen is essential to deliver messages with the least user effort (Eldesouky, 2013). As I discuss in Chapter 7, the priority of information can be influenced by adopting writing techniques and user-centred design that help to curate the user's pathway (Eldesouky, 2013; O'Flaherty, 2011).

Frontloading is another technique used to achieve hierarchy when writing content for websites and mobile apps. The principle of frontloading is based on the "inverted pyramid", a theory established in the field of journalism and first introduced by Edwin Shuman in 1903 (Canavilhas, 2007). This direct writing style places the most immediate information in the first sentence and contradicts the traditional chronological storytelling approach, which builds up a suspenseful and anecdotal narrative (Pöttaker, 2003; Errico, 1997). Similarly, the writing guide for the University of St Andrews suggests the "big-picture" information should be provided first (Hamrick, 2017). Theorists in the field agree that the keywords carrying the most important information should be moved to the front of a sentence to improve "scannability" (Eldesouky, 2013; Loranger, 2015; Ligertwood, 2017; Moore-Williams, 2014; Nielsen, 2009; Redish & James 2014; Rung, 2016).

In Chapter 7, I argue that these writing techniques can be applied to each "chunk"[14] of text in the hypertext space to allow users to define their own reading paths in a less prescriptive manner. This approach allows the reader to source the most important information with the least amount of effort. Furthermore, these writing techniques are particularly relevant to the reduced mobile screen, as well as the distracted, task-driven mobile user.

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[14] The concept of "chunking" was originated by George Miller (1956) in his theory on the number of items that appears in a list. In the field of cognitive psychology, it is considered to be an organisational unit of memory. In digital design it refers to a small unit of text that categorises information into sections on a page, making it easier to comprehend (Moran, 2016b).

Principles and theories of hypertext

Hypertext theory forms one of the core theoretical foundations of this thesis, and extends the theory from previous literary application to the context of mobile media. The origins of traditional information-ordering links back to the early thinking that the text is married to the physical structure in which it appeared: the clay, papyrus, or book. This explains the "stubborn materiality" of the text in a printed book that remains a constraint on the user's experience (Delaney & Landow, 1994:4-6; Landow (1992). The traditional book features several internal hypertext functions, such as a table of contents, page numbers, chapter, footnotes, and indexes, which operate as informal methods of organising thought. These elements could be considered as "mental chunks" that help break up complex information into intelligible components. However, hypertext theorists believe the text format in a book poses constraints on the user's experience (Delaney & Landow, 1994). The digital screen on a computer or mobile phone therefore enables the enhancement of the user's interaction experience by applying the principles of hypertext, which provides an unbounded, multi-dimensional reading experience.

The principles of linking are said to have originated with the innovative thinking of Vannavar Bush in 1945. Bush (1945) proposed a potential device, the "memex", which could store large amounts of research data in different blocks of text, in order to facilitate the workings of the mind. He highlights the substantial value it would offer if joined together with linkages and trails of associative, informational webs (Landow, 1992:15). Bush (1945:103) suggests it would allow each idea to "snap instantly to the next" through an association of thoughts. This device wasn't actually built and Bush could not have predicted the importance of his prescient thinking. However, his vision inspired future visionaries such as Theodore Nelson, who coined the name "hypertext" in 1965 to describe this non-sequential writing approach that branches in different directions and allows the reader to make individual choices (Nelson, 1965; Landow, 1992:4-15). The defining characteristics of hypertext feature a linking of information blocks or "nodes" to provide the user with a choice of multiple reading pathways (Slatin, 1990; Yankelovich, 1985). Leading hypertext theorist, George Landow claims this categorical structuring of information makes it possible to present separate pieces of information at appropriate stages in the user's journey (Landow, 1992). This de-centralised organisation of information represents a significant shift in the balance between reader and writer. Landow (1992) believes hypertext writing democratises the power of information by abandoning the authoritative arguments presented by the writer and allowing meaning to be determined by the reader.

Supporters of hypertext claim it liberates readers of the vertical rigidity of printed text and the domination of the centralised author (Birkerts, 2006, Bolter, 1991; Carter, 2000; Delaney & Landow, 1994) because the linear structure and order of information in a book doesn't match the individual needs of the user (McArthur, 1986). Critics of hypertext writing claim it results in a lack of order, but Jay Bolter (2001) counteracts this point by arguing that there is no single or "normal" order that needs to be followed. Unlike the pages of a book, hypertext presents opportunities for a new type of order and "writing space" (Bolter, 2001:1, 1991; Carter, 2000). The principles of a non-linear text sequence represent a sense of deconstruction and a break down of the traditional order, echoing the theories of destructuralist philosopher, Jacques Derrida. Derrida (1987, 1993) argues that although a structure is by nature organised, the organisation of elements in the centre of the system is more flexible and creates its own order. I build on these theories in Chapter 7, and suggest that hypertext creates its own unique order, specifically within the context of the mobile interface. It functions as the optimum writing approach for this medium by categorising information based on the needs of the user.

The convergence of hypertext theory and literary theory
Several influential literary theorists discuss the boundaries between the reader and the writer, and the reader and the text. I apply this thinking to the *user* and the text in a mobile context. Roland Barthes (1975) claims different types of text present varying levels of participation in the interpretation of text (Ironstone *et al*, 2018). The concept of "readerly" text refers to a conventional passive reading experience. In contrast, "writerly" text disregards the narrative style and places the reader in greater control of interpreting the meaning (Barthes, 1975:5). The "ideal text" offers the reader access through several "entrances" (Landow, 1992:3), which I suggest correlates with the digital user's constant entry and exit through categories of text based on individual needs. Edward Said (1985:6) expands on the theory of *openings* in the text, which he claims demonstrate the writer's intention of meaning. Unlike the single entrance of a printed text, hypertext provides multiple entrances, giving the reader more options – much like the menu options that feature on every screen in a mobile app. The departure, or closing, in hypertext writing is also more open-ended, as each reader would experience an individual ending. However, it is agreed that the boundaries in hypertext are blurred and any part of the text could be an orientation, arrival or departure (Birkerts, 2006; Carter, 2000; Landow, 1992; McCarthy, 2010).

The reading experience associated with hypertext is therefore entirely different to a book, which dictates the way the text should be read. Birkerts (1994) even suggests that hypertext might not involve reading, but rather "word-piloting" (Birkerts, 1994:29). John Slatin (1990) proposes that the interactive reader experience changes the activity of writing to "authoring", as it also involves *composition* of text on the interface and the management of links between nodes of information. The inclusion of visual elements breaks the constraints of linearity in the text (Derrida, 1987; 1993), a point supported by Carter (2000) that graphic elements influence the spatial arrangement of the text and affect the logical force of the argument. Bolter (1991:107) spoke of "topographical writing" and suggests hypertext writing is both verbal and visual, and the spaces become part of the argument. This theory emphasises the importance of structuring content in terms of "topics" and networks of meaning to mould a *visual* space for content. I discuss this point in Chapter 6, emphasising synergy between text and visual interface design.

Another important critique of reading hypertext is the missing narrative structures, which provide coherence based on the neighbouring nodes of meaning, and relations with preceding and future information (Canavilhas, 2007). Barthes (1975:4) suggests the breaking up text into fragments or "lexias" means they consequently take on their own separate and individual identities and Carter (2000:86) refers to each text unit as a self-contained "island of meaning". The underlying principle of hypertext is that these reading units become autonomous, as they are not dependent on a sequence of information (Landow, 1992). The level of predictability in the hypertext reading experience is therefore reduced as there are fewer "readability indexes" than those found in a book (Slatin, 1990:871). I apply these arguments, and propose that the journey through a mobile application establishes its own unique type of narrative towards a specific destination. This narrative is indeed influenced by preceding and upcoming information, but also gives users the choice to enter or leave each "unit", "fragment", "island" or "chunk" without sacrificing meaning.

Researchers who support hypertext writing believe it gives the reader more control over the retrieval of information; however, there are also opponents to the theory (Bransford, 1979). Hypertext critics such as Davida Charney (1994) claim that this control results in greater cognitive burden because the reader requires added effort to locate the information. In contrast to Bush's view that hypertext matches the natural workings of the brain, Charney suggests hypertext doesn't accurately correspond with the mind's sequential organisation of information, causing a greater

demand on short-term memory. Traditional reading theorists Miall and Dobson (2006:1) claim it impacts the comprehension of content, as there is a disruption in the flow of the reading experience. Birkerts (2006) supports this thinking, and proposes that the fragmentation of text results in disjointed understanding. Hypertext removes the sequential relation of the text and the visual cues, resulting in a loss of context as users become overwhelmed with too many choices when faced with multiple links (Canavilhas, 2007; Charney, 1994; Conklin, 1987; Foss, 1989). I suggest it is the role of design, UX and writing to provide context and present information in appropriate stages to avoid information overload.

Some elements of this criticism are worth considering, but in the context of mobile media writing, most points are now less relevant. Charney (1994) spoke of the disparate facts bearing no relationship to the needs of the user, but this point is counteracted by the current emphatic focus on UCD. In terms of reduced coherence, Landow (1992) and Carter (2000) argue that effective navigation facilitates comprehension as the structure becomes integral to the content. Considering mobile writing is predominantly task-focused, hypertext makes large amounts of information more manageable and easier to find. I support Slatin's view that hypertext is in fact a new medium that requires writers and designer to find new methods of constructing information to achieve optimum coherence (Slatin, 1990:882).

The principles of reader response theory in context to mobile writing
A further theoretical underpinning of this thesis is found in reader response theory, which I apply to examine the relationship between the writer, the reader, and the text. Leading literary theorist Louise Rosenblatt (1978) claims that there is a transaction between the text and the reader, and both play a role in the production of meaning. She argues that the meaning of the text, or stimulus, is influenced by individual interpretation, based on the reader's background and emotions. This view opposes the New Critics or Formalists who suggest meaning is found solely in the text and it cannot be affected by the background of the reader or intentions of the writer (Tyson, 2014). I extend Rosenblatt's view in relation to mobile media, as information in this context will always be interpreted from the perspective of the user, but the writer plays a role in guiding the intended interpretation.

Rosenblatt (1978) distinguishes between literary text and "scientific" or "everyday" language (Tyson, 2014). The latter I suggest relates to the functional, informational text found on mobile media. Rosenblatt also differentiates the "poem" - any form of

literary work, and the "text" - a set of linguistic symbols denoting meaning. Her theory questions the reader's stance in the transaction with the text, as either "aesthetic"[15] or "efferent"[16]. I maintain that the efferent stance correlates with the task-focused nature of writing for mobile media. Although these two types of reading present distinctive responses, Rosenblatt (1978; 1988) acknowledges that most reading experiences "hover" between the extremes of aesthetic and non-aesthetic and the text should serve as a guide not a rigid mould.

Stanley Fish (1980) theorises that a text only exists by being read and the meaning resides in the mind of the reader. His theory of "affective stylistics" focuses on the way the text "affects" the reader's response (Eagleton, 2011; Tyson, 2014). David Bleich (1975) believes there is no text beyond the reader's interpretation. The subjective reader-response theorists differentiate between the words on the page as the objects, the reading experience as a "symbolic object", and the interpretation experience as the "re-symbolisation" (Bleich, 1975:99; Tyson, 2014:178). Wolfgang Iser (1972) bases his thinking on phenomenological theory, implying that the reading processes used to construct meaning are built into the text as "determinate" or "indeterminate" meaning (Tyson, 2014). The former is applicable to writing for mobile media as the determinate facts assist in preventing ambiguous interpretation and increased cognitive load.

User experience writing for mobile interfaces

In this thesis I demonstrate that writing for mobile requires a unique range of skills, insights and techniques, with the objective of reducing the cognitive load of the user. In Chapter 7, I also discuss an additional influencing factor: the actual writing *process,* involving the relationship between the designer and the writer, and the integration of these specialist skills.

Andrew Dillon (2015:66) discusses the divisions between writing and design in his research on the shape of information space. He suggests that each discipline manipulates the other and there is a natural relationship between the content and the form in which it is presented. The writing of text, and designing the interface therefore shouldn't be separated, as the writer requires context to "shape" it into a "consumable hypermedia form". I build on this thinking by further suggesting that the timing of the writer's contribution in the design process should also be considered in

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[15] The "aesthetic" stance involves the emotions associated with the reading experience.
[16] The "efferent" stance focuses on the interpretation and information that is taken away, and acted upon, by the reader.

order to enhance the information presentation, as the late involvement of the writer hampers the optimum development of meaningful user experiences (Berkery, 2018; Bowles & Box, 2010; Six, 2015). There is, however, a growing recognition of the role of the (UX) writer. This supports my argument that the mobile writer requires a specialist approach, as it essentially involves designing user experiences with words (Bjoran, 2017). In Chapter 7, I analyse the techniques and best practices for effective UX mobile writing, with reference to the Google writing guideline and other influential digital writers (Halvorson & Rach, 2012; Kissane, 2011; Ligertwood, 2017; Rung, 2015). The text on mobile design operates as a multi-functional element that aims to communicate, inform, navigate and delight. I maintain the crafting of these words requires a unique and specialised writer to facilitate the user in achieving a desired objective with minimised cognitive load.

Conclusion

This chapter draws on theories of hypertext, literary criticism, and reader-response, in order to explore the relationship between the text, the reader, and the writer, in the interpretation of meaning (Bolter, 1991; Canavilhas, 2007; Carter, 2000; Delaney & Landow, 1994; Fish, 1980; Iser, 1972; Landow, 1992; Rosenblatt, 1978; Slatin, 1990; Tyson, 2014). The discussion applies these theories to the context of mobile media, and the current reader of text on a screen, compared with literary works and books. Furthermore, it applies the theories of cognitive load (Baddeley, 1992, 2007; Paas *et al*, 2003; Sweller, 1988, 1994; Sweller *et al*, 1980; van Merriënboer *et al*, 2005; Wickens, 2002, 2008;) as a theoretical foundation to my argument that the cognitive load can be minimised if attention is paid to the writing of text on mobile media.

In the chapters that follow I explore some of the factors that I believe influence the processes of writing text for mobile media. The unique characteristics of the smartphone device are analysed in terms of their impact on information presentation. I examine the psychological patterns of the digital user, with discussion on characteristics, behaviour and expectations of the mobile phone user. I also analyse relevant visual elements and principles of design, with reference to theories of signs and semiotics relating to the role of icons in mobile interface design (de Saussure, 1974; Eco, 1976; Peirce, 1974).

I further develop my argument by examining practical theories on techniques for improving usability and writing for this medium (Babich, 2016, 2016b, 2017; Budiu,

2018; Krug, 2005, Garrett, 2010; Nielsen, 1995, 1996, 1997, 1999, 2000, 2004, 2006, 2009, 2007, 2011; Norman, 1988, 1999; Norman *et al*, 1986; Redish, 2014). Finally, I situate this discussion with analysis of current industry practice regarding the processes of the UX writer in the development of meaningful mobile user experiences. The synergy between writing and design is discussed with reference to Dillon's theories on the shape of information space (Dillon, 2015:64).

I suggest there is a paucity of previous analysis of the writer and text in context to mobile media, and specifically within the framework of cognitive load theory. I argue the possibility of this medium characterising a unique type of narrative in the ordering and presentation of information and contend that the theories presented provide the foundation for further examination of this topic.

CHAPTER THREE: RATIONALE & METHODOLOGY

Introduction

This chapter rationalises the research methodology utilised in this thesis and provides an outline of the methods used to substantiate the argument presented. I utilise a qualitative research approach, including a mix of interpretative text analysis, case study and interviews.

Qualitative research provides an effective paradigm for examining human behaviour. It assesses how people are guided by individual, personal objectives and how they give meaning to the communication that determines and controls their everyday, pragmatic existence (Cheseboro & Borisoff, 2007:12). The unique integration of the mobile smartphone in people's everyday lives reflects the relevance of this methodology to the context of my topic. Issues such as perception and meaning are also fundamental areas of focus in qualitative research, which enables a comprehensive, insightful perspective, reinforced by the literature that frames the argument (Bradley, 1993; Ochsner *et al*, 2012).

Qualitative interpretative research methodology

The type of qualitative methodology in this study is descriptive-interpretative research. Considering the diverse nature of qualitative research, Bradford (1993) suggests it isn't desirable to label different types of research with prototypical methods. However, interpretative research is a commonly used approach in literature and linguistic studies (Hemlin, 1996) and I contend that it is also relevant to the text-based theoretical analysis presented in this study. MacDonald (1994) argues that humanities research is typically more text-driven as writing is a fundamental component of knowledge generation. This point echoes my analysis on the role of text in the interpretation process according to reader-response theories, and further supports the decision to conduct this method of research. The particular characteristics of interpretative qualitative research are described in terms of meaning, feelings, and processes in contrast to the empirical focus on statistics, data and measurement. I suggest this method of analysis is of particular relevance to the field of HCI, as it aims to identify the construction of meaning which people experience during various forms of interaction (Cheseboro & Borisoff, 2007:11).

Humanities research doesn't follow a linear process, but rather focuses on "extending current knowledge based on the coexistence of competing knowledge" (Oschner, 2012:80). An important aspect of research in the field of humanities is originality with the objective of introducing a wider scope of new perspectives, opinions, and individual analyses rather than the linear pursuit of discovering new facts, which is more typical of quantitative research (Hellqvist 2010:315). In the context of qualitative methodology, the researcher plays a direct role in these perspectives, as it is natural to assign subjective meaning in the interpretive activity (Bradford, 1993). I suggest that my role as researcher contributes significantly to the interpretation of theory on this topic, as I bring extensive related experience and previous knowledge to the research outcome.

The research argument in this study aims to demonstrate how the optimum approach to mobile media writing can assist in reducing cognitive load. A quantitative measurement of cognitive load is not relevant to this topic of discussion. The science of measuring cognitive load with quantitative research methods is extensive. It involves studies using psychophysiological techniques, based on indices such as pupillary diameter, heart-rate variability, and brain activity during mental effort (Paas *et al*, 1994). A performance-based methodology would be more relevant to this topic, as it measures behavioural factors such as reaction time, task completion and memory retrieval (Oviatt, 2006; Paas *et al*, 2003). However, the focus of my argument is not on the measurement process, but rather provides an interpretive analysis of the factors that contribute to cognitive load. It has also been acknowledged that UX is a notably challenging discipline to measure as it relates to emotive, hedonic, and aesthetic variables; hence a successfully "optimised" user experience is difficult to quantify or assess (Hassenzahl, 2003; Zimmerman, 2008). There is evidence that effective UX writing makes a tangible contribution to profit margins and ROI as it helps to remove the barriers that prevent users from completing the journey and rather encourage them to continue their interaction (Yifrah, 2018). It's likely many online shoppers have abandoned their online basket at the final stages of a transaction, an action which could have been prevented with more insightful "microcopy"[17]; such as a simpler explanation of the delivery procedure, or a few reassuring words to explain payment at the check-out. However, the quantitative measurement of the impact of UX writing on website conversion rates is

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[17] Microcopy refers to the words or phrases that appear on the interface for mobile apps to guide users through a specific journey (Yifrah, 2017).

also not a focus in this study, but it is presented as a topic of potential future research. The objective of this thesis is to analyse the influences on writing techniques that enhance the interpretation of information on mobile media, by reducing cognitive effort.

The text resources for this analysis take the form of both academic literature and expert discussion. The progressive nature of mobile as a new medium means that much of the relevant literature on this topic is sourced in industry journals, website articles, blogs, textbooks, digital forums, and industry resources.[18] I suggest that a cohesive, interpretative analysis of relevant and current references provides credible evidence to support my argument that specific design and writing techniques are able to enhance usability by making the interaction easier for the user. This thesis also presents a theoretical framework for pivotal topics within the research argument, presented as the factors influencing the cognitive load of the mobile user. As discussed in Chapter 1, the foundation of this thesis builds on the theories of CLT, applying this thinking to the context of mobile media. I also analyse the theories of hypertext and reader-response, discussed in Chapter 2 and Chapter 7, to establish a potential model for optimum writing techniques.

Case studies

This research topic presents opportunities to develop further understanding of the specialist digital writer and develop writing techniques to provide more satisfying user experiences on mobile media. A further qualitative research method used in this thesis is the inclusion of case studies. The type of case study considered appropriate for the research objective is categorised as a single, descriptive case study, in contrast to multiple case, explanatory or exploratory studies (Baxter & Jack, 2008).

One of the case studies featured in this thesis refers to my previous research for a chapter I contributed to a textbook on writing for online audiences.[19] The case study outlines the strategy, UX and writing processes involved in the development of a new website for ABSA, a leading South African bank in 2016. This study presents a practical illustration of user-centred design as a method of improving usability and

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[18] Resources such as the Apple Style Guideline.
[19] Pritchard, M & Sitto, J. (Eds). *Connect: Writing for online audiences.* Writing website content and enhancing user experiences. Speechly, M, 102-129. Cape Town, South Africa: Juta Publishers.

providing a more satisfying user experience. The study demonstrates the importance of establishing an insightful understanding of the user's needs and expectations, at each stage in the journey, and presents this user behaviour as an integral factor in the presentation of information (Pritchard & Sitto, 2017). The second case study investigates the role of the hamburger symbol as a practical analysis of icons and the role this symbol plays in effective communication on digital interfaces.

Yin describes the case study research method as an empirical approach to investigating a contemporary phenomenon within its practical real-life context (Yin, 1984:23). He claims a case study approach is useful to answer the "how" and "why" questions, which I suggest demonstrates its relevance to this thesis by providing practical application of the theoretical analysis. The concept of real-life application is of particular relevance to this research as the interpretative discussion is situated within current industry practice, with opportunity for future recommendations on pragmatic writing approaches. One of the advantages of case study methodology is that it enables the researcher to closely examine the data within a relevant situation, rather than isolating the phenomenon from its context of use (Zainal, 2007). This method of research is also a useful way of narrowing down a single aspect of a broad concept (Shuttleworth, 2008). I acknowledge that the case studies are supplementary to the central analysis in this study, but they provide valuable practical context to theoretical discussion.

Interviews

As an appendix to my central research study, I also chose to conduct several qualitative, semi-structured interviews with relevant industry role-players in the Cape Town area. These interviews are not presented as findings relating to the central argument but aim to situate the argument. I suggest they augment the theoretical analysis with a practical examination of the current practices applied within the industry.

Semi-structured interviews are ideally used when the researcher has sufficient knowledge of the topic to understand what is and isn't pertinent to the research question (Charmaz & Belgrave, 2012), which I suggest is pertinent to my background and research approach. This type of interview has become a hallmark of qualitative research, as it is a way of conducting "trustworthy inquiry in a world of complex and interwoven constructed realities" (Bradley, 1993:432). The primary benefit of utilising

qualitative interviews is that their semi-structured nature allows for a conversational approach to source relevant information without a rigid formula. The interviewees are able to share information in their own words and are encouraged to speak in detail about the topic (Bernard, 2000). The open-ended nature of the questions also provides the opportunity to identify new ways of seeing the topic, and developing understandings from a fresh perspective (Cohen & Crabtree, 2006:1).

Semi-structured interviews also allow the researcher to focus narrowly on a specific topic that speaks to the research question. Although the interviewee is able to speak freely, the interviewer maintains a degree of control, particularly when compared with an unstructured interview whereby the questions are loosely formulated as the interview proceeds (Rubin & Rubin, 2011). This methodology therefore allowed me to prepare and plan my questions in advance to provide a constructive framework for the discussion.

The interviews I performed took the form of informal discussions, based on a set of pre-designed questions relating to each person's experience of mobile writing, design and text presentation within their specific area of specialisation. The open-ended approach allowed for some deviation in the responses as each interviewee worked in different areas of the industry and was therefore able to present an individual perspective on my topic of discussion. The aim of this research method is primarily to determine the importance of the writing *process* as an influencing factor in the design of information on mobile media. A particular focus was given to the *timing* of the writer's inclusion in the development and design process, as the typically late (and often non-existent), involvement of the writer impacts the outcome of the user experience. The interviews also assessed the ideal skillset required by the specialist writer, with reference to the current multi-disciplinary demands of creative communicators, which I have identified from my experience within the advertising industry.

I was able to speak to three experts from a range of different organisations within the industry, who all exhibit varying areas of knowledge and expertise. The interviews comprised 12 questions that allowed for open-ended discussions relating to my central research question: How can the writing of text for mobile media reduce the cognitive load of the user? I also asked them their overall opinion on the role of the digital writer, as I think this question helps to provide a practical perspective from people directly involved in this field. Each interview lasted approximately one hour

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and was conducted on the work premises of the interviewees in Cape Town during July and September 2018.

Summary of interviewees and their positions:
1. Ruth Gathercole: UX and Business Analyst
   Isoflow Digital Design
   www.isoflow.co.za
2. Andries Bester: Marketing Development Lead
   GetSmarter Online Education
   www.getsmarter.com
3. Maru Fourie: UX Writer
   ABSA Bank Digital
   www.cowboyaliens.com

This element of my research is acknowledged to be a small sample and only applies to the South African industry, but the outcomes provide valuable insights into the realistic challenges of writing for mobile applications and websites. I believe the resulting discussion also supports my identification of the gaps regarding appropriate skills in this field and the need for further research, training and understanding. Although there are limitations to the statistical value and geographic range of the interviews performed, I maintain this method contributes to the research by providing valuable practical insights into the role of the writer in industry.

Professional industry experience

The arguments and theories submitted in this thesis are also based on my own extensive professional experience in the field of advertising and brand communication. I have worked as a senior copywriter in the industry, a tutor for an online correspondence writing college and as a lecturer at a private advertising college in South Africa. I have developed comprehensive content for lectures and professional training workshops on writing for digital media, including websites and mobile media.[20] I have consequently identified the need for specialised skills associated with writing for mobile as a medium, in comparison to traditional media as well as other digital media channels, such as desktop websites.

In the process of preparing students to find employment as copywriters in the

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[20] www.mandyspeechly.com

industry, I have also become astutely cognisant of the shifts in the skillsets and demands associated with the writer operating in the current and future world of digital communications. Developments in technology have significantly influenced methods of communication and media consumption. As a result, the skills of the digital writer are now required to converge with a range of different disciplines; including journalism, copywriting, literature, design, psychology, and information technology. I consequently recognised the unique characteristics of effective information presentation for the mobile phone and identified gaps in current research on this topic. Although there is considerable research and discussion on UX, interface and interaction design, (Cooper *et al*, 2007; Garrett, 2010; Krug, 2005; Preece *et al*, 2002; Robinson *et al*, 2014; Shneiderman *et al*, 2016) and website writing (Redish, 2014, Carroll, 2014), the role of the writer and the text for mobile media is often misunderstood and neglected, specifically in the South African context.

Conclusion

This chapter provides a rationale for the qualitative methods applied in this research. I have highlighted the relevance of interpretative qualitative methodology in the analysis of relevant texts, to provide a theoretical foundation and interpretative analysis to the research (Bradley, 1993; Cheseboro & Borisoff, 2007; Ochsner *et al*, 2012). I also present reasons for including semi-structured interviews as an appendix to the research argument, which enabled planned but free-ended discussion from industry experts on current practices (Charmaz & Belgrave, 2012; Rubin & Rubin, 2011). Furthermore, I present the benefits of including case study research in order to examine the topic within a relevant, real-world application (Baxter & Jack, 2008; Zainal, 2007). I suggest that the methodology used in this research provides a comprehensive theoretical and practical overview of the factors influencing writing text for mobile media, and creates a foundation for future recommendations on specialist writing techniques.

CHAPTER FOUR: CHARACTERISTICS OF MOBILE PHONES AND MOBILE USAGE

Introduction

This chapter provides background to the mobile smartphone as a medium. It outlines the current surge and relentless growth of mobile phone usage in modern countries around the world. Mobile usage has also increased significantly in South Africa over the last decade and internet access via mobile is higher than on desktops, with 75% of the South African population now owning a phone (Number of smartphone users in South Africa, 2018). These facts demonstrate the importance of this research, within a South African and global context, in order to determine optimum methods for writing text on mobile interfaces.

Mobile phones now integrate seamlessly into people's everyday interactions and present a significant, possibly revolutionary, influence on the way in which people communicate and source information (Lee, 2015; Lindholm *et al*, 2003; Luce, 2015; Miller, 2015; Singh *et al,* 2017). The device offers previously unthinkable levels of convenience, but has also played a vital role in historic global events; over-throwing governments, peace-keeping endeavours, and literally saving lives (Luce, 2017). [21] The importance of the mobile phone has inspired researcher-author, Florie Brizel to suggest a new academic field, Mobilology, for the study of the effects of mobile phone use on behaviour, community, culture, entertainment, and economics. She suggests it is a valuable academic discipline that is uniquely collaborative and interdependent with other academic disciplines. The nature of mobile as a medium means it is not possible to address just one aspect, such as the economic impact, without also considering other elements such as people's behaviour or cultural influences (Brizel, 2012; Luce, 2017).

This prevalence of the smartphone in everyday life has resulted in the need for more in-depth understanding of this device and the interaction experience associated with the achievement of specific tasks. This interaction is influenced by the mobile context of usage and the physical characteristics of the phone, as these elements all place additional demands on the effort required by the user. This chapter therefore

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[21] During the recovery operations in the 2010 Haiti earthquake, rescue workers used mobile phones to track people trapped in the rubble (Luce, 2017).

analyses these practical influences with reference to the role the writer can play in enhancing the user experience, in varying contexts use.

Current trends in mobile usage

The use of mobile as a communication tool has increased exponentially since the first mobile phones were launched commercially in the mid 1980s.[22] The development of the *smart*phone has also influenced the surge in phone usage.[23] Many European countries such as Finland and Italy have a mobile penetration rate of 100%, and it is not uncommon for people to own more than one handset, even in South Africa (Jones & Marsden, 2006:317). It is now acknowledged that society is moving towards a more mobile-oriented world, but mobile usage has overtaken desktop at a much faster rate than was initially predicted. In November 2016, it was recorded for the first time in history that more users accessed the web from smartphones than from desktops.[24]

Mobile usage in a South African context

In South Africa, mobile usage and internet visits have also increased significantly.[25] The dominance of mobile usage in developing countries is a common trend, including other emerging markets such as India, where mobile devices remain the primary point of internet access for most people. In more mature markets such as the USA and UK, desktop currently still dominates as the primary source of internet access (Mobile and tablet internet usage exceeds desktop for the first time worldwide, 2016). There are also significant increases in the proportions of mobile users who accessed websites and social sites, downloaded apps, and used instant messaging on mobile phones (Ofcom, The Communications Marketing Report, 2015).

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[22] Global statistics portal, Statista reports that the number of mobile phone users in the world will pass the five billion mark by 2019 (Number of mobile phone users worldwide, 2018). In 2017, an estimated 62.9% of the population worldwide already owned a mobile phone.

[23] It is predicted that by 2020 the number of smartphone users in the world will reach 2.7 billion, more than 50% of all mobile users (Number of mobile phone users worldwide, 2018).

[24] 51.3% of global internet visits came from mobile devices compared to 48.7% from desktops (Desktop vs Mobile market share worldwide, 2018).

[25] Mobile users in South Africa represent 70,8% versus 29,2% from desktops (Desktop vs Mobile market share South Africa, 2016).

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In further analysis of the South African mobile environment, the phone usage statistics present an interesting reflection of the unique societal characteristics of the country. In early 2018, there were approximately 19 million smartphone users in South Africa, slightly more than one third of the total population (Number of smartphone users in South Africa, 2018). This is notably lower than the global population penetration average, but considering that approximately half of the South African population lives below the poverty line, it indicates that more than 75% of these low-income groups own a mobile phone. This high percentage suggests that people place a disproportionate value on owning a mobile phone, which signifies the positive contribution it makes to their life. Technology journalist Jim Luce (2017) expands on this point in suggesting that mobile phones contribute to economic development, as they allow access to remote geographic frontiers, and communication from there to the rest of the world. "In many parts of Brazil, Russia, India, China, and Africa...wireless mobile communication has leapfrogged over landline infrastructure". These statistics and facts demonstrate the significant growth in mobile phone usage, in South Africa and around the world, and consequently the importance of this research to improve the mobile user experience.

The multiple uses of a mobile phone

The mobile device can no longer be considered simplistically as a telephone, as it satisfies a plethora of different roles in people's lives (Jones & Marsden, 2006; Murray, 2011). Talking is now a secondary function compared with many other common applications of the mobile phone. The main categories of usage are summarised as person-to-person messaging, the research of information, solving problems, and entertainment. A study on mobile application usage supports this evolution in the role of cell phones and reveals that mobile phones have evolved from single-purpose communication devices into dynamic tools, which support users in a wide range of tasks, including listening to music, navigating directions, playing games, and taking photos (Singh *et al*, 2017:1). Because phones have become increasingly multi-functional, the user's demands have also increased in terms of satisfying these tasks efficiently. As the technology behind smart phones continues to develop, the capabilities of these devices expand into an even broader collection of uses and expectations. According to Lindholm, mobile phones used to be "functionally direct replacements of their wired forebears", now they have also become indispensable platforms for entertainment, shopping, sourcing information and, consuming media (Lindholm *et al*, 2003:6). I argue that these additional features

and functions, which are now integral to the smart phone, influence the way in which people interact with the device to source information or communicate.

In 1999, before smart phones were invented, renowned product designer, Don Norman, envisioned that the computer would evolve into a more simplified "information appliance" and we would rather surround ourselves with many individual devices that all communicate with each other (Norman, 1999:3). In reality, however, mobile phones are certainly not single-purpose appliances, but rather "do-everything, solve-it-all, shrunk down personal computers" (Jones & Marsden 2006:12). Phone manufacturers are, in fact, embracing the desire to carry around one device that satisfies an array of different tasks. As quoted in an Economist article, *Vision meet reality*; "The new mobile handset will become the single, indispensable 'life tool', carried everywhere by everyone, just like a wallet or purse is today" (Vision, meet reality, 2004).

An important aspect of these multi-modal characteristics is that the features on a phone do not always work in isolation; the functionality of each individual feature actually complements the other. For example, although every smartphone features a camera, this feature is now no longer used just to gather visual memories or snapshots of our lives, but also to provide a shortcut for communication and information retrieval. Digital technology experts are already predicting the demise of the keyboard as a means of searching for information. Stinson (2017) suggests the mobile smartphone represents a new era of computer technology that has turned the phone's camera into an alternative input device, as "the camera is the new keyboard". He reiterates that the camera allows the user to photograph an object instantly without the need to type in the right description and risk making errors. I propose that these enhanced features of the phone create a distinct shift in usage behaviour, which is important for the writer to understand when presenting information on this medium, as it influences the need for functional text on the interface.

Mobile phones now even influence the way people interact with other media channels, as the ubiquity of the device transforms engagement with traditional media. To illustrate this point it is worth considering a few examples of how brand

advertisers maximise the multi-screening[26] behaviour of consumers with innovative interactive campaigns. In the United States, the Chevy Game Time campaign required Super Bowl viewers to find clues from the real-time television broadcast and capture them on a mobile app to try win a car (Chevy Game Time owns the Super Bowl, 2012). A Coca-Cola Zero campaign utilised Shazam[27] technology to create "Drinkable Ads" that allowed consumers to drink virtual Coke from a glass on their mobile phones, and win a voucher for a real Coke (Coca Cola creates first ever 'drinkable' advertising campaign, 2015).

Context-awareness for on-the-go mobile usage

The intrinsic, on-the-go nature of the mobile phone means that it is essential to consider context of use as one of the determinants for optimum information presentation on this medium. The meaning of context has been defined in Chapter 1, but the broader impact of context could be analysed from several different perspectives: psychological, social, and technological. All of these viewpoints relate to the field of HCI. Therefore it is necessary to define the goal of "*context-aware*" applications, which allows the user to receive information in real-time, based on actions that take place in the surrounding environment and physical world (Abowd & Mynatt, 2000:38).

The principles of "context-aware computing" were first discussed in 1994, suggesting software could adapt according to the location of use, the people in the area, other accessible devices and changes in the environment (Schilit *et al*, 1994:1-2). This thinking progressed to apply to mobile phones, where customised, context-aware mobile applications allow more efficient and relevant interaction. As a result, mobile users are not required to continuously enter information about their environment or location (Dey & Häkkilä, 2008).

The concept of ubiquitous computing, "ubicomp" was introduced by Mark Weiser (1991) in his seminal work, *The computer for the 21st century*. His theory envisions

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[26] Multi-screening refers to the simultaneous use of multiple digital devices at once, for example, mobile phones, desktop computers and the television (The rise of the multi-screen phenomenon, 2013).

[27] Shazam is a popular mobile app available on Apple and Android devices and used by more than 100 million people around the world. It identifies music by "listening" to a track and instantly reverting information on the title, artist and lyrics (Shazam. n.d).

computing experiences that are invisible to users and provide seamless interaction, without disturbing their natural flow of activities. Weiser (1991:98) likens this "ubiquity" of information-access to the written language, which provides a constant background presence of "literacy technology" without involving active attention. He suggests that in order to assist with overcoming the problem of information overload, the human environment could help to establish natural user interfaces. Furthermore, designing a machine that fits the human environment, rather than forcing humans to fit the technological world, will make using a computer "as refreshing as a walk in the woods" (Weiser, 1991:104). Understandably, this theory does not refer to personal mobile computing devices such as smartphones, but rather proposes immersing computer interfaces in the user's environment by capturing relevant locational information. However, Weiser's research shaped the fundamental thinking of context-aware computing and established an important focus on the influence of situational factors.

The vision of augmenting people's environments with computational resources, wherever they are located, ultimately strives to make everyday life simpler, which supports the objective of reducing cognitive load in human-computer interaction. I propose that relevant information about the user's environment and context of use, significantly influences the interaction experience with a mobile device. There is an increasing trend for researchers to make devices and services *context-aware,* to adapt and respond to the changing context of the user (Dey & Häkkilä, 2008:206*).* This phenomenon is integral to the field of human-computer interaction, with on-going development of location-sensitive technology. The promise of "continuous immersion" with computation that could constantly partner with people's thoughts and actions was initially discussed as a future vision, but the prevalence of the smartphone has made it a common feature of everyday interaction (Abowd & Mynatt, 2000:31).

The contextual situations in mobile usage vary considerably and might even change several times during a single conversation or interaction (Verkasalo, 2009). For example, a person might use a mobile phone to navigate a destination on a map application, and simultaneously message a friend, while commuting. During this experience, the external environment is continually changing as the user moves through different parts of the city. These variables could include; environmental noise, light or darkness, weather conditions, and network connectivity (Schilit *et al*, 1994). All of these elements cause distractions, partial concentration, and restricted

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interaction with the information, which results in increased cognitive load. This interaction experience doesn't only involve changes in the details of the location, but also the person's goals and needs.

Location is the most obvious element in contextual information and new technologies such as GPS, have contributed significantly to the accurate detection of user location (Dey & Häkkilä, 2008). However, context involves more than just where the user is situated, and also includes: surrounding terrain, the other people in proximity, as well as the simultaneous performance of different tasks. These factors are difficult to measure and predict, but are realities of on-the-go usage (Schilit *et al*, 1994; Schilit & Theimer, 1994). More detailed research has been performed to understand the various "modes" of contextual behaviours, such as walking, waiting, socialising, navigating, hurrying – or indeed combining all these tasks in a typical 21st-century, multi-tasking experience. Each of these different "mobilities" demand appropriate multi-modal input facilitation; for example, interaction with information on a mobile phone while walking might ideally require single-hand input rather than two-thumb keyboard typing (Tamminen *et al*, 2004:136). The mobility of a smartphone offers significant contextual opportunities, but these devices are now also expected to adapt appropriately with the user's rapid changes in context – and act upon them (Dey & Häkkilä, 2008). Kaasinen (2003) discusses the impact of social setting and the situation of use for different mobile services. For example, gaming sites are mainly used at home and at night, whereas internet research services are more frequently used in locations outside of the home environment. A phone application that is used during outdoor exercise would demand different input functionality to one that is used in an indoor sedentary context. Current mobile interface designs therefore require a typical "stop-to-interact" approach, simply because of the complexity of the tasks that are now performed on mobile phones (Robinson *et al*, 2015:387). The impact of people in the environment also applies to commuting, which would require an interface design that adapts to experiences of walking, waiting, and mixing with crowds of people (Böhmer *et al*, 2011). Unlike the desktop computer, the mobile is used in so many different situations and contexts, specifically while multi-tasking, it is even important to take into account factors such as time of use when developing effective interaction methodology for this medium (Church & Smyth, 2008).

I argue that context-relevant information is of considerable importance to the interface designer and UX writer in the process of developing appropriate functional

information for mobile media interaction. This information might lead to relevant shortcuts or menu buttons as a method of inputting instead of typing on a keyboard, to minimise the complexity of the action – and the related cognitive load (Abowd *et al*, 2002). The deficit in the mobile screen size could therefore be overcome with "situationally-relevant device functions" (Dey & Häkkilä, 2008:215). Modern mobile users assume that contextual factors such as location recognition have been considered, and are likely to move to an alternative service or site if any frustration is experienced in the process of interpreting information. The context of usage also presents an increase in the cognitive load experienced by the user, which makes it imperative to take these distractions into account and simplify the interaction wherever possible. The mobile user is ultimately striving to gain quick access to information or a particular service with the least amount of interaction effort, within a specific context of use (Kaasinen *et al*, 2003).

The unique characteristics of the mobile phone device

The physical characteristics of a mobile phone have a direct impact on the way in which information is designed, written and presented on this medium. Elements such as the shape, size, functionality, and interface of the device will logically influence the user's interaction experience in the interpretation of information.

At face value, the small screen and fiddly keyboard pose a daunting challenge for the interactive designer and digital media writer. The obvious reduction in screen space implies limitations and restrictions regarding the communication opportunities of a mobile device compared with a desktop computer. However, my core argument suggests that these challenges simply demand new ways of thinking for all the role players involved, including graphic designers, interaction designers, UX specialists, human-computer analysts, developers, and digital writers. There is a definite "mobile-first" approach currently adopted in the development of user-focused content, which demonstrates an increasing understanding of the unique characteristics of mobile as a medium (Xia, 2018, Longo, 2012).

The two primary practical features of the mobile device that are discussed in this thesis are the keyboard and the screen.

The mobile phone keyboard

The first handheld device, or Personal Data Assistance (PDA), the HP95LX, released by Hewlett-Packard in 1991, featured a small QWERTY keyboard.[28] The keyboard was so small that touch-typing was virtually impossible. The pen device was introduced in the late 1990s, but handwriting recognition technology wasn't yet effective or commercially viable, so these technologies proved to be inaccurate and demanded too much memory. The next major development was the soft keyboard, which disappears when not in use, allowing for screen space to be maximised. This is the input feature that is currently most commonly used in modern smartphone design (Bellis, 2018).

The role of the keyboard on a phone provides a familiar way of controlling content on the screen, and inputting new information. Although the traditional QWERTY keyboard layout was invented more than 100 years ago (Anderson, 2016), it persists as the standard keyboard on the latest Apple and Android smartphone designs. August Dvorak invented an alternative keyboard layout in 1874, claiming a more ergonomic and efficient typing experience. This format and ABCDE are thought to improve typing comfort and speed (Page, 2013). However, it is the QWERTY format that has endured as the accepted keyboard layout. The technique of typing with all ten fingers was invented many years after the QWERTY design, so it was coincidence that this illogical letter layout allowed for reasonably efficient typing with both hands. It has, however, proven to be less efficient for two-thumb typing, which is the most common technique for mobile usage (Kristensson, 2013). It is therefore surprising that this keyboard remains as a standard feature of all smartphone design. Anderson points out accurately, "while every other aspect of the way we commit printed words to record has changed in the past 100 years, the layout of the keys we type with has remained static, despite having evolved to meet thoroughly bygone challenges" (Anderson, 2016).

There has been some research into alternative, more ergonomically efficient keyboard layouts. Kristenssen developed a keyboard layout, known as KALQ, to develop a more thumb-friendly typing experience. The research was based on three factors: the unique grip that is appropriate for thumb typing; the equal use of the two

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[28] The QWERTY keyboard is the standard keyboard design for Latin-script alphabets. It was invented by John Pratt in 1864 to avoid the typewriter hammers from jamming, by separating the recurring two-letter combinations. The current formation of the letters was only finalised in 1874 when Remington and Sons acquired the patent (Anderson, 2016).

thumbs and the distance each thumb needs to travel. Although there are no signs of the KALQ keyboard becoming a permanent alternative to QWERTY on future smartphone design, it can now be downloaded as an app (Kristenssen, 2013).

The ultimate goal of effective usability is to create an interface that produces fewer errors, feels intuitive and natural for the user, and ultimately requires minimal cognitive load (Page, 2013). The persistence of this relatively antiquated design could be questioned, but there is an ingrained familiarity with this keyboard among mobile users that would be difficult to shift without significant added benefit. Smartphone developers are reluctant to launch new device models with a completely new keyboard that would require current user behaviours, skills and habits to be altered and re-learnt.

The mobile phone screen

The limited space on a mobile screen introduces new challenges to digital designers and content developers. The smartphone user has also had to adapt to these new constraints and is gradually learning how to complete tasks efficiently on the small screen. The smartphone is ideal for "short dashes of activity or *microtasks*" (Clark, 2010:32)*.* The connection between the keyboard and the screen continues to evolve and users are becoming more comfortable and skilled at interacting with their mobile devices (Kostromins & Baltmanis, 2014).

Although touchscreen technology was utilised in the 1970s, it only became standardised for mobile phones after the Apple iPhone was launched in 2007. The adoption of the touchscreen became popular for several reasons, including flexibility of design, and cost efficiency of development. The launch of the iPhone was immensely influential in the phone user's screen technique and interaction methodology. The introduction of the iPhone created a paradigm shift in mobile touchscreen interfaces; it essentially set a new model for future touchscreen products and inspired further research activities in the field (Colley, 2017:30).

Touchscreen technology transformed the mobile user experience, allowing for a variety of different operations, including swipes, slides, magnifications, taps, pinches, and zooms (Robinson *et al*, 2015). The familiar "pinch and zoom" action has become a standard learnt behaviour across phone brands, and extends beyond the use of mobile phones into all digital applications, including tablets, game devices, digital information billboards, and even ticket dispensers at airports and cinemas (Colley,

2017). Mobile users have already become instinctively familiar with the swiping action to move content either vertically or horizontally on touchscreen devices. This action presents a significant shift in the interactive behaviour of the mobile user. I propose that this behaviour plays an important role in the way content is read and information is retrieved on this medium, which in turn affects the manner in which it is written.

Disadvantages of the touchscreen

The benefits of touchscreens are also counteracted with certain disadvantages that are worth considering in the context of this discussion. The generally recognised shortcomings of the touchscreen are summed up in two points: poor accuracy, and the missing haptic feedback associated with mechanical controls.

Accuracy of input became known as the "fat finger" syndrome, suggesting that the shape and softness of a typical finger creates a broad area of contact with the screen, which results in lack of accurate control with a specific screen area. The finger also occludes the content on the screen at the point of contact, reducing visual feedback and contributing to inaccuracy (Kolly & Wattenhofer, 2012). Further research argues against this theory and introduces the perceived input point model, which reasons that the inaccuracy is caused by the posture or orientation of the finger at the point of contact, as well as the mental approach of the user, rather than the shape of the finger (Holz & Baudisch, 2010).

The second shortcoming of a touchscreen is the loss of tangible mechanical controls that are integral to our interaction with other things in our daily lives – a door clicks when it's shut, a volume dial slots into a groove for each level, a button pushes in or out to indicate whether an appliance is on or off (Norman, 1988). All these tangible signals of successful interaction reduce the need for visual acknowledgement, which becomes a crucial criterion in touchscreen interaction. One of the features of any satisfactory human-product operation is the need for clear indication of successful input: did the "button" you press respond in the way it promised it would and achieve the intended objective? The switch of a light makes a globe shine; the twist of a knob makes music play. In a digital context, this need for interactive satisfaction is counteracted in other ways. In the absence of haptic response on a touchscreen, the role of the design and text is therefore required to provide reassurance that the action was successful (Robinson *et al*, 2015). For example, a competition entry on a

touchscreen mobi-site could be followed up with reassuring text, such as, "Thanks, we received your entry", or "You're ready to move onto the next step".

These shortcomings in the interactive experience with touchscreens have encouraged on-going research to develop improvements in the user experience. Further details of the specific human interaction have been explored, such as the shape of the finger's contact area, as well as the varying functionality of individual fingers. Technological solutions have also been considered, including concepts of morphing screens and sequential touch covers (Colley, 2017), NanoTouch backside screens (Baudisch & Chu) and Ridgeway fingerprint sensing (Holz & Baudisch, 2010). It is also noted that individual touchscreen input behaviour is different for each type of user, which presents a plethora of front-end and hardware design opportunities (Kolly & Wattenhofer, 2012).

Alternative input methodology on mobile phones

Although the keyboard currently provides the most common method of input for a smartphone, this might not be the optimum approach. Researchers are now looking beyond the keypad to consider other possible interactive opportunities that match different behaviours and emotions, as well as new advances in technology (Page, 2013). Freehand pen-based interaction is experiencing a resurgence with improved results, after the first-generation designs were unsuccessful in the 1990s. A range of different "graspable" objects is also being considered to manipulate electronic screens (Abowd & Mynatt, 2000:32). The texture of the touchscreen presents alternative methods of interaction, with varying nodes and tactile surfaces representing specific tasks or features on the phone. The use of vibration and buzzes to elicit information feedback is an area of future research that could replace the necessity for physical viewing of text on a screen (Robinson *et al*, 2015).

Body-based design thinking introduces further opportunities for screen interaction with natural actions, such as gestures, nodding, waving, or turning and twisting the device around to trigger a specific action or input. These interactions present familiar and easy input methods to augment elements of the graphic user interface (GUI) and produce computer interaction that more closely simulates the way people behave in the physical world (Abowd & Mynatt, 2000; Jones & Marsden 2015; Robinson *et al*, 2015).

To illustrate this point, some apps for advertising campaigns feature interesting physical interaction mechanisms, such as shaking a virtual box of chicken pops or blowing on the screen to release the seeds of a dandelion. These innovative input actions could also be applied to basic interaction with information on a mobile phone, such as a shake to change a song track or a tilt to undo an error. Interactive design trends are starting to focus more on user's *non-digital* experiences to inspire the most rewarding digital engagement. Bret Victor argues for a more holistic vision of future interaction that goes beyond the one-dimensional use of the finger to touch or swipe a screen; and asks the question, "with an entire body at your command, do you seriously think the Future of Interaction should be a single finger?" (Victor, 2011). There are so many different motions and gestures that people use in their everyday interaction with the world, they could provide alternative methods of user manipulation with digital devices (Robinson *et al*, 2015). As these features become more commonly integrated into the operations of the smartphone it eliminates the need for visual or textual feedback and consequently influences the content developed by the digital writer to ensure a meaningful user journey. It is therefore important for the writer to stay in touch with these developments when designing text for this medium.

Voice-activated interaction input

There is a growing interest in the role of audio and use of sound as a method for interaction with digital interfaces. The relationship between visual and audio is fundamental to most media and communication channels, originating from the traditional cinematic experience (Felton, 2013). Audio cues play a significant role in enhancing the user experience, and many auditory icons have become integral to everyday digital interaction.

When a file is moved into the "trashcan" on an Apple Mac, it makes a familiar thump; or when an email is successfully sent, it issues a satisfying whoosh. William Gaver suggests that non-speech sounds add valuable functionality to a computer interface because auditory icons have the ability to categorise information into distinct categories with a single sound (Gaver, 1989). Audio icons can also relate more directly to sounds that occur naturally in people's lives. However, some of these sounds are often arbitrary and metaphorical and have no relation to the action they represent, but they become familiar with frequent application and eventually play a core communicative function. I suggest that this point on *audio* symbols relates to the

discussion on signs in Chapter 5, which focuses on *visual* symbols but also reflects de Saussure's theory that signs are arbitrary and only given meaning by their context (de Saussure, 1974).

In the context of mobile communication, the role of audio is already significant, as demonstrated by the array of ringtones and keypad sounds available on each device. Sounds can even be adapted for different interactions and shortcuts to different activities, such as customised sounds for incoming Whatsapp messages, to distinctive bleeps and pings for SMS or Facebook messages (Designing with audio, 2016). The role of audio is now of considerable importance in people's current interaction with digital media. The invention of conversational agents such as Apple's *Siri* and Amazon's *Alexa* have also normalised the experience of voice instruction as an input for information retrieval from a digital device. These virtual agents are now integrated into people's daily activities and personal spaces and are often given human-like treatment and personified with gender specific pronouns (Purington *et al*, 2017). The use of voice notes on Whatsapp has also increased significantly for personal messaging. Sending voice notes is currently the more common method of communicating on a mobile phone as opposed to texting (Sykes, 2018). I suggest that this verbal method of interaction with a mobile device offers a communication shortcut, and replaces the need to read text on a mobile screen. The concept of voice-activated information retrieval is currently an important topic and is predicted to become a primary methodology for future device interaction (Profit *et al*, 2003; Allan, 2001). It is also a subject requiring considerable and exciting future research opportunities, but isn't central to the area of this thesis, which focuses on the *visual* presentation of text that is *read* on mobile media.

As discussed, there is extensive and exciting research on potential interactive methodologies with mobile screens and smartphone devices. I argue that the ultimate goal of all these design objectives is to simplify interaction and to reduce the cognitive effort experienced by the user to achieve a specific goal. I contend therefore that the text design should utilise a human-focused approach, with an understanding of the needs and abilities of evolving mobile users, as well as the context of usage. With constant advances in screen and keyboard technology, there is a risk of science dictating development rather than insights into human behaviour and the emotional connection with this device. The writing of text plays a crucial role in facilitating the inputs on a mobile screen. I claim this is a role that is often incompetently performed by the designer or developer, without recognition of the

specialist linguistic, conceptual and psychological skills associated with this aspect of information presentation. The topic of the role of the writer in the development process is discussed in more detail in Chapter 7, as well as the appendix featuring opinions from industry role-players.

Conclusion

In this chapter I have provided a valuable background to the trends in mobile usage, demonstrating significant and persistent growth, both globally and in South Africa. The smartphone offers significant benefits of convenience and multi-functionality, making the device indispensable and integral to everyday interactions and activities. The concept of *mobile* usage cannot be ignored, as the on-the-go contextual usage of this device is core to the unique behaviour and expectations of the user. I analyse this in relation to theories on context-awareness, which consider factors such as the influences of the surrounding environment, location sensitivity, "mobility" behaviour and the impact these distractions have on the user's cognitive load. I also discuss the physical characteristics of the mobile phone, specifically the keyboard and screen, in relation to the contribution of the mobile writer. Elements such as the reduced size of the screen and two-thumb typing action present new challenges for the interface designer and writer to ensure the user interaction experience involves the greatest reward and least amount of cognitive effort.

CHAPTER FIVE: PSYCHOLOGICAL CHARACTERISTICS OF THE MOBILE USER

Introduction

The relationship between humans and different digital media is integral to this research discussion (May & Hearn, 2005; Miller, 2015; Oksman, 2010; Pirolli & Card, 1999). This chapter discusses some of the psychological traits of the mobile user associated with smartphone interaction. The mobile user displays a unique set of behavioural patterns, characteristics, mind-sets and expectations, which are essential for the writer to understand in the process of developing content for this device.

I argue that the behaviour of the typical mobile user influences the manner of interpretation and interaction, which consequently affects the approach to writing text. The goal of effective communication on any medium is to limit the cost of interaction required to achieve a desired objective. Each element in the presentation of information on mobile media therefore aims to minimise the cognitive load experienced by the user, allowing the mental resources to remain focused on achieving the intended interaction objective (Sweller, 1994). The aim of reducing cognitive load is not to over-simplify the content, but rather remove unnecessary steps in the interpretation process. In this chapter I analyse the principles of CLT in relation to mobile media as one of the theoretical foundations of this research argument.

Cognitive load theory in context to mobile media

As discussed in Chapter 2, CLT arose from the field of educational presentation, but this theory is relevant to many areas of design and media communication. Information presentation on digital platforms, such as websites and mobile apps, shares many common characteristics with educational material design in terms of user interactivity, task-focused interpretation of information, and an understanding of user expertise, and previous knowledge (Feinberg & Murphy, 2000:353). I develop this thinking to apply to user interaction on the mobile smartphone, which involves considerable extraneous cognitive demands.

There are varying degrees of "element interactivity" that take place in the processing of information. If it happens simultaneously, rather than successively, there will be an increase in cognitive load. For example, a student who is learning a foreign language is required to translate the individual words while simultaneously interpreting the meaning of the words in the sentences (Sweller, 1994:303). In the same way, the digital user has to figure out the navigation of a website or app while simultaneously interpreting the meaning of the text. These additional "element interactions" result in a higher level of cognitive load and explain why some texts and websites are more difficult to comprehend than others. It is challenging for the user to focus on understanding the information content if it is first necessary to engage in instructional activities (Chandler & Sweller, 1991:295). Effective information presentation on mobile phones therefore has a direct impact on reducing the cognitive load, by making the navigation clear and simple, as the user is also dealing with other extraneous factors such as multi-tasking, attention distractions and on-the-go usage (Oviatt *et al*, 2004).

As discussed in Chapter 2, an important element of CLT is the categorisation of information into schema. By categorising individual elements into a single schema, learners (and users) are able to increase the amount of information that is held in the working memory of the brain. This becomes feasible because there are no limits in the *complexity* of information that the working memory is able to process so the individual schema could contain a vast amount of information (van Merriënboer & Sweller, 2005). The way in which information is processed can also either be controlled or automatic; if the reader has existing knowledge of the topic, the learning becomes automated, allowing working memory to be freed up for other activities (van Merriënboer & Sweller, 2005:150). I apply this theory in support of my argument, that the presentation of information on a mobile interface can *facilitate* schema acquisition by categorising information into meaningful pieces and presenting them at relevant stages in the user journey (Sweller, 1994:295). The user's cognitive resources are then free to focus on comprehension of the text, allowing for a deeper interpretation of meaning. It is easier to acquire new schemas and automate them if the instructional method assists by compensating for the limitations of the working memory (Oviatt, 2006; van Merriënboer & Sweller, 2005:149). This theory is also relevant to digital information presentation in the form of "chunking"; a term initiated by Miller (1956) many decades before the invention of smartphones. "Chunking" is now a common and important technique utilised in website content presentation, and also applies to mobile interface design, and the structuring of textual information.

The role of user-centred design in reducing cognitive load

The underlying principles of UCD are relevant to my argument in that usability is improved by gaining an intricate understanding of the mobile user. By analysing relevant needs, behaviours and expectations, the writer and designer can present relevant information at the right stage in the user experience, thereby reducing the cognitive effort. The historical approach to HCI was based on technology, which required the user to learn how to interact with a specific interface. In contrast, current human-centred design creates more intuitive interfaces that model users' natural behaviour (Oviatt, 2006:2). The system is therefore shaped around the user's *pre-existing behaviour* instead of constantly trying to re-train entrenched patterns. User-centred interface design always aims to leverage users' previous experience, knowledge, preferences and engrained behavioural patterns. Every level of the interaction should avoid unnecessary complication, in terms of linguistic, diagrammatic, symbolic and numeric elements. If all digital interfaces are designed with familiar elements and relevant functions, users will be able to focus on performing well in the interpretation process (Oviatt, 2006; Hedberg *et al*, 1993).

Cognitive fluency and familiarity

It can be argued as a subjective perception that people generally prefer to interact with things that are easy to absorb, function or read (Jacoby & Dallas, 1981:308). This *feeling* of ease or difficulty to achieve a specific task is known as "cognitive fluency" (Roller, 2011). Colleen Roller suggests that this subtle and often subconscious fluency is of considerable importance when designing user experiences as it guides the user's thinking in the decision making process. The concept of "familiarity" is integrally linked with cognitive fluency and provides a strong motivator for human behaviour, as familiar things feel easier (Roller, 2011). Fluency becomes a "mental shortcut" by the user to determine if the information presented is something that has been encountered before. It therefore prevents the user from spending any unnecessary time or effort in re-learning what is already known, which follows on from the principles of UCD. In the fast-paced context of digital communication, even a millisecond of confusion can increase cognitive load and force the user to have to think twice before making a decision.

The Microsoft Word menu bar provides a useful example of how familiarity has become ingrained in users, reducing the effort during interaction and demonstrating that expectations can be based on habits rather than preferences (How design sites

match user expectations, 2015). Even the choice of font in information presentation can create or avoid levels of mental effort, as well as the *perception* of the actual content. If the font is difficult to read, the user also *perceives* the task to be more difficult (Song & Schwarz, 2008). When a stimulus *feels* more fluent, the user is more likely to make a decision based on a gut feeling, which usually takes place before the more rational and analytical decision process. In contrast, when the presentation of information feels "disfluent", this results in the user slowing down to reassess the decision (Roller, 2011). I suggest this principle applies to the text on mobile apps or websites because the wording of information plays a significant role in creating an impression of simplicity, or complexity. The choice of vocabulary, style of phrasing, and tone of voice can create the feeling that the app is approachable, appealing, and "fluent".

Another component of familiarity can be found in the concept of prototypes, which give the brain a "template for how things should look and feel", or a mental image to help categorise the things around us (Walker, 2017). People consider a prototypical piece of furniture to be a chair, and a prototypical chair to have four legs and a seat. However, this idea is also relevant to a prototypical website or mobile app, which follows expected patterns in terms of design and structure. In the context of an e-commerce site, a prototypical element would be the shopping cart that leads to the payment portal. If familiar or prototypical elements are omitted or altered drastically on a digital interface, the user feels out of control, gets frustrated and is unlikely to complete a purchase. This rejection might take place on a subconscious level, as Garrett suggests a strange thing happens when people interact with technology; they tend to blame themselves when it doesn't work out according to expectations. Ineffective design makes users feel like they have done something wrong and "making people feel stupid drives them away from a site" (Garrett, 2010:17). Tognazzini supports this point, with a critical view of Apple's decision to remove the scroll bar on their interface. When the scroll bar isn't present, users have no way of identifying their location within a document, without actually initiating a scroll to a different part of the document (Tognazzini, 2013). This action requires an additional step, resulting in increased cognitive load.

Factors associated with reading on a digital screen

The degree of cognitive load experience by the mobile user is influenced by many factors, including the effect of reading text on a small digital screen. This section

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discusses the negative and positive psychological effects of this experience, which are important considerations in the process of designing and writing for this medium. Technology aims to improve people's lives and add value to everyday activities, but there are also shortcomings associated with human-computer interaction. The manner in which people interpret information on a digital screen is different from the experience of reading books, or other printed material, which can result in reduced accuracy and slower reading speeds (Dillon 1992; Jabr, 2013; Noyes & Garland, 2008:1370; Wästlund, *et al*, 2005). Reading on a digital screen reports higher levels of eye stress and fatigue, which also impacts on the cognitive load experienced by the user because the light, reflection and flicking is physiologically more demanding than reading paper text. As screens become smaller on mobile devices, the possibility of eyestrain also becomes greater (Common causes of eye fatigue, 2013).

Reading content from digital devices results in a missing tactile experience that is integral to reading printed material. It is ironic that the word *touch* features in the title of a touchscreen and yet this sense is often neglected and marginalised in the design of user interfaces (Kolesárová, 2018). This missing sense of touch is known as "haptic dissonance" and can be defined as the "perceived unpleasantness an individual experiences because using an object feels physically different from other cognitions held by the individual" (Gerlach & Buxmann, 2011:6). The tactile feeling of a printed book plays an important role in a user's attitude towards the digital reading experience (Tanner, 2014) as the manipulation of text on a screen can be clumsy compared with the simplicity of turning a page (Dillon, 1992). However, the role of tactile responses with digital devices is a topic of on-going interest to interaction designers, who are now striving to factor in the familiarity of physical real-world user interaction in the digital context wherever possible (Jones & Marsden 2006; Resmini & Rosati, 2011). In the context of the mobile device with its restricted interface parameters and on-the-go usage, haptic response plays an essential role, as visual feedback in this context isn't always sufficient. Some efforts are being made to address this need, such as physical edges on graphical widgets, clickable icons, or vibrations (MacLean, 2008). Other innovations include: "Tactile Layer" technology on the screen (Li, 2013), interaction gestures (Kolesárová, 2018) and "vibrotactile" feedback during manipulations such as text selection, scrolling, and button clicks (Kaaresoja *et al*, 2008). From the perspective of the mobile writer, I suggest some of the missing haptic attributes can be compensated with relevant textual instructions and reassurances based on the individual needs of the user.

Lack of consistent digital formats

Digital platforms don't feature a standardised architecture, unlike the standard format of a book, with the familiarity of chapters and a contents page. The information on each website and mobile application is presented in a range of different templates, formats, and designs. As a result, the user is required to re-learn the navigation for each journey, which affects the reading experience and increases the cognitive load. There is a trend, however, to standardise the features and elements in user interface design to create consistent design and UX conventions. The global Android guide to visual and interaction design, www.material.io, is an example of the universal drive to create standardised specifications and style components when designing mobile apps (Material design for Android. n.d.).

As discussed in Chapter 2, Jakob Nielsen's usability principle, known as "Jakob's Law of the Internet User Experience" suggests that users prefer a website to work in the same way as most other sites they know. Mature digital users become accustomed to certain standard features and begin to expect certain design conventions (Nielsen, 2004). It might not be possible to standardise every element on a website, but certain consistent design patterns are now recognised to establish commonality in user behaviour. Some of the recognised standard, universal web design elements are featured in the visual example provided in Figure 5.1.
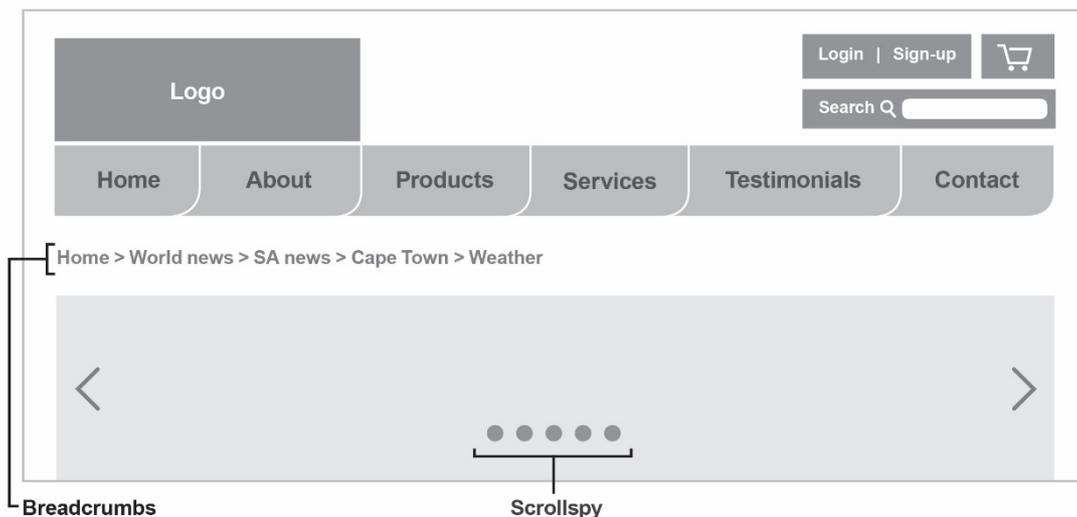

Figure 5.1: Example of standard web design elements and navigation features.

The universal elements shown in Figure 5.1 include: the logo in the upper left corner of the page; search box on the right side of the homepage; navigational

"breadcrumbs" listed horizontally under the navigation bar; shopping cart in the upper right corner of the page; login and sign-up links in the top right hand corner; arrow icons for scrolling horizontally or vertically and scrollspy to indicate the scope of content. The standard horizontal global navigation bar also features common tabs in a universally accepted order. These design conventions apply to desktop websites, but the principle of standardisation is also relevant to mobile interface design. Although these conventions play a role in reducing the cognitive load of the user, I contend that the digital designer is not compelled to adhere to template-based web design for effective presentation of information, but innovation should not impede communication.

Psychological effects of reading on digital screens

One of the consequences of perpetual interaction with digital screens is the inability to read attentively for extended periods of time. Nicholas Carr (2011) analyses this user behaviour from a neurological perspective, and determines that reading online content actually rewires neural pathways, which ultimately affects the way people currently read and interpret information on digital media. Carr claims that constant immersion in digital technology has affected the way people consume information as media channels offer more than just information **"they supply the stuff of thought, but they also shape the process of thought"** (Carr, 2011:6). The interpretation process takes place in different parts of the brain; the pre-frontal cortex regions of the brain are stimulated when users engage with websites, as this is the area of the brain associated with problem solving and decision-making. The experience of deep reading and sustained concentration, in contrast, is activated through the temporal lobe in the back region of the brain; an area that is now becoming neglected in the digital age, and even shrinking (Small & Vorgan, 2008).

Small demonstrates that people's brains physically change in response to excessive interaction with digital media[29] and claims that consistent exposure to technology strengthens new neural pathways, but also results in a weakening of other areas (Small & Vorgan, 2008). Reading content on digital media doesn't only involve reading, but also evaluating links, scanning, sifting and constantly making navigational choices, which interrupts the deep thinking processes and distracts focus from the interpretation process (Carr, 2011:122). The overload of stimuli and activity makes it difficult to analyse and understand content and results in increased

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[29] After one hour of internet search for five days, the users' brains revealed heightened activity in the pre-frontal cortex (Small & Vorgan, 2008).

cognitive load. This research explains why digital users struggle to concentrate on longer pieces of content, or even finish an article right to the end (Manjoo, 2013).[30] I argue that these insights present significant considerations for the digital writer, including a guide to suitable text length in relation to the diminished concentration levels of the user. This discussion also aligns with the underlying principles of CLT in that users struggle to interpret intrinsic information if the mind is required to engage with extraneous instructional activities that are not relevant to the purpose of the content (Chandler & Sweller, 1991).

Despite the negative effects of reading text on a digital screen, there are also positive outcomes associated with the experience. In opposition to Carr's (2011) negative claims, Thompson (2013) presents a more optimistic perspective on the future of human-computer interaction. He counteracts the claim that exposure to technology is rewiring people's brains negatively and points out that people already experience cognitive overload in many areas of everyday activity, not only on digital platforms. The relationship between humans and technology is "rippling through every part of our cognition"; it affects the way people learn, memorise and how they act on this new knowledge, "emotionally, intellectually and politically" (Thompson, 2013:6). Thompson refers to other tools in history that humans have used to augment thinking processes, or "outsource bits of cognition": printed books, pens and paper, newspapers, the telegraph, the word processor – and now the mobile phone. People are constantly using tools to enhance their ability to solve problems, much as a software package allows people to perform complex tasks (Clark, 1998). Thompson (2013) demonstrates how inventive digital tools are pushing us towards new behaviours and opportunities rather than inhibiting our cognitive ability, in fact the increase in human interaction with digital devices is deeply positive. To illustrate this he references the vast increase in the number of young grand chess masters in the 2000s compared with the 1900s. Thompson (2013:6) argues that rather than restricting our ability to think, the distractions of technology are creating opportunities to make impossible connections, find information with unimaginable ease and provide tools to "scaffold our thinking into ever-more-rarefied realms". I build on Thompson's optimistic view of digital interaction and suggest that it foresees a future of immensely competent, experienced digital users with elevated expectations,

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[30] A study of readers' scrolling behaviour revealed that readers predominantly only reach the 50% point in an article, or the 1000th pixel, and only 25% of readers make it past the 1600th pixel of a page. Only 5% of users who clicked on the article start scrolling at all (Manjoo, 2013).

requiring interface designs and user experiences that match their heightened skills in the interaction with digital tools.

The emotional attitude towards reading on digital screens

The anecdotal view of reading an e-reader is that it does not offer the same rewards as reading a traditional book – there are often irrational comments made regarding the appealing smell of book pages. This emotional attitude towards reading on mobile phones and digital screens also influences the overall user experience. However, there isn't any scientific or cognitive reason why people claim to get more pleasure from reading printed books (Benedetto *et al*, 2013:5), and there is now a greater willingness for people of all ages to read long-form content on a phone or digital screen (Mitchell, Stocking & Matsa, 2016). Users are also learning how to read and interact with screens better, which could be a consequence of advancements in the LCD screen technology.[31] An important contribution to these new technologies is the non-reflective backlit E-ink screen, which more closely mimics traditional ink and paper and features on some of Kindle's e-readers such as the "paper-white"[32] (Kozlowski, 2018).

The digital screen poses significant practical, emotional and psychological challenges for the reader. I suggest these factors should be taken into consideration when writing text for the mobile digital screen. However, there is a definite shift towards a more positive attitude regarding reading digital content, in contrast with the previously sentimental connections people associated with paper media (Jabr, 2013). I argue that as technology improves, and the digital user becomes more comfortable and capable, the digital screen will diminish as a potential barrier in the effective interpretation of information on a mobile device.

The characteristics of digital user behaviour

The digital user, and specifically the mobile smartphone user, exhibits notably different behaviours and attitudes compared to the reader of printed material. These

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[31] According to Carl Taussig, a director at Hewlett-Packard's information surfaces the new LCDs do not affect the eyes as much because the screens now update every eight milliseconds, whereas the human eye is moving at a speed between 10 and 30 milliseconds (Bilton, 2010). Improvements are also reported when the cathode ray tube (CRT) terminals were changed to liquid crystal displays (LCDs) (Benedetto *et al*, 2013).

[32] Eye fatigue is reduced when reading on e-reading devices for long periods of time, compared to traditional digital screens (Kozlowski, 2018).

factors are important to understand when writing text for this medium.

Unique psychological traits of the mobile user

The relationship people experience with their phone is unlike that associated with other media devices or appliances; it is considerably more personal, intimate, and integral to their everyday activities and challenges (Miller, 2015).[33] The choice of device also reflects a specific personal image: the phone has become a statement of aesthetic values, reflecting a similar psychology to the adornment of jewellery or other fashion accessories (Katz, 2005). The simple presence of a mobile phone in a social setting has proven to have an impact on the quality of conversation (Misra *et al*, 2016). Mobile users talk about their phone as if it is an extension of their body. Miller suggests the mobile phone and the user are "intertwined"; it defines us and enables us to be "more than just human, but perhaps humans +" (Miller, 2015:3).

The behavioural characteristics of typical web users are not very complimentary: once people transform from being readers to digital users, they tend to become impatient, distracted, impulsive and cynical individuals. As Crawford Kilian asserts, users want **"**jolts of gratified inquiry" (Kilian, 2001). Google researcher, Lisa Gevelber suggests mobile users demand instant gratification and immediate action as they have become "empowered and emboldened by information" (Gevelber, 2017). Digital users have evolved from food-foraging for survival to info-foraging, which satisfies their deep urge to seek out information (Gazzaley & Rosen, 2011:4). The distraction faced by digital users is an important factor, as they seldom focus on only one task at a time, usually have several search tabs open and are constantly multi-screening.[34] This continual shift between tasks on desktop and mobile screens results in increased cognitive load and reduced performance. The issue of distraction is an even greater factor in the context of the smartphone user, and is escalated by the experience of consuming information in a mobile manner (Malin, 2016).

As I discussed in Chapter 4, *contextual* usage plays an important role in the presentation of content on mobile because users frequently interact with their devices while performing another activity: such as walking, commuting or exercising.

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[33] A study showed that 58% of smartphone owners said they don't go an hour without checking their phone and 54% said they check their phones while lying in bed, before they go to sleep and after they wake up (Miller, 2015).

[34] In 2016 approximately 68% of internet users in the United States accessed the internet via smartphone and TV simultaneously" (statista.com. 2016).

Google researcher, Phil Webb (2012) identifies three patterns of mobile user behaviour; *repetitive* – seeking recurring real-time information; *bored* – seeking reward while waiting; and *urgent* – demanding information at a specific moment. All of these contexts are associated with several distracting elements, including noise, light, and people; issues that wouldn't be a factor while interacting with a desktop website (Verkasalo, 2009). Google research shows that mobile users often leave a page after 3 seconds (Fitzpatrick, 2016), emphasising the need for fast and easy access to information.[35] I argue that appropriate functional microcopy and text on mobile media can contribute to ease of interaction, taking into account the additional distractions of the mobile user in the search for information.

The expectations of the digital user

Digital users are almost entirely goal-directed – they visit a website or use an app to find information, complete a task, or satisfy a specific objective (Redish, 2014). If the text or visuals do not immediately communicate the information, or the navigation is confusing, users are reluctant to work too hard. They typically get frustrated and are likely to leave if their expectations are not fulfilled (Garrett, 2003).[36] When these high expectations are combined with the distracted and impatient nature of the digital user, it becomes even more important to provide immediate value to the user, and more challenging for the designer and writer to provide a satisfying user experience that minimises the cognitive workload.

The expectations of a user are present at every stage of interaction with digital content, even if they happen subconsciously. These expectations could even begin *before* interacting with the interface, as a result of the initial marketing or advertising for the website or app (Brandall, 2016). Expectations are also created by the messaging on the home page as it establishes a promise of tone and content for the rest of the journey. Other forms of expectation relate to the functionality of navigation tools, such as the expectation of a link button clicking to another section. In a guide for IBM, Peter Seebach discusses the frustrations caused by websites that hide navigation buttons or redefine the basic visual cues users need for navigation

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[35] Google research reveals that 53% of mobile users leave the page if it doesn't load within 3 seconds (Fitzpatrick, 2016).

[36] Regarding the average amount of time people spend on the first entry of a website "Users often leave Web pages in 10–20 seconds, but pages with a clear value proposition can hold people's attention for much longer" (Nielsen, 2011).

(Seebach, 2001). He uses the example of the blue underline that represents an active link, suggesting that it isn't sensible for designers to change this convention for the sake of aesthetics because there is now an expectation that a blue underline links to another specific page or site. There are several fundamental elements that developers and content writers can observe to meet user expectations and reduce frustration: accurate data, responsive interfaces, progress indicators, easy logins, consistent input functions and easy correction of errors (James, 2009).

I suggest that the writer plays an integral role in matching the wording on a site with the keyword terminology required for effective search-engine friendly text (Redish, 2014:261). User expectation also relates to the experience of searching and finding specific information from a search engine. Search engines have a significant influence on user expectations as the vast scope of information available to users to satisfy a specific need creates elevated expectations. Google has had a dramatic influence on user expectations, even within the context of library information retrieval. Users now not only expect ease of use and a massive amount of information to be available, but also the intelligent semantic outcomes to keyword searches that are so efficiently offered by the world's biggest search engine (Miller, 2014).

There are also expectations in the *internal* journey through the content, as an internal link should accurately transport the user to the relevant section. This expectation can be satisfied if attention is paid to the navigation and architecture of information. Each of these stages in the user journey, and many others, involve a level of expectation from the user, even if it then happens without consciously thinking about it (User Expectations, 2018). Steven Smith (2008) suggests user expectation is influenced by the context of interaction at each stage in the journey. He categorises user expectation into three tiers: "entrenched", "formative" and "one-off". The first tier is entrenched – the expectations that are formed over time, including certain conventions, such as the search bar and a contacts page. The second tier is formative – focusing on the expectations that are still being formed in the mind of the user, but show some flexibility. These expectations are formed through consistent online experience, and could eventually become entrenched as the user becomes more web-savvy. The third tier is one-off and applies to the expectations that are formed when a user instantly visits a web page.

There is a definite level of expectation from users to find a sense of familiarity, consistency and convention in their interaction with digital devices. People are

comfortable when there is a connection between their real-world experiences and digital interactions because it doesn't involve any unwelcome surprises (Brandall, 2016). The "Principle of least astonishment" is a theory based on this insight, focusing on negative "astonishment" as in bewilderment and perplexity rather than amazement. It was first mentioned by Geoffrey James in his 1984 book on coding, *The Tao of programming* (James, 1984), but now also applies to many facets of design. Seebach (2001) explores this principle in the context of interaction design, as the navigation through content on a website or app shouldn't involve any unpredicted surprises. The principle presents a useful guidepost for designers to ensure that each feature functions in the expected way to avoid negative "astonishment" or surprise on the part of the user (Keene, 2001; Saltzer & Kaashoek, 2009).

As mentioned in the discussion on CLT earlier in this chapter, if users have to learn new interactive behaviours with every digital interface they encounter it results in higher levels of cognitive load. To illustrate this point, people wouldn't expect to have to relearn the symbols on every road they drive as they are now familiar with what the red, orange and green lights represent on a traffic light. Good design essentially reduces the number of things users need to learn to complete a task (Berkun, 1999). I argue that it is the job of the digital writer and designer to prevent these unwelcome surprises in the interaction with a mobile phone, by being aware of the user's expectations at every stage of the journey. A misalignment between the functionality of the interface and the task-driven motivations of the mobile user results in unsatisfied user expectations, and increased cognitive load.

As a consequence of continual advancements in smartphone technology, mobile users now expect even more from their phones than from their desktops. Mobile experiences are not just contracted versions of desktop interactions; they present unique contexts of use and methods of communication and fact-finding (Schade, 2017). As a result, the convenience of accessing information in any location is no longer a unique or surprising feature, but has become a basic user expectation. Mobile users now *expect* sites or apps to provide easily accessible, simple, relevant and personalised interactions while on the move.[37] Users also expect mobile apps to be targeted to their interests, aware of their geographic location and understanding of their needs at the time of use (Sonderman,

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[37] A Google study revealed that 55% of smartphone owners expect a mobile app or website to work as well as a desktop. 61% of mobile app users surveyed expected apps to start up in less than 4 seconds. 80% indicated they would abandon an app if it presented any problems, including heavy battery usage (Dimension Research, 2015).

2014). To illustrate this point; a mobile application was developed that offers an insurance policy for individual drone flights. The amount for each person's premium could be determined instantly from the users' phone, based on real-time data regarding location, air traffic and weather conditions (Schade, 2017).

The practical features of the phone, such as built-in cameras and voice recorders, also influence the expectations of mobile users, who increasingly communicate using audio or visual content because typing long messages can be more challenging on the smaller keyboard (Sonderman, 2014). Schade (2017) suggests that in spite of the restrictions of the screen and keyboard on the mobile phone, the new tools on these devices are empowering, and enable users to satisfy their needs simply, efficiently and in a diverse range of locations. These unique functionalities should be taken into account in the design and writing process, as scanning and tapping is less error-prone than typing. This point supports my argument that the mobile media writer requires a unique bank of skills, as the future interaction with a smartphone is likely to involve more than visual text, but also conversational voice-activated input. The expectations of the mobile user are unique and constantly evolving. I argue that design or writing text for this medium therefore requires an awareness of these changes, and an insightful understanding of the *individual* expectations of the targeted user.

The behaviour of the experienced digital user

People become more proficient at engaging with digital devices, in particular their mobile phones, as technology becomes more integrally linked to everyday activities. Current digital users have therefore become more "experienced" or "mature", in contrast to novice users, who require more guidance through the user journey. The mobile revolution doesn't only apply to younger digital natives who grew up only knowing a world with mobile phones, other generations are also becoming accustomed to accessing the internet on their phones for research and information-sourcing on the go (Lu, 2017).[38] The attitude by digital and UX designer's towards the novice or experienced user has shifted considerably over the last two decades. In 2000, Nielsen suggested the focus of design should be on the novice user as "most sites don't have many expert users" and it doesn't matter if the performance of a user is slow (Nielsen, 2000). This report offers a few begrudging concessions for the

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[38] A 2017 report from the Pew research centre revealed that 79% of 50-64 year-olds now get their news on a mobile phone, which is nearly double the percentage recorded in 2013 (Lu, 2017).

needs of the experienced user; giving loyal users more advanced design with faster loading pages and providing some additional shortcuts for the experienced user that were invisible to the novice. However, the dominant view at the time was that the "pendulum won't swing all the way back to a single-minded focus on experts" (Nielsen, 2000). This view has undoubtedly shifted, as there are now more experienced users than novices interacting with digital platforms and the focus of design and writing is indisputably directly at the experienced user. Apple designer, Bruce Tognazzini (2013) introduces the idea of the "third user", with the first being the buyer and the second the naïve user. He claims Apple initially failed to consider the full spectrum of users and tended to ignore the experienced user. In their drive to sell computers, Apple initially created clean, slick screens that were not always UX friendly, an approach that has now been remedied. Tognazzini suggests a user-focused approach to design could trigger "the start of a gradual, planned transition from training-wheels to full-fledged computer-user" (Tognazzini, 2013).

The shift in expectations is applicable to most current digital users, who have been exposed to hundreds of websites since their very first interaction with the web and are now familiar with how websites and applications should work. People take for granted that information is available at their fingertips, tailored for their specific needs – they expect the "right here, right now" moments. Google researcher, Gevelber (2017) explains the concept of "micro-moments"; a term introduced to describe typical and pervasive mobile user behaviour. Most people now can't remember what it feels like not to have the opportunity to find information, play, do or buy whenever and wherever they are, simply by reaching for a device in their pockets. The current mobile user experiences an increasing number of micro-moments with every interaction, and with each experience there is a certain level of expectation. Gevelber (2017) sums up the micro-moments in the following three categories: well-advised – they want their phones to provide information and advice on almost anything; right-now – they demand on-the-spot search information to satisfy their immediate needs, and right-here – they want information that is contextualised and relevant to their location. Mobile users are now familiar with the features and opportunities presented by the mobile device, which results in added interactive confidence, and consequently an expectation of reduced effort. These raised expectations impact the way in which content is consumed and interpreted. Experienced users expect a more personalised service that remembers their preferences and previous interactions (Miller, 2014). They are also less tolerant of poor design, content and navigation than novice users and expect user-friendly, aesthetically pleasing interfaces (Smith,

2010). Basic assumptions of navigational understanding can now also be made –
just as writers of a book don't need to explain how the reader should turn the pages.
In the same way, it is unnecessary for a call-to-action link to be titled "click here" as
most users now know a click or tap is required to link to another section. As Redish
(2014:263) explains, "most site visitors today assume that something that looks like a
link is a link". Furthermore, Shephard (2013) states that mature users now expect
conceptual links that indicate further content and add value rather than generic links
with redundant instructions. I suggest therefore that the levels of maturity and
associated expectations of the mobile phone user also influence the writing of text for
this medium.

Conclusion

This chapter discusses the role of the user's behaviour, emotions and attitudes in the
interaction with mobile smartphones, and how this impacts on the writing of text for
this medium. The unique characteristics of the mobile user influence the
interpretation of information and interaction with the device. Mobile users are
generally distracted, demanding and impatient, and also reluctant to invest too much
effort in achieving a specific task. I discuss the expectations of mobile users, which
evolve with more experience and confidence in the medium. One of the primary
expectations of the typical mobile user is *ease of interaction,* in spite of the
heightened demands presented by on-the-go usage. I discuss this level of effort from
the theoretical perspective of CLT and argue that the cognitive load experienced by
the user can be reduced if the extraneous "method of instruction" facilitates the
intrinsic nature of the content (van Merriënboer & Sweller, 2005:150). I propose that
an analysis of the unique psychological characteristics of the mobile user is
fundamental in the development of optimum writing techniques, as text plays a core
role in creating a satisfying user experience.

CHAPTER SIX: THE ROLE OF DESIGN IN THE MOBILE USER EXPERIENCE

Introduction

The text is integrally linked to the *design* of a mobile interface as the words are always working in synergy with the visual elements on the screen (Cooper *et al*, 2007; Jones & Marsden, 2006, Preece *et al*, 2002). This chapter discusses the visual presentation of information on digital media. The design elements on a mobile interface introduce a different form of language and represent an important influencing factor in the writing of text for this medium (Fleming & Koman, 1998:3).

One of the core visual elements that features consistently on mobile apps is the graphic *icon,* which provides an essential shortcut to meaning. In this chapter I analyse the role, meaning, and characteristics of graphic icons, with some discussion on the theories of signs and semiotics (de Saussure; 1974; Eco, 1976; Peirce; 1974). The process of integrating text with digital design elements has a significant impact on the presentation of information, and I argue contributes to the level of cognitive load experienced by the mobile user.

The role of design in creating satisfying user experiences

There are many specialities of design, which I suggest begin to overlap in the development of information on a mobile smartphone. Richard Buchanan (1990:78) provides a valuable overview with the assertion that "design provides the thought which guides the making of all products". The "products" he speaks of include objects, communications, services and systems; the latter of which could now be associated with digital systems and interfaces. Another relevant definition from industrial designer Victor Papanek (1972:4) claims that, "design is the conscious and intuitive effort to impose meaningful order". This thinking supports my argument that conscious attention to the design and presentation of information can contribute to a more meaningful order, and consequently a satisfying user experience. This section therefore explores what exactly is meant by *user experience design* (UX) and usability. "User experience" was first used in a book on user-centred system design (Norman & Draper, 1986) and then popularised in 1993 when Norman described his

job as a "User Experience Architect" (Zimmerman, 2008). The literature presents a range of different definitions for user experience, (Hassenzahl & Tractinsky, 2006; Law *et al*, 2008; User experience NNgroup, 2007) and Zimmerman notes the difficulty of finding a generally accepted definition for the term. The reason for this could be because it is a field that focuses on nebulous concepts, featuring emotional, experiential, hedonic, and aesthetic variables in the pursuit of creating positive human experiences (Zimmerman, 2008).

The concept of "usability" is easier to define because it primarily deals with the attributes of the product, and is often focused on functional errors. In contrast, UX focuses less on how the product works and more on why people enjoy using it (Saarijärvi, 2017). The common feature of all UX research is that it provides a user-oriented perspective on human-computer interaction. This follows the more widely accepted definition of UX presented by Hassenzahl and Tractinsky as "a consequence of a user's internal state, the characteristics of the designed system…and the context (or the environment) within which the interaction occurs" (Hassenzahl & Tractinsky, 2006:95).

Information architecture (IA) is another aspect of digital design, which focuses on the *structure* of content, utilising navigation tools to help users find information that is relevant to their needs. Interaction design (IxD) considers the behaviour and reactions of the user, the environment, and the system. Unlike traditional design disciplines that focus primarily on the form and meaning, interaction design first assesses how things behave and then designs the most appropriate form to communicate those behaviours (Cooper *et al*, 2007). IxD designs interactive spaces to support everyday human communication (Preece *et al*, 2002). User Interface (UI) design focuses on the elements featured on the actual user interface, at the point of contact between the "machine" and the person (Garbade, 2018). I suggest that the design and arrangement of all elements on the interface, including text fields and navigational buttons, strive to engineer the most efficient and enjoyable user interaction, and consequently reduce cognitive load.

Insights into the graphic user interface (GUI)
The interface forms the initial physical contact point for the user, but Moran (1981) claims it represents more than mere aesthetic presentation on the screen when viewed from a conceptual perspective, and also includes the entire behaviour of the system or programme. Foley and van Dam (1983) suggest there are four levels to

the user interface: conceptual, semantic, syntactic and lexical. This thinking is extended by the idea that interface design involves the integration of two "language models", *action language* – expressed by the user, and *presentation language* – used by the computer (Satzinger & Olfman, 1998:169). Human-computer interaction can be viewed as communication between two parties with notably different methods and capabilities of sending and receiving messages. To illustrate this point: in presentation language a word could be displayed with different colours or fonts, whereas in action language a word expresses a user function such as an invitation to click on an icon.

Effective digital interface design also follows the fundamental principles of graphic design. One of the core elements in this discipline is the use of a grid to organise and structure elements on a page or screen, with the purpose of optimising the flow of information. Influential designer, Josef Müller-Brockmann (1996) establishes valuable design principles based on grid structures in his seminal book, *Grid systems in graphic design*. Elements of this thinking are also incorporated in web and mobile interface design frameworks. An important function of the design grid is to apply principles of hierarchy by organising information into categories. This process creates an intuitive sequence for the reader and a logical relationship between elements on a page. Hierarchy can be achieved with basic design techniques, such as size, position, font application, colour and contrast (Fleming & Koman, 1998; Pettersson, 2010). The principles of hierarchy are fundamental to my argument as appropriate information presentation and structure helps to minimise cognitive effort. I suggest these visual cues play a core role in guiding the user to achieve a defined task as they instantly indicate levels of importance in the information, such as headings being larger than body text. The design, text and architecture of the information therefore *curates* the user's journey through a website or app by effectively consolidating the language of the user with the language of the computer.

Techniques for reducing the cognitive load of mobile users
Researchers agree on several basic design and writing principles to help reduce cognitive load, as ineffective presentation can utilise extraneous processing that hampers the comprehension of the intrinsic content (Halarewich, 2016; Shravya, 2017; Whitenton, 2013). Krug (2005:18) stresses the importance of web content being "self-evident, or at least self-explanatory". These basic techniques provide a default for clarity and simplicity in presentation:
• Avoid visual clutter that distracts and fights for attention

- Avoid animations, bright colours and elaborate, illegible fonts

- Use simple navigation for user interaction

- Be sure the instructions are unambiguous

- Eliminate unnecessary tasks or actions that require extra decisions

- Make sure all information is relevant to the objective

- Don't present too much content at the same time

- Don't offer too many choices

- Establish familiarity by building on existing mental models

- Present the most important information and actions upfront

- Organise and break up content into logical categories

There is understandably a level of cognitive overload that cannot be avoided in the navigation through a mobile app or website, as the user is required to make a series of decisions to locate the desired information. The number of steps or decisions can be a common cognitive barrier that prevents users from achieving a specific goal. However, it has been determined that the number of steps isn't the crucial factor, but rather the complexity of these steps. It is therefore preferable to add *more* simple and concise steps rather than fewer complex steps (Anderson, 2017), as Redish (2014:63) suggests "...the smoothness of the path is more important than the number of clicks".

Design principles for mobile media

In 2015, Google prioritised mobile-optimised sites as a ranking criterion for search results, and more recently they implemented mobile-first indexing, basing search rankings on the mobile version of a website first (Jones, 2018). My research is of importance in the field because there is a growing need for mobile-friendly website designs and apps that understand the mobile user and accommodate the unique size and format of the smartphone (Gregory, 2016). Many of the principles and navigational features of desktop website design are also relevant to mobile media (Nielsen, 2004), but the unique characteristics of the mobile phone present individual challenges and opportunities for the designer and writer.

The transfer of content between different digital devices also impacts on the user experience. There are three accepted interface design options to transfer content from desktop to mobile interfaces: stand-alone, adaptive and responsive design (Soegaard, 2018). I suggest these different design approaches and decisions influence the writing of information for mobile media as each format affects the

hierarchy of the headings and position of the text on the screen. The stand-alone mobile design makes sense in theory as a mobile website can then adapt very specifically to this device, but it also requires a high level of maintenance to keep separate site designs homogenous in a seamless way. Adaptive design tailors the content into fixed layout sizes, which effectively customises the user experience, but is also more labour intensive for the designer. Responsive design is the most commonly used design approach as it eliminates the need for scrolling or resizing by automatically adjusting the placement of design elements on a desktop website to optimally fit into the smaller screen of a mobile phone (Jones, 2018; Gregory, 2016). Ethan Marcotte (2010) coined the term responsive web design and suggests this approach allows for a degree of fluidity in the design grid and architecture of information.

The role of navigation in digital design

The navigational elements in a site or app provide crucial cues for users to experience a seamless journey, with the objective of expending the least amount of effort in interpreting information and achieving a specific task (Cooper *et al*, 2007; Preece *et al*, 2002). Unlike a typical real-world journey, the user's movement through a website doesn't have a specific starting point, or even a defined route. Users initially have to figure out how to find what they are looking for; as Garrett explains, "a website is a "self-service product", there is no instruction manual to read beforehand, no training seminar to attend, no customer service rep to help guide the user through the site" (Garrett, 2003:11). The user's point of arrival also isn't guaranteed, or even consistent with each visit. Unlike the experience of reading a book, which starts at the front and progressively moves to the last page, there are several possible entry points on a website. The user can reach a page on a site from many different sources: direct URL entry, internal links, external website links, search engines, social media links. The visual narrative created by the designer in this context essentially governs the user's journey. Atzmon (2010:2) suggests there is seldom a clear beginning middle and end in the rhetoric of a visual narrative. There also aren't explicit chronological or syntactic "directional" markers that are characteristic of traditional linear storytelling. She argues that the interpretation of design elements is frequently programmed by individual beliefs and attitudes, a theory echoed by Rosenblatt (1978) and discussed in Chapter 7, regarding the influence of the reader in determining meaning from a text. In the context of the user journey through a flow of information, it cannot be assumed that the digital user will follow a predictable

narrative, as in entering a site via the home page. Consequently it becomes important for the designer to clearly signal the user's location to avoid confusion and increased cognitive load. The use of explicit "you are here" indicators can take the form of bolded type, frames or different colours for the relevant tabs (Farrell, 2015; Krug, 2005:75). The "breadcrumb trail" is a valuable navigational device to help indicate the past and future path of the user, as seen in the visual example in Figure 6.1. This familiar horizontal row of sequential text links received its name from the well-known Hansel and Gretel story, and provides a secondary navigation technique to reveal the user's location in a website (Krug, 2005:76). It is useful for sites with large amounts of content and many different levels of hierarchy as the scope of content dictates the complexity of the navigation (Babich, 2016; Cooper *et al*, 2007). It also prevents the need to retrace steps in the journey by clicking the back button, which is a commonly used method, but some designers believe effective navigation should avoid the need to click the back button (Redish, 2014:99).

| Home | About | Products | Services | Testimonials | Contact |

Home > World news > SA news > Cape Town > Weather

Figure 6.1 Example of the navigational device known as "breadcrumbs".

Figure 6.1 shows how "breadcrumbs" assists in orienting the past path of the user on a journey through a website. This tool is useful in indicating the user's location within the information on the site and navigating to achieve a specific goal (Babich, 2016; Krug, 2005).

Planning the navigation requires customised techniques and strategies when designing specifically for mobile media. For example, breadcrumbs are effective for desktop websites, but are not practical for mobile interface design (Nielsen, 2007). The reduced space and vertical shape of a mobile screen also makes it impractical to feature all the top-level categories in a horizontal global navigation bar. It isn't possible to feature varying hierarchies of local navigation on the mobile screen, a technique that works effectively on desktop sites. As a result, it becomes necessary to utilise alternative methods of information architecture for mobile media, such as "hidden navigation". A menu icon or text link communicates to the user that additional information is available, without presenting all the details in a single screen (Babich,

2016; Budiu, 2018; Cardello & Whitenton, 2014).

The role of the menu as a navigational tool

The navigational menu is a fundamental element in interface design and general digital communication as it provides an overview of the site contents in a single glance. A menu allows the user to select from a list of items that are all presented at the same time. As a result, a task can be accomplished without the need to memorise the necessary steps or the location of the relevant information (Cooper *et al*, 2007; Preece *et al*, 2002; Shneiderman *et al,* 2016; Whitenton, 2015). The concept of a digital menu is best explained in relation to the real-world experience of selecting a meal at a restaurant.

The earliest history of the menu dates back to the late eighteenth century where it took the form of a chalkboard outside an eating-house. The physical printed menu was first recorded in France, where it is now still known as the *carte,* or directly translated as a map. I suggest this offers an appropriate analogy for the digital menu that essentially provides a virtual map of the content on the site. A navigational menu serves a similar objective to a restaurant menu, which also presents a shortcut to the offerings of the kitchen without the chef needing to interact directly with every customer (Origins of the menu as we know it today, 2010).

The influence of mobile media on digital design

The prominence of mobile-first in every aspect of communication strategy and design creates new standards and expectations for all digital media interaction. The mobile-first approach to digital design also influences website design, demonstrating a reverse in the initial trend.

The unique characteristics of mobile-specific design originated from the constraints of the screen and keyboard, but many of these approaches are now also applied to desktop website design, in spite of the varying features of the two platforms (Aggarwal, 2016). As a result, there is a current a trend in web design to take inspiration from mobile app design, introducing a phenomenon known as "*appification*" (Behnam, 2012). Some of these "app-like" functions and techniques include: finger tapping instead of interacting with a mouse, use of bigger fonts and buttons, more frequent use of icons and graphic images, call-to-action links on the home page, hidden navigation and drop-down menus. However, these mobile design

techniques are proving to be less effective or appropriate when they are utilised on other media (Cardello & Whitenton, 2014). For example, the approach of hiding navigation information is not always effective as the user is required to take an extra step in the journey before discovering the full scope and content of the site. This additional step slows down the completion of a task and adds cognitive effort to the process. Although hidden navigation assists with the management of space on a small screen, it results in reduced user comprehension when used in other contexts (Pernice & Budiu, 2016).

This point supports my argument that each medium requires a customised approach to the design and writing of information. There are many common design features shared by desktop and mobile media, but the distinctive mobile user behaviour and unique physical features of the smartphone require a specialised approach.
I contend that the approach of mimicking design techniques from other media channels negatively affects the user experience, and the subsequent cognitive load. To illustrate this point, I use the example of early websites in the 1990s, which frequently featured text that was lifted directly from a print brochure, or soundtracks for television commercials that were transferred directly to radio. These executions resulted in miscommunication, reduced ROI and varying levels of user frustration. Fortunately there is now a growing appreciation of the unique characteristics of each medium, but I argue that there remains a need to further customise the design and writing approach according to the unique characteristics of mobile as a medium.

The conventions of digital design

Analogue products have remained relatively consistent in their design; for example, an appliance such as the pop-up toaster hasn't changed much since its invention in 1919. In comparison, the design of digital products is constantly evolving and subsequently requires a constant focus on invention rather than refinement. Digital media technology is relatively new, which means established standards or conventions are not as firmly standardised as in print media. In the digital sphere, designers are therefore required to first invent the fundamental building blocks, before actually creating a specific platform.

To illustrate; basic interaction elements such as the joystick controller, the point and click mouse, the search engine, the "pinch and zoom" and the navigation bar are now familiar to digital users, but they required initial innovation before they became

conventions (Murray, 2011). Digital design therefore reflects its own conventions and disciplines, which makes it necessary to adapt some of the universal design principles for a digital context. I argue that the relative "newness" of the mobile phone as a form of digital media presents a further set of unique design conventions. Innovation is a commendable pursuit in any creative industry, but in the context of mobile design, making changes for the sake of creating something different isn't always a recommended approach. It is therefore effective practice for digital designers, and writers, to re-use basic conventions when designing and planning digital interfaces, as users become familiar with specific symbols, navigation practices and also verbal terminology (Nielsen, 2004). It wouldn't make sense to position the steering wheel in the back seat of a car, or place a door handle at the top of a door. In the digital context, there are also familiar interaction functions and input devices that ideally shouldn't be changed without a valid rationale. Certain icons in digital design have become instantly recognisable and functional in the navigation of information on a website, and depend on convention to be understood. Changes to convention without substantiation can negatively impact the user experience (Krug, 2005). Furthermore, it is not only the symbolic representation of design elements that has become convention, but also the position in which they appear on a page (Spool, 2006), such as the magnifying glass search function that typically appears in the top right hand corner of a website. Convention also includes the order of information when filling in forms, such as the username/email field first, followed by the password, then a call to action button, as illustrated in the visual example in Figure 6.2 (Rico, 2017).
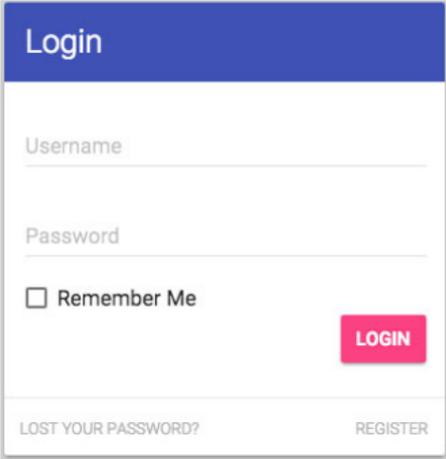
Figure 6.2 A visual example of a conventional login form (Material design, 2018).

Figure 6.2 uses an example of a login form to illustrate the conventions used to order information as well as the familiar choice of terminology. Digital users now accept this format as a standard and any changes to these conventions would cause confusion and consequently result in increased cognitive load.

In the context of this topic, I build on this theory of *visual* conventions and claim it is also important to consider *textual* conventions, such as the terminology of a "login" or "username" that have become familiar textual elements in user interaction. As Spool suggests, it can be tempting for the writer to use innovative and quirky terminology in links and navigation, but it weakens the "information scent" and increases cognitive load, as in this context "clarity always trumps fun" (Spool *et al*, 2004:8).

Real-world metaphors as a digital design convention

A common convention in interface design is the use of familiar metaphorical models based on real-world analogue objects and experiences (Garrett, 2013; Cooper *et al*, 2007). People predominantly experience the world in a three-dimensional space so they have an intuitive understanding of how everyday objects work. It therefore makes sense to transfer the familiarity of the "real-world" into the digital world.

It is the role of the interface design to compensate for the missing signposts that are taken for granted in physical off-line interactions (Farrell, 2015). Buchanan (1985) and Norman (1988) consistently argue that well-designed objects are easy to interpret and understand because they contain visible clues on how they should be operated; a door handle should clearly be pushed or pulled to open. This theory is applicable to digital interface design, which is most effective when interaction signs are visible and unambiguous. For example, when a user enters an online store there are no familiar contextual clues such as aisles and signage that would be experienced in a physical store. The layout of the store and scope of the stock availability is also not obvious from the point of arrival. However, the *structure* of an online digital store is directly influential on the buying behaviour (Liang & Lai, 2002); if users have difficulty in locating the products they are looking for they are likely to leave the site (Bernard, 2002).[39] I suggest the writer and designer should provide clear design cues: functional, appealing text and unambiguous navigation to guide users on their chosen journey through the information.

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[39] A survey by PriceWaterhouse Coopers reports that "40% of respondents indicated that being unfamiliar with the storefront was a barrier to their online shopping" (Bernard, 2002:1).

A common convention in interface design is to transfer the familiarity of the three-dimensional analogue world to the digital context. The principle of skeuomorphism is frequently applied to interface design, whereby the features of physical product designs are mimicked in digital contexts. The original function of these features might no longer be relevant, such as a yellow lined diary page for notes on a digital screen or the sound of a camera shutter closing when taking a photo on a smartphone (Page, 2014). However, a significant benefit of skeuomorphism is that it familiarises users by relating older real-world designs with new digital designs, which makes them feel comfortable – such as a stiffy disk or a 1950s radio (Wilson, 2014). The challenge for the digital designer is to ensure the digital objects function in the same way as their real-world counterparts in order to avoid frustrations and increased cognitive overload. There can be a negative consequence to using skeuomorphic design if it is only applied as an aesthetic default and vintage decoration rather than a recognisable function. If a digital object mimics a familiar real-life object, it is important that it functions in the expected way; a page that doesn't turn or a volume button that won't slide results in the user experiencing frustration and unnecessary cognitive load (Page, 2014). An example of unsuccessful transferral of the real-world to digital is seen in an airline website that featured an image of a reception desk on its home page, closely replicating the elements that would be found in the physical travel office. The website failed in its user experience because it tried to simulate the experience of booking a physical ticket with a human consultant but didn't effectively use the navigation, text or design to guide the user to move through the *online* journey, *without* the presence of a human assistant (Jones & Marsden, 2006). It is possible for digital icons and conceptual models to become familiar with frequent exposure and usage. They are then eventually interpreted intuitively so the user isn't even aware of their origins (Norman, 1988:2). I stress the importance of utilising relevant conventions in the presentation of information, both visually and textually, to create a sense of familiarity for the user in the interaction with mobile media.

The importance of consistency

Consistency is an integral factor in the field of HCI as an element in bridging the "language" of the computer with the comprehension of the user. Nielsen (1995) dedicates an entire item to this concept in his set of "ten usability heuristics", which is described as follows: "Consistency and standards: Users should not have to wonder whether different words, situations, or actions mean the same thing". Kellogg justifies the significant need for consistency in design as a means of controlling the

fundamentally arbitrary nature of the "mapping solutions" featured on user interfaces (1989:10).

It is generally accepted that consistency requires all the items in an interface to be presented with the same format or display. However, there are several different dimensions to consistency and it shouldn't only be assessed on obvious "lower level" elements such as appearance. Other types of consistency include *conceptual* consistency, relating to metaphorical usage actions such as dragging files into a trashcan, as well as *communicational* consistency in interface interaction, which would be relevant to the writing of text (Kellogg, 1989).

There are definite advantages to maintaining consistency in the development of rewarding interaction experiences. Presenting elements on an interface in a consistent pattern allows users to process information faster, more intuitively and more accurately, which assists in reducing cognitive load. The importance of consistent user interfaces across applications is demonstrated by leading application developers, Apple, IBM and Microsoft, who now enforce certain copyrights for the "look and feel" of specific user interface designs that are proven to be effective (Satzinger & Olfman, 1998:168).

As discussed in Chapter 5, developing an understanding of the user's expectations helps to present digital information in a way that avoids unnecessary effort. Users like predictability and familiarity when they are interacting with something to achieve a specific goal, consequently the product should behave in a way the user thinks it will. A real-world example of this can be seen in the familiar scenario of taking a shower in a hotel bathroom, where the tap designs might look stylish and innovative, but they often present a scalding conundrum when trying to figure out which one is hot and which is cold. I claim that consistency in the context of mobile media, in relation to text and visuals, facilitates ease of learning and provides the ability to move through the content in a predictable and intuitive way. I present this point in context to CLT, as the user's ability to draw on existing knowledge while processing a new interface helps to reduce the level of cognitive load. If any unnecessary inconsistencies are presented, the user is required to shift from automatic interpretation that allows the conscious mind to focus on deeper processing, to controlled interpretation that requires more cognitive effort (Satzinger & Olfman, 1998; van Merriënboer & Sweller, 2005). I argue that a focus on consistency and convention is a simple method to ensure ease of use in every step

of the user's journey, and should therefore be a central point of consideration for the digital designer and writer.

I extend the analysis of consistency to distinguish between internal consistency and external consistency (How design sites match user expectation, 2015). Internal consistency involves the elements within the interface, such as similar terminology, colour theming, typeface, navigation style or even paragraph length. External consistency refers to the users' previous knowledge and experiences outside of the specific website or app – including their interaction with any other website, software or even non-digital devices in their everyday experiences such as other websites or apps (Saarijärvi, 2017). All these previous interactions generate specific behaviours and ideas that impact on future interaction expectations. The knowledge of these external consistencies leads to more optimal use of internal consistencies within a specific website, which should be consistent within itself (Garrett, 2010).

Head of design at Quora, David Cole, uses the volume control as an example of external consistency. People are all familiar with the use of the slide button to increase or decrease volume: it matches how they perceive the volume and their individual expectations of how to monitor this level of sound (Cole, 2012). External conceptual consistency can also be illustrated in the scenario of a vehicle driver indicating to turn either left or right. The driver intuitively flicks the indicator level in the direction in which the steering wheel will be rotated, matching the predicted motion of the vehicle (Saarijärvi, 2017). Consistency essentially allows the user to predict what will happen if the same action is performed in a different context, using the same skill (Wolf, 1989).

Furthermore, the *Apple human interface guidelines* offers a framework for universal app design by incorporating features in ways that people expect and understand. The guideline describes the principle as follows: "A consistent app implements familiar standards and paradigms by using system-provided interface elements, well-known icons, standard text styles, and uniform terminology" (Apple human interface guidelines, 2018). Consistency doesn't have to result in boring uniformity. It is the challenge of the interface designer to evaluate the effect of departing from consistency, to create an effective balance between the functionality and the appeal of the text and visuals (Satzinger & Olfman, 1998:168). I suggest, as with any creative pursuit, the rules can be adapted to enhance the sense of satisfaction, but only if there is valid reason and the user is able to experience a general feeling of familiarity in the process of interpreting information.

The role of iconography and signs in mobile design

Graphic icons provide valuable communication shortcuts to guide users intuitively through a flow of information and facilitate a dialogue between the computer system and the human user. They work closely with text to visually represent an object, action or idea and could be defined as a "graphical representation of concepts that symbolize computer actions" (Gatsou *et al*, 2011:1). Gittens (1986:520) describes icons in a similar way as "pictographic representations of data or processes within a computer system, which have been used to replace commands and menus". Icons are now integral to effective interface design and their ubiquitous presence demonstrates mobile users' current comfort with symbolic visual communication. Although pictorial language doesn't have recognised syntactic and semantic rules underlying its comprehension, as with verbal language, Rogers (1989) claims the strength of graphic icons in a digital interface is based on the assumption that people are familiar with a visual and spatially organised environment. This thinking is supported by the current popularity of emojis in messaging, as computer users are now familiar with "piecing together sentences from "tiny-icon languages" (Loungekat, 2010).

Icons add significant value to the GUI and the mobile user's interaction experience. They primarily help to reduce the complexity of the interface by using less screen space and representing important functionality in a condensed form. Icons are easily targeted with a finger tap that avoids the need for typing on a touchscreen. Considering the hover feature isn't utilised on mobile touchscreens, the interface can become overloaded with buttons that would normally only appear when the mouse hovers above the link (Harley, 2014). Icons also assist in categorising information into neat visual elements by breaking up the text and creating an appealing feeling of "white space".[40] The presence of these graphic elements on the screen also contributes to the aesthetic design of the interface, which is now recognised as an important factor in enhancing usability and establishing a positive association with the information presentation (MacDougall & Reppa, 2008:1). Icons are effective if they are visible, legible and comprehensible (Babich, 2016b; Gatsou *et al*, 2011; Mullin, 2017). These visual symbols also represent a universal "language", which assists in transcending language barriers. It can be challenging to find vocabulary

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[40] White space is also known as negative space; an important technique used by designers in both traditional and digital media. The space is not necessarily "white" but rather just the invisible non-content areas between the text and visuals (White, 2002).

that is consistent across different languages, or to find suitable words of equal length that complement the design restrictions. Multi-lingual sites require translation, which increases production costs. Icons also assist in avoiding cultural differences, for example a mailbox might look different in various countries but an envelope is a consistently recognised international icon (Harley, 2014). The icon of a document remains consistent across English, Chinese and Arabic, even though the word is different in each language and alphabet (Rogers, 1989).

The primary drawback of icons is the lack of instant comprehension and the potential for ambiguity in meaning for new symbols that are not yet universally recogised. This interpretation is also influenced by factors such as previous knowledge of a specific field, cultural background, age, and digital experience: younger users predictably achieve a higher recognition rate of icons than older people (Gatsou *et al*, 2011:706). However, I suggest that graphic icons represent an integral design element that should form part of the writer's toolbox. These visual symbols speak a unique language, with the potential to transcend the power of the word, but can also augment meaning when used in synergy with the right text.

The role of icons is fundamentally linked to the history of GUI design (Horton, 1994). The first interface design could be attributed to engineer and inventor, Douglas Engelbart, who was noted for his seminal essay, *Augmenting human intellect,* that envisions the computer as enhancing the "intellectual effectiveness of a human" (Engelbart, 1962:3). Engelbart discusses the manipulation of symbols as a means of organising the processes that enable human comprehension, a concept that essentially laid the foundation for communication and representation through icons. This original thinking influenced the pioneers of Apple Computers in 1976, who introduced the first interface icons, and essentially helped computers become accessible to mainstream, non-programmer users (LoungeKat, 2010; McInnis, 2011). The first Apple icons were designed by Susan Kare, a member of the original Macintosh team and currently a creative director at Pinterest (AppSee, 2018). Many of her icons remain in use, such as the command key on an Apple keyboard. Kare claims that good icons are more like road signs than illustrations, as their objective is to *communicate ideas*, and ideally achieve this in a clear, concise and memorable manner (Lange, 2017).

Types of icons

There are several different theories on the categories of icons, which provide a useful background to the semantic development of these symbols. I include this analysis of icon categories in order to highlight the importance of these visual devices and their relationship with text on the mobile interface. If the writer is involved in the process of UX and design planning from the early stages, I claim the efficacy of these icons can be tested. It can then be determined if additional explanatory text is required to ensure the correct meaning is conveyed, and thereby reduce the level of cognitive effort in the process of interpretation.

In the definitive book, *Universal principles of design*, it is presented that icons are most successful when based on past user experiences and symbolise familiar items from the physical world (Lidwell *et al,* 2003). There are, however, many different categories of icons that do not directly represent familiar or related objects (Alvarez, 2005; Langella, 2018). Rogers (1989) presents a generally accepted categorisation of icons with four distinct definitions and representations, summarised in the visual table in Figure 6.3.

Type of icon	Definition	Representation	Icon
Resemblance	Shows a direct likeness to the object that it represents.	Photo	
Exemplar	Depicts an example of the object it represents.	Airport	
Symbolic	Conveys an abstract version of the object it represents.	Fragile	
Arbitrary	Depicts no logical relationship to the object or concept it represents.	On or off	

Nick Babich (2016b) proposes an alternative categorisation of icons into three types with an alternative list of criteria: universal, conflicting and unique.

1. Universal icons

The benefit of universal icons is that they are consistently recognised and globally understandable for a high percentage of users (Babich, 2016b). Icons in this category form a crucial element in interface design, as consistency avoids the need for re-learning, and assists in reducing cognitive effort. Users rely on an icon having the same functionality every time it is encountered, which is achieved by establishing consistent meaning with regular use (Harley, 2014; Wood, 2014). In Figure 6.4 a collection of universal icons is presented, representing functions that are now immediately understood and recognised by computer users around the world.
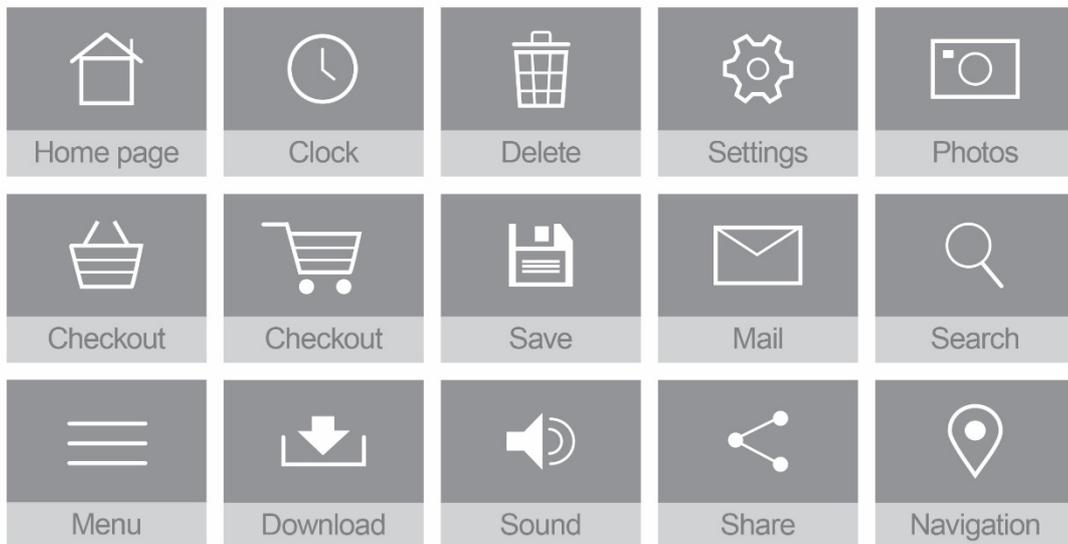
Figure 6.4. Examples of universal icons that present standard symbols for specific functions. The icons have become immediately recognisable by users across different languages and cultures.

As discussed in the section on conventions in this chapter, another essential element of universal standardisation is the location and position of an icon on the screen (Blankenberger & Hahn, 1991). Jared Spool demonstrates in usability experiments that user performance is affected when icons are shuffled on the toolbar, even if the

symbols are clearly visible, suggesting universal location is also a user expectation (Spool, 2006).

2. Conflicting icons

Conflicting icons should ideally be avoided as they have contradictory meanings that result in a confusing user experience and increased cognitive load. It is essential for icons to communicate without creating any doubt, as users are likely to stop their journey, backtrack or simply leave a site when they aren't completely sure what the icon means (Alvarez, 2015). In this context it is useful to include a text label with the icon to avoid miscommunication. As illustrated in Figure 6.5, each symbol could represent several different outcomes and the functionality might vary across different platforms (Babich, 2016b).

Icons	♥	★	✎
Alternative functions	Like Favourite Wishlist	Bookmark Favourite Rating	Add Edit

Figure 6.5. Examples of conflicting icons with potentially contradictory meanings or functions that could result in user confusion and increased cognitive load (Babich, 2016b). The use of text labels with these icons becomes essential for effective communication.

3. Unique icons

Unique icons represent abstract or once-off representation for a specific context. The correct interpretation for this type of icon isn't guaranteed, which can influence the user experience as it takes time before users know what an icon is meant to represent (Alvarez, 2015). For example, when Google decided to simplify its Gmail interface by using abstract icons, such as a square made up of nine dots, users wanted to know where their Google Calendar had been moved (Babich, 2016b). I suggest the unfamiliarity of unique icons can evolve in the minds of users by consistently presenting them with a text description until the visual becomes synonymous with the implied meaning. However, the understanding and recognition of the actual symbol is not as important as the meaning and functionality it represents. To illustrate this point, many users born after 1990 are unlikely to have ever seen a floppy disk but

they are aware that clicking this icon will save their data. Furthermore, the universal phone icon depicts an old-fashioned telephone rather than a smartphone device and yet the meaning is interpreted accurately (Harley, 2016). Icons are therefore effective communication tools as the meaning they represent becomes universally recognised.

The role of text labels with visual icons

The efficacy of icons is enhanced with the inclusion of text labels, highlighting the value of strategically linking text writing with visual design. The meaning of an icon should be interpreted automatically and independently of text, as effective icons draw on their *implicit* meaning rather than depending on another means of representation, such as the inclusion of a textual description (Gatsou *et al,* 2011:2). However, other research demonstrates a consistent preference for the use of a text description in combination with an icon, to avoid delayed communication, ambiguity or misunderstanding (Harley, 2014).[41] Visual-only icons restrict user comprehension and increase cognitive load, whereas a visible text label alongside the icon ensures instant user understanding and provides easy access to content (Harris, 2005). The value of text labels over icon-only was demonstrated during the updating of the Microsoft Outlook 98 toolbar structure, which shows that consistent use of text-plus-icon results is the most effective communication, but text-only works better than icon-only (Mullin, 2017; Rossi & Querrioux-Coulombier, 1997).[42] A more extreme view suggests, "stripping icons of text labels renders them completely meaningless and is counterproductive to the goal of providing easy access to content" (Harley, 2014). Or as Tognazzini (2013) claims, one word is more effective than a thousand pictures. This research supports my argument that text in design has been previously unappreciated and now demonstrates that a strategic focus on words can improve comprehension, enhance the user experience and consequently reduce cognitive load.

I argue in support of the claim that icons work more effectively when used in combination with text. However, if they are required to work in isolation, a user-centred approach to the design is central to effective communication, as the design should work around the meaning in the mind of the user (Caplin, 2001; Gittens, 1986;

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[41] By adding the word "menu" in addition to the three hamburger lines, the click-through rate increases by 20%. Placing the three lines inside a box so that it looks like a navigational button further increases response by 22% (Stokel-Walker, 2015).

[42] User Testing blog revealed in tests that users could correctly predict what would happen if they tapped a specific icon with a label 88% of the time. When users interacted with icons without labels, this dropped to 60% (Alvarez, 2005).

Shneiderman *et al*, 2016). Furthermore, I contend that the writer for mobile media requires a comprehensive understanding of graphic icons, as they are integral to the effective presentation of information in this context. The text and the symbol function in synergy to provide shortcuts to functionality and communication, with the aim of reducing the cognitive effort required for interpretation.

Theories on the meaning of signs

The notion of using pictorial representations to communicate a concept is related to the theory of signs and the study of semiotics. The work of Ferdinand de Saussure (1974) and Charles Peirce (1974) is influential in the fields of linguistics, philosophy and psychology, and I argue further contributes to this discussion on HCI. I utilise the theories discussed in Chapter 2, in order to examine the meaning of signs relating to graphic icons as a symbolic functional element on the mobile interface.

Signs can take the form of images, words, sounds, flavours and objects, but they only actually become signs when people invest a sense of meaning in their interpretation (Innis, 1985; Yakin & Totu, 2014). De Saussure (1974) claims that the symbols have no intrinsic meaning and are only given meaning by their association with other elements; a point which relates directly to the layout of different elements on the digital interface. De Saussure (1974) also considers the sign to comprise two parts, a "signifier" – the form it takes, and the "signified" – the concept it represents, which I suggest relates to the actual visual symbol of a digital icon and the function it represents in the mind of the user. The sign therefore only becomes whole as a result of the association of these two elements – the signifier with the signified (de Saussure, 1974:20). De Saussure regards the signifier to be entirely arbitrary, just as the letters in the alphabet have no inherent meaning or value without their relation to each other – or the three lines of the hamburger icon have no connection to the meaning of a menu. There is consequently no logical link between the actual signifier and the meaning it signifies, but the joining of the two parts creates a mental "linguistic unit", which is essentially what de Saussure refers to as a sign (Chandler, 2007). To illustrate this point, Chandler (2017) uses the linguistic example of the word "open". In the context of a sign on a shop doorway, the signifier is the word "open", and the signified is the concept or cognitive understanding that the shop is open for business. However, this same signifier could represent a variety of signified meanings if it appears in different contexts, such as on the top of a packing box or a button on an elevator (Chandler, 2017). This concept relates to the previous

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discussion in this chapter on *conflicting* icons, whereby the symbol of a heart or a star is given meaning by its context, whether textual or visual, and I suggest it is the role of the design team to ensure these contextual elements are sufficient in establishing the desired meaning.

Influential semiotics theorist, Umberto Eco (1976), claims that de Saussure did not define the concept of the signifier clearly and a sign can be simplified as a communication device that is used to express a message. Eco also introduces the element of social convention influencing the meaning of a sign as something standing for something else (Eco, 1976). He considers the views on signs by Charles Sanders Peirce as being more "semiotically fruitful" (Eco, 1976:16). Peirce's model includes three inter-related parts: a sign, an object and an "interpretant", the latter being the unique element, which refers to the *cognitive understanding* of the relationship between the sign and the object (Peirce, 1974; (Peirce's theory of signs, 2006). The interpretant is therefore the sign *in the mind of the interpreter;* it is what the reader makes of the sign, so the meaning of a sign is only manifested in the way the user interprets it. Based on this thinking, everything is then able to become a sign as it can represent something according to the individual's interpretation and thought (Yakin & Totu, 2014). The resulting sign therefore becomes more developed in meaning than the initial signifier. I suggest this point relates to the synergy between visual symbol and the text in the communication of information on digital interfaces, as the two individual elements are given a greater meaning through their combination.

I examine Peirce's theory further in terms of the categories of icons, which are relevant to the role of signs in digital interface design (Bradley, 2016), and also connect to the icon categories of Rogers (1989) and Babich (2016b) discussed earlier in this chapter. Peirce's categories of signs include: icon, index and symbol (Peirce, 1974). The *icon* shows a physical resemblance to the signified and shares similar qualities to what it represents, for example the picture of a man on a bathroom door; or in a digital context, the icon of a trashcan or trolley. The *index* shows a direct connection between the signifier and signified; although there are no similarities in characteristics, the index *implies* the concept of the signifier. For example, smoke indexes fire, a thermometer implies temperature; or in a digital context, an envelope indexes mail. The *symbol* shows no resemblance between the signifier and the signified, which means their connection is arbitrary and must be learned (Chandler, 2017). In the context of interface design, an example of a

symbolic sign could be the three joined lines of the "share" icon joined by three dots, as seen in Figure 6.4.

Case study one: The "hamburger" icon

I propose that the ubiquitous and familiar three-lined "hamburger" icon, symbolising a menu, presents a valuable practical analysis of graphic icons and the role they play in digital design. As illustrated in Figure 6.5, the hamburger is one of the most commonly used icons across different interfaces, and is often used as a device for "hidden navigation", with varying levels of success. This icon is now universally recognised as the symbol for a menu that represents a selection of additional information, and has become a standard UI feature on both desktop sites and mobile applications (Pernice & Budiu, 2016; Stokel-walker, 2015).
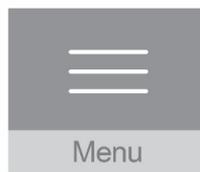
Figure 6.5. Example of the "hamburger" icon.

The hamburger icon in Figure 6.5 is used to symbolise a menu on digital interfaces. This icon is now universally recognised and understood and appears on most mobile applications and websites. Reflecting de Saussure's (1974) theories on signs, the hamburger icon is an arbitrary symbol and has only become recognised through consistent use, and given meaning by its relation to other contextual elements. As Bradley (2016) affirms, there isn't anything about the three lines that connects with the concept of a menu, but the connection is eventually learned and acknowledged through consistent use.

This hamburger interface icon originated from one of the first personal workstations known as the Xerox "Star", designed by Norm Cox in 1981 (Stokel-Walker, 2015). In an interview with Geoff Alday, Cox explains that the icon was intended as a "container" for contextual menu choices, and aimed to mimic the look of the displayed menu list (Alday, 2014). The hamburger icon effectively illustrates the primary benefits of icons, particularly in context to the small mobile phone screen. It assists in cleaning up the interface and avoids multi-tiered navigation, search bars

and links. The hamburger icon is also universally understood across any language and prevents the need for localisation. The primary advantage of the hamburger menu is that it presents a lot of information in a small space and simultaneously provides easy access to this information. This design approach places the user in control, by providing a selection of information for the user to select strategically, rather than the sequential ordering of a contents page. I suggest this feature builds on the principles of hypertext, discussed in Chapter 7, which is characterised by a non-linear architecture of information. Although the user has the opportunity to select the order of information, the designer is able to curate the user experience by eliminating "decision fatigue" (Budiu, 2014). As de Castro (2018) summarises in an article on the benefits and disadvantages of the hamburger icon, "the beauty of the hamburger icon is that it's like the key to a hidden drawer on your website, which the user can open at any time to look for menu options".

There are also shortcomings to the approach of hidden-navigation, which uses the menu icon as a replacement for more detailed, visible and verbal navigational tabs at the top or side of a site page. The hamburger icon hides informative links, which may affect the click-through rate of the user by demanding an additional step. The icon is also not familiar to every user, particularly those aged over 45, which impacts on the flow of the user journey (de Castro, 2018; Gatsou *et al*, 2011). Hidden navigation degrades the user experience because web and mobile users have become accustomed to certain consistent patterns of interface and interaction design. There is some evidence that hidden navigation increases the time it takes for a user to achieve an online objective, specifically when working on a desktop compared with a phone (Pernice & Budiu, 2016).

I argue that these limitations are counteracted by the increasing proficiency and confidence of the experienced user. The consistent adoption of the hamburger menu illustrates how design trends have responded to user maturity in the interaction with digital platforms. It is now assumed that users instantly understand this as a symbol for a menu. By implication the complete navigational menu is no longer necessary to display on each page, although research has also shown that the icon is understood more clearly and frequently when used with the text word "menu". The hamburger is an interface tool that is still widely used and remains effective on mobile interfaces, but visible navigation remains the preferable option wherever possible (Budiu, 2018).

I utilise all these theories to further my argument regarding the role of the writer in the presentation of content on mobile media. I maintain all the elements appearing on a

mobile interface, including the words, present information using a combination of symbols. Such symbols become signs, which, in turn, represent meaning based on the user's previous knowledge. I suggest that icons and words function in synergy to convey a specific function or concept and the optimum combination of these elements can facilitate the user's interpretation process.

Case study two: ABSA bank website re-launch

I utilise a relevant and practical case study to demonstrate the benefits of UCD in the presentation of content for digital media. I argue that the principles of UCD permeate every aspect of information presentation for digital media, and should be integral to each stage in the development of websites and mobile applications. It is not the role of the user to sort through information to find what is wanted, but the responsibility of the designer and writer to *anticipate* the user's expectations, identify the information that the user is most likely seeking, and present it in a logical structure. A focus on the *human* aspect of HCI, and the needs of the end-user, helps to facilitate simple, rewarding experiences in the interaction with digital interfaces, and consequently reduce the cognitive load (Garrett, 2010).

Although this case study was developed for a textbook chapter on writing for general websites not smartphones, (Pritchard & Sitto, 2018), I consider the central principle of enhancing user experiences to be applicable to writing for mobile as a medium. The case study features the re-design of the website for ABSA, one of the top four banks in South Africa. In 2017, ABSA identified the need for a new strategy to communicate to their clients in the digital space and required a new website as the "front door" to these conversations.

The bank first performed research on their clients' opinions and expectations of their bank's website and app. They identified an important insight: that every interaction clients make online is task-driven; they are not browsing but aim to achieve a specific goal. The core strategy behind the re-launch therefore aims to provide clients with what they want, when they want it, using a human-centred approach of "people, not pixels". As seen in Figure 6.6, the home page of the previous ABSA website doesn't show an understanding of the user's needs as it features too much information at the same time, which causes confusion for the user and becomes overwhelming. This design bombards users with too much information that is all presented at the same time, and doesn't focus on the needs of each individual client.

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Figure 6.6. The homepage of the original ABSA website.

Based on the information sourced in the research, and applying the principles of UCD, the content on the new site was redesigned to present information in relevant stages, with a gradual progression of detail. As indicated in the example page in Figure 6.7, users are now given a selection of options directed at individual banking needs, at appropriate stages of their information-foraging experience.
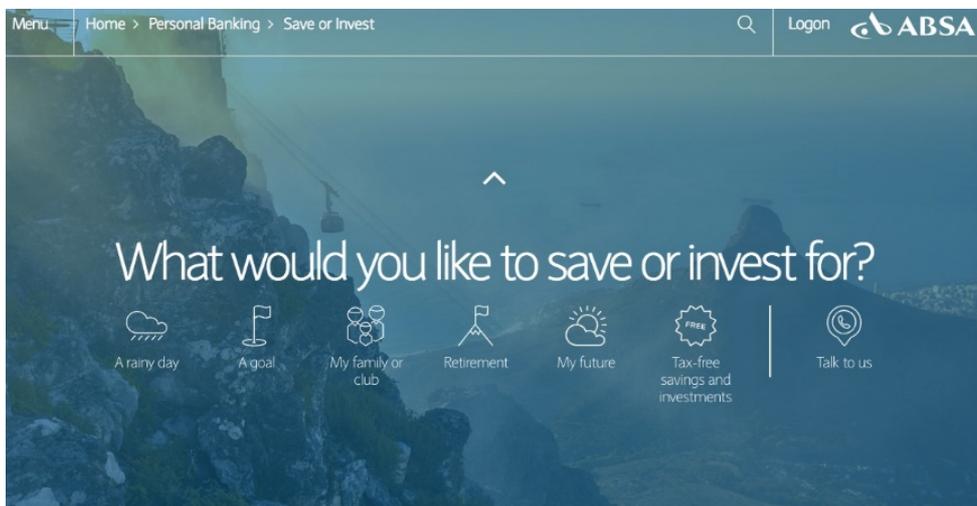
Figure 6.7. One page featured on the revised ABSA website.

Figure 6.7 shows how users are now given the opportunity to choose from a selection of options according to their individual banking needs at that particular moment. The information is presented in a gradual progression of stages, which are all governed by the user. The updated version of the ABSA website demonstrates

the effective application of user-focused design as a means of simplifying the interaction experience. By providing relevant information to each user at an appropriate stage in the journey, the user remains in control and consequently experiences reduced cognitive load in the process of achieving a task. The revised site therefore provides an accessible, user-friendly journey through a maze of complex financial information to source solutions that are relevant to the individual client's needs (Pritchard & Sitto, 2018).

Conclusion

This chapter discusses the principles of design in the presentation of information on mobile media. I analyse the various areas of digital design, including user experience, interface and interaction design and explore the role of the writer within these disciplines in the process of developing content. A theoretical foundation is provided with reference to theories on signs and semiotics for discussion on the meaning of icons on a mobile interface. I contend that the limitations of the mobile screen space demand a careful synergy between text and visuals in the design of information for this medium, without compromising on user experience (Natoli, 2017). I argue that it is the challenge of the digital designer and writer to optimise the balance between effective communication and aesthetically rewarding information presentation. Each element on the mobile digital interface, whether visual or textual, aims to minimise the cognitive load experienced by the user in the journey to achieve a specific task.

CHAPTER SEVEN: PRINCIPLES OF WRITING FOR MOBILE MEDIA

Introduction

This chapter is fundamental to the central argument that an optimum approach to writing text for mobile media can assist in reducing the cognitive load experienced by the mobile user. Based on the research presented in previous chapters, I analyse the impact of user psychology and digital design on the writing process. I argue that there is a need for research in the area of mobile media that provides a specialist focus on the writer, and the role of text in this medium, as the words make an integral contribution to the interpretation of information. Hence I present writing techniques that apply specifically to the mobile user and smartphone interface. I do this by utilising my experience as a lecturer and writer in copywriting and digital communication, as well as referencing research on digital writing by Carroll (2016), Krug (2005), Pritchard & Sitto (2018) and Redish (2014).

As a theoretical foundation to the discussion I analyse hypertext theory and apply the principles of non-linear information architecture to the context of mobile interaction. I propose that this presents an original perspective on the theories of hypertext by Bolter (1991), Canavilhas (2007), Carter (2000), Delaney & Landow (1994), Landow (1992) and Slatin (1990). The relationship between the writer, the reader and the text is also a topic of direct relevance to this discussion, and provides invaluable insights into the process of writing for digital media. I thereby analyse the principles of reader-response theory and apply the thinking of Rosenblatt (1978), Iser (1972) and Fish (1980) to the context of mobile media. The intention is to explore the characteristics of specialist writing techniques that assist in reducing cognitive load. This discussion demonstrates the unique relationship experienced by the mobile user in the interpretation of information, which I suggest is unlike the interaction experienced on any other medium.

The reading patterns of digital users

People behave differently when they read text on a screen compared to a printed medium (Dillon, 1992). Digital users will instinctively find the path that requires the least amount of effort, to intuitively minimise the cognitive load, as discussed in

Chapter 5. Lam (2008) claims that users subconsciously maximise the reward received in relation to the effort invested in reading. Interfaces with too many options therefore confuse the user and consequently increase the "interaction cost" (Lam, 2008:1149). To economise the time spent on satisfying a task, the reader therefore attempts to reduce the number of fixations on words, which results in a *scanning* experience rather than reading. An influential research study by Jakob Nielsen first revealed the concept of users scanning information rather than reading (Nielsen, 1997).[43] A "scannable" page helps the user to determine in a glance whether the page is of interest and able to satisfy the desired objective. Specific writing and formatting techniques are utilised to compensate for the web user who scans rather than reads (Goldstein, 2015).

Microsoft researchers determine that the "dwell time" of most website users is typically around ten seconds before they choose to leave a page; on mobile phones, it is closer to 3 seconds (Fitzpatrick, 2016; Lui *et al*, 2010; Nielsen, 2011). I argue that the amount of time users should ideally spend on a page depends on the objective of that specific page within a site or app, as the purpose of the content is to communicate a message efficiently. The user shouldn't leave the page before satisfying the intended task, but also shouldn't be required to "dwell" longer than necessary.

The pattern of the typical digital reader also contributes to the optimum presentation of information. The Nielsen Norman Group researched users' reading behaviour with heat maps and eye-tracking tests and the results revealed the "F-shaped reading pattern". This pattern was tested in the USA on readers of the Latin alphabet and remains an influential reference for web user interaction. As illustrated in Figure 7.1, this pattern shows that users first read in a horizontal movement across the top of the page, forming the first bar of the "F". The user then moves down the page and once again reads horizontally, but now for a shorter area. Finally, the user scans the content on the rest of the page in a vertical movement, which forms the stem of the "F" (Babich, 2017; Nielsen, 2006).

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[43] Research showed that 79% of test users in the USA always *scanned* any new page they came across; only 16% read word-by-word (Nielsen, 1997).

Figure 7.1 The typical F-shaped reading pattern of web users based on heatmaps from user eye-tracking studies in the USA on three separate websites.

Figure 7.1 indicates the areas that were viewed the most according to colour. Red is the most viewed area, followed by yellow and the least-viewed areas are indicated in blue. The grey areas didn't attract any fixations (Nielsen, 2006). The implications of this pattern is that the area located on the top left side of the screen is more likely to be read than other areas. It should be noted that this pattern applies to the content area on a page and not the navigation bars, even if the navigation appears in a left-hand column.

There are varying views on the importance of this pattern in the approach to information presentation. Pernice (2017) believes the F-shaped pattern is limiting as it forces users to default to predictable areas of the page to assess the value of the content in a way that requires the least amount of effort. Users aren't consciously aware of reading in a F-shaped pattern, but it does become the predictable route if there are no other cues or hooks to help lead to other areas of the page. Cao (2015) contrasts this view and suggests it makes sense to follow the F-pattern when presenting information on a page, because it mimics the way people naturally read, from top to bottom and left to right. If the content is presented without any consideration of the F-pattern, readers are forced to readjust their natural eye movement, which causes unnecessary frustration and effort. Eldesouky (2013) develops this theory further by suggesting that users only follow instinctive eye patterns when reading large blocks of text if there is no established hierarchy. It is the role of information design to create visual hierarchy by adding different elements of "varying visual weight" as the eye will take the path that is created (Eldesouky,

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2013:157). I support Eldesouky's view and argue that the most important contributing factors for screen-reading behaviour is the format, structure and presentation of the content, as readers are not entirely locked into the F-shape. Large blocks of text with ineffective formatting, such as bolding, bullets or sub-headings forces the reader to follow the intuitive F-shaped pattern, which might then result in other important information on the page being missed (Pernice, 2017). Further research by the NNGroup assessed if there had been a meaningful shift in users' reading behaviour as they develop more experience and familiarity with digital interfaces (Pernice, 2017). The results show that readers still follow this F-shaped pattern, which is not surprising considering the typically distracted and impatient behaviour of the user, who is attempting to satisfy a specific task in the most efficient way possible. I suggest that the reading pattern can be influenced if the information is strategically planned and follows the principles of UCD with relevant formatting techniques.

The unique reading patterns of the mobile user

Although there are similarities between the reading patterns of desktop and mobile users, there are also significant differences (Nielsen, 2011b). Patel (2011) suggests the mobile reading pattern is significantly different to desktop readers and there isn't a specific area that should be prioritised for this medium. As illustrated in Figure 7.2, the focus of the mobile reader is more evenly distributed across the whole screen, particularly in the centre, rather than consistently from left to right and top to bottom. It is important to consider the shift in content when it is adapted to a mobile site using responsive design, as the text will appear in different places on a mobile screen as it would on a desktop. The hierarchy of information consequently shifts according to each screen size, affecting the flow of the F-pattern. I suggest it therefore isn't recommended to rigidly place important information according to this reader-pattern on mobile media (Biedert *et al*, 2012; Knaus & Schlemmer, 2016).
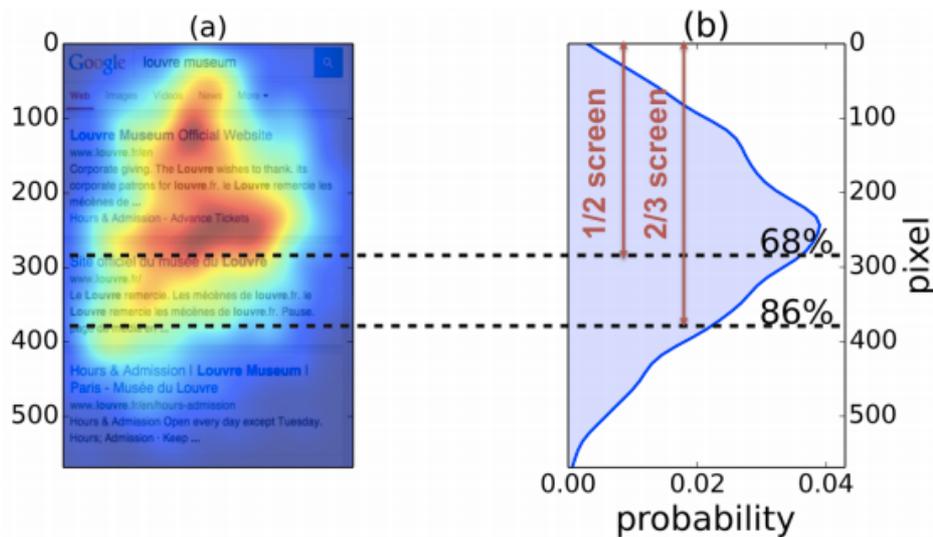
Figure 7.2 The reading patterns of the mobile reader based on eye-tracking heat map for readers on mobile smartphones.

Figure 7.2 shows the dominant area is now in the centre of the screen rather than the typical F-shaped pattern followed by the desktop user (Knaus & Schlemmer, 2016).

The pattern of text reading is also influenced by the context of usage on mobile phones. Although the mobile user is predominantly task-driven, a significant characteristic of mobile usage is time wasting, such as browsing a phone while waiting in a queue. However, in spite of this seemingly time-rich situation, mobile users are still impatient and consistently demand content that communicates the desired information quickly, concisely and with the lowest possible interaction cost (Budiu, 2013; Nielsen, 2011). Users also need to slow down when reading a mobile phone to achieve the same level of comprehension as on a desktop. They are prone to sacrifice a level of comprehension as a trade-off for the benefit of covering more content at a particular speed (Budiu, 2014). This phenomenon is referred to in psychology as the "speed-accuracy trade-off", which suggests that accuracy is sacrificed to perform a task faster, resulting in the possibility of more errors (Nugent, 2013).

Reading on a mobile becomes more difficult as the complexity of the content increases (Moran, 2016). However there have been notable improvements in mobile user performance in the last five years that can be attributed to a number of different

factors (Singh *et al*, 2011). Firstly, screens on smartphones are now bigger and resolutions are crisper with more pixels, making it easier for the eye to read without fatigue. Secondly, mobile users are becoming more familiar with reading articles on a phone and are also comfortable with the thumb-scrolling interaction. The increasing familiarity of the more experienced mobile user is an important aspect of my argument, as information should be presented in a way that is relevant to these new expectations, as discussed in Chapter 5. Another factor that is unique to the mobile reading pattern is that the smaller screen filters out any competing information and therefore *reduces* distraction, which contrasts with the increased external distractions of contextual use (Moran 2016). Users tend to achieve similar comprehension results when reading content that is presented in a linear sequence, such as an article (Singh *et al*, 2011). However, in reality most information read on a smartphone is not narrative, specifically in the interaction with mobile apps. The journey is task-oriented and involves some form of navigation through links, decision-making effort and functional interaction (Paradis *et al*, 2003). Komninos (2018) suggests people use smartphones for short bursts of time to accomplish focused, information-retrieval tasks in the simplest way possible. I contend that the reading patterns on mobile screens present an important influencing factor in the approach to information presentation. The size, colour, font choice, position and length of text therefore become even more instrumental to effective interpretation.

Factors contributing to "scannable" text on mobile media

Formatting text

The formatting of text contributes significantly to the way in which users read words on digital screens because it helps prioritise and categorise information. It is important to create "hooks" to draw attention to key parts of the information. Large text blocks that come across as "wall-to-wall words" can be a barrier to effective usability (Redish, 2014:107). Formatting tactics purposefully change the focus of a sentence or paragraph in order to guide the reader in the direction that the writer intends the words to be read. I use this point to support my argument that design techniques, such as formatting, are integrally linked to the meaning of text and therefore cannot be developed separately.

There are several techniques that are accepted as standard approaches to formatting text for interface design (Patel, 2018). *Bold and italics* help to prioritise and

emphasise specific words and draws the eye of the reader to specific points in the text. *Captions* with visual elements such as photos, illustrations, or graphics tend to be read before the text in paragraphs. *Bullet points* are easier to scan than paragraphs as they provide a shortcut to the scale and content of the page in a single glance (Loranger, 2017). Brian Clarke claims that bullet points operate as "mini-headlines" which help to express a clear promise to the reader, facilitate the scanning behaviour of the reader and encourage further investigation into the core content (Clarke, 2006).

Lists assist with the reader's first assessment of the page to determine if the content offers relevant information and help to make complex content appear more accessible. Lists also provide an effective editing tool to shorten text by removing redundant bridging words without losing essential meaning. Psychologist, George Miller (1994), claims the optimum length of a list is seven items, known as the "magical number seven". This number is based on his findings that a sequential ordering of information assists with the processing of information and reduces the effort (Miller, 1994). Miller's research reveals that people consistently present a limited "channel capacity" for receiving, processing and remembering information. However, he claims that by organising the information into a sequence of text units, it becomes possible to break "this informational bottleneck" (Miller, 1994:9). Lists put "active spaces" around the words to allow readers to skim and scan more easily (Redish, 2014: 206). They present a way of creating "white space", which improves legibility, prevents clutter, avoids distraction and organises information in an aesthetically pleasing and coherent way, giving text room to breathe. These formatting techniques are relevant to the designer and writer to help steer the user to the desired areas of the page, particularly call-to-action links (Boman, 2012; Coursaris & Kripintris, 2012; Redish, 2014:227-241).

The role of headings and sub-headings

The heading is a fundamental element in almost every format of information and communications writing: advertising print adverts, posters, social media posts, and newspaper articles (Felton, 2013; Pritchard & Sitto, 2018; Sullivan & Boches, 2016). I maintain a core skill of the traditional advertising copywriter is the ability to write effective headlines, as consumers are unlikely to read smaller text if the headline hasn't created a meaningful hook. In the context of writing for mobile and websites, the heading has to work even harder as it also serves as a link to further information. Headings present several important benefits in digital writing; they create a hierarchy

of the most important information, provide an overview of content in a glance, contribute to the formatting of content, and draw attention to relevant areas on the screen. Headings and sub-headings are also frequently the dominant *visual* elements owing to the brevity of content on a mobile screen (Carroll, 2014; Redish, 2014). Another significant function of the heading is as a signal to search engines regarding the information that the site contains. Headings, labelled as H1 in HTML, are prioritised higher than sub-headings (H2) and body text (H3). The use of simple, functional language utilising relevant keywords assists with search engine ranking (Redish, 2014:157). However, I emphasise that the content of the headline should be meaningful and relevant *to the user* first rather than the search engine.

Effective headlines are characterised by certain important characteristics. The style and tone of the writing should be appropriate to the user, as well as the brand, if the content is related to marketing. The tone of writing reflects a specific personality or attitude and is achieved with relevant choices of vocabulary and phrasing. Loranger (2015) claims that headings on websites and mobile apps are more effective when they use simple, familiar language without the use of witty double meanings, marketing hype, or metaphorical analogies that might confuse the user. The use of idioms is also not recommended as they can obscure the meaning, and aren't consistently understood by second-language users around the world. Jargon or trendy wording in headings is also not ideal, unless this terminology is certain to be understood, and appreciated by the targeted user (Loranger, 2015). The main aim of the words is to help users to scan through the information, make decisions and interpret meaning, so "giving readers a chuckle is only a secondary goal" (Goldstein, 2015). The optimum length of the heading depends on the content of the site and objective of each section, but there should be a balance between too long or too short. Research has shown that a 6-to-8-word headline is an optimum length for websites (Redish, 2014:160) as less wordy headlines are more likely to be read on the smaller mobile screen (Charlton, 2016). Morgan claims that it isn't the length of a headline that should be the focus, but rather the combination of contextual and engaging words. I concur with the theory that longer headlines are preferable to concise lines if they communicate clearly, as any confusion or lack of clarity ultimately results in increased cognitive load. The headings on mobile sites or applications are primarily functional and should ideally be written in a manner that expedites the user journey and reduces the effort required to achieve a task.

Principles of hierarchy in information design

The arrangement and structure of elements in information design influence the order of what the human eye sees. Visual hierarchy is a fundamental principle of graphic design and establishes levels of importance. According to Petterson (2010) people reading the Latin alphabet are instinctively accustomed to this natural hierarchy when interpreting information, expecting the secondary facts to follow the important facts. Eldesouky defines visual hierarchy as, "the order that the human eye follows when recognizing what it observes" (2013:148). The brain doesn't view each element on a page individually but categorises information in terms of relationships, and instinctively groups components into ordered patterns of importance. This order is created by establishing contrasts in context to the environment, which can be achieved by adjusting the character, alignment, size or colour. These design and formatting techniques affect the dominance of a certain feature on a page or screen according to the desired communication. Hence they establish a form of hierarchy within the design to control the user's pathway through the information (O'Flaherty, 2011). This research supports my theory that the writer can facilitate the user's journey through the information by applying strategic thinking and insightful presentation techniques.

One of the core principles of hierarchy are linked to the Gestalt psychological theory, which claims the human mind perceives individual components as part of a greater whole. The brain instinctively organises elements in context to the surrounding elements (Cherry, 2017). A founding Gestalt theorist, Max Wertheimer claims the behaviour of the "whole" is not determined by the individual elements, but intrinsic nature of this whole (Wertheimer, 1938:2). I propose that this concept is of considerable significance in the presentation of information on a small mobile screen, where the "bundling" and organisation of individual words directly impacts the interpretation of the user. Another underlying principle of Gestalt theories discusses the "association hypothesis", or "factor of proximity", which suggests that elements located close together are perceived to be associated with each other (Wertheimer, 1923:302). This principle is relevant to mobile interface design that meticulously deliberates the relationship between each element on the screen due to the limited available space. To illustrate this point, a word that appears adjacent to a link button is likely to be perceived by the user as part of that link. The "factor of similarity" is also relevant to this discussion, as words that are presented with shared characteristics, such as colour or size, will be considered to have an association. In

the same way, if features are conspicuously *different*, they set themselves apart from their surroundings (Eldesouky, 2013:148). I extend this thinking to word-based patterns, such as a series of "How to…" headings on a web page that will establish a perception of association. I maintain that these perceptive behaviours influence the hierarchical presentation of information, as a strategic and insightful organisation of elements will always result in a more effective delivery of the intended message.

The role of frontloading in digital writing

Based on the principles of hierarchy, the position of each word plays a direct role in establishing clear organisation of thought, or "reading gravity" (Eldesouky, 2013:152). The concept of "frontloading" is a crucial technique for writing informational content for websites and apps. The University of St Andrews describes frontloading as a writing technique that places the most important, big-picture information first, with additional details following (Hamrick, 2017). By moving keywords to the front of a sentence, the user is able to scan the first few words and understand what the rest of the page is about (Loranger, 2015).

When presenting content on a website page, the most important thoughts appear in the H1 heading, with decreasing degrees of importance featuring in lower levels of H2 sub-headings and ultimately body copy. In the context of mobile text with the number of words restricted by the reduction in screen space, the principles of frontloading don't just apply to sentences, but to every word (Moore-Williams, 2014). Research performed by Nielsen reports that more users click on links when the first two words or 11 characters feature the most important "information-carrying" words (Nielsen, 2009). Leading plain-language experts, Ginny Redish (2013) and Neil James (2013) stress the importance of determining what the user considers to be the most important information and featuring that upfront. They also point out that the size of the heading impacts its level of importance, which means longer headings with smaller type might be perceived lower on the hierarchy (Redish & James 2014).

Google UX writer Allison Rung illustrates the concept of frontloading with the challenge of writing an appropriate password error message. The example features a first draft for an error message using the words "You have entered an incorrect password". This phrasing poses a problem as the most important information, the word 'password', appears at the end of the sentence. To apply the principles of

frontloading, the second iteration of the phrase simply read, 'Wrong password'. Although this version helps to satisfy the principles of effective hierarchy, the tone of the phrase isn't suitable for Google's friendly brand voice, resulting in a final re-write of the phrase to read, "That password doesn't look right". In this version of the phrase, the most important information has been effectively "frontloaded", with the crucial word "password" appearing upfront. Furthermore, it also successfully conveys the information in a friendly tone that doesn't suggest the user is at fault (Ligertwood, 2017; Rung, 2017). I suggest this research demonstrates the weight and credence of each word in the presentation of mobile information, not only in terms of content, but also position and tone.

Principles of the inverted pyramid

The concept of frontloading is based on a journalistic theory known as the "inverted pyramid", a term introduced by Edwin Shuman in 1903 (Canavilhas, 2007). The origins of this writing approach are related to the telegraph, which demanded urgent and concise delivery of news messages using a limited and strategic selection of words (Canavilhas, 2007; Scanlan, 2003). Other researchers claim this "first news first" style of writing became a convention as a result of social factors such as the rise of educated, science-oriented and fact-driven journalists, and financially driven publishers (Errico; 1997; Pöttaker, 2003). The inverted pyramid approach contradicts the narrative of traditional literature or story writing that deliberately positions important information further down in the hierarchy to achieve a degree of suspense or build-up (Errico, 1997). It does however support the writing of narrative news articles in which the story is more important than the reader, so it is essential to present the most "newsworthy" information upfront to offer reward with the least amount of effort. As indicated in the diagram in Figure 7.3, the inverted pyramid features the most important information first in the "lead sentence" or heading, and the remaining information appears in decreasing order of importance.
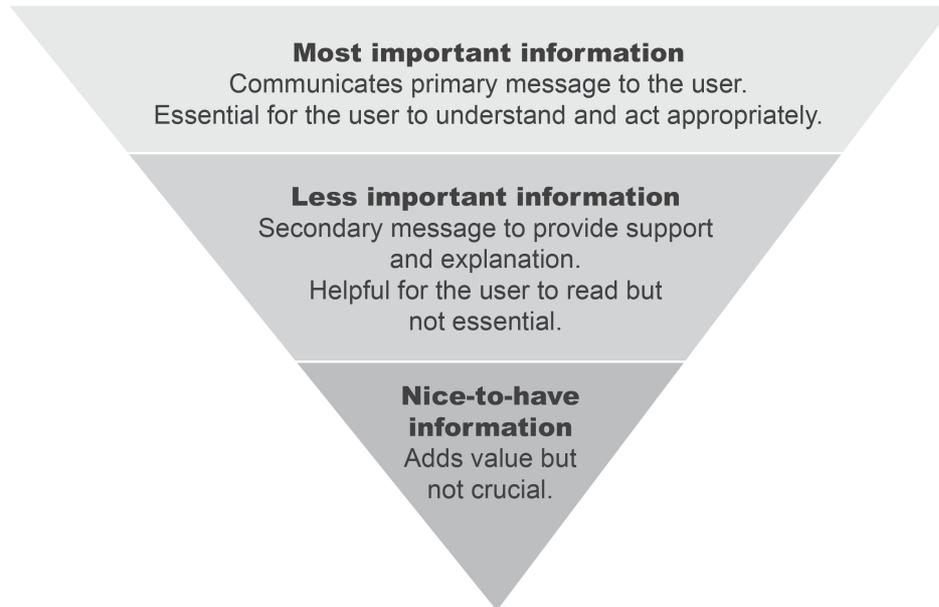
Figure 7.3. Diagram of the "inverted pyramid" illustrating the hierarchy of information presented in varying levels of importance to the user.

There is some opposition to the value of the inverted pyramid in the presentation of information to the digital user. Pöttaker (2003:501) claims this writing approach "attacks the selectivity of perception" by removing control from the reader and deliberately compelling specific content to be covered first. João Canavilhas (2007) suggests that every user has different interests and opinions on what is actually the most important information and these do not always coincide with the view of the writer. His research demonstrates that users sometimes select information links on lower levels of the hierarchy if it is of more individual relevance. Furthermore, he argues that the inverted pyramid is not necessary to structure information if the architecture of the site is strategically planned (Canavilhas, 2007). The inverted pyramid and principles of frontloading are effective if the information is based on insightful knowledge of the user's needs. I argue therefore that it is the role of the writer to prioritise a meaningful hierarchy of information to guide the user towards an intended action with a seamless path. Frontloading is therefore a technique in the presentation of information that can reduce cognitive load if applied appropriately.

The principles and theories of hypertext

As discussed in Chapter 2, hypertext is one of the core theoretical foundations of this thesis. This categorical non-sequential structuring of information works in contrast to the linear flow of article writing, which unravels the meaning from the most important to the least important facts. The basic defining characteristics of hypertext feature a combination of information blocks or "nodes" joined by electronic links and networks to create multiple choices of paths between different segments of text (Landow, 1992:40; Slatin, 1990; Yankelovich, 1985). I argue that the principles of "chunking" text into blocks of information is applicable to writing for digital media, as it puts the task-driven digital user in control of the reading process as a means of reducing effort during the interaction experience.

Shift in the power of the reader

This re-organisation of information might appear simple, but it represents a significant, almost revolutionary, shift in the balance between reader and writer. Leading hypertext theorists, George Landow and Paul Delaney describe hypertext as "democratic and anarchic" and suggest it breaks down people's habitual way of experiencing and understanding texts (Delaney & Landow, 1994:30). This decentred form of writing abandons the previous authoritative and hierarchical presentation of information to society (Landow, 1992:2). Reading a hypertext document decentralises the author from the text and allows the reader and writer to become "fellow travellers" in the mapping of the text (Birkerts, 2006:26). The reader is empowered as it allows for individual choice and offers liberation from the linear rigidity of printed narrative text. Bolter agrees that the horizontal nature of hypertext linking "counterweighted the vertical dimensions of power" (Bolter, 1991:107). The inter-linking of facts also makes it possible to present coherent pieces of information at appropriate stages in the user's journey (Landow, 1992). Hypertext challenges the traditional structure of the written "argument" as the arrangement of the text is now in the mind of the reader (Carter, 2000). However, I suggest the writer of mobile content does have the power to *curate* an ideal user path to achieve a specific objective, based on relevant user insights, but the user should always feel in control.

According to French literary critic, Roland Barthes (1975:4), different types of text present varying levels of participation between the reader and the writer. The concept of "readerly" text uses a conventional style to establish a predetermined meaning, leaving the reader in an idle, passive state. In contrast, "writerly" text

disregards the narrative style and places the reader in greater control of interpreting the meaning. Barthes also discusses the "ideal text", which features networks that interact and offer the reader access by several "entrances", without any of these entrances being authoritatively declared as the main opening point (Ironstone *et al*, 2018; Landow, 1992:3). In relation to the openings and exits of text, Edward Said (1983) claims that beginnings designate the meaning that the writer intends to communicate: the entrance to what the content offers (Landow, 1992:58; 2006; McCarthy, 2010). With hypertext writing, the concept of the "beginning" becomes more complex as the information is presented with multiple entrances. Unlike a printed text that features a single entrance point for the reader, in the context of hypertext writing, the beginning of each "atomized" piece of text represents the first step in the writer's intentions (Landow, 2005). The experience of reading hypertext involves a series of repeated beginnings, and "implies return and repetition rather than simple linear accomplishment" (Said, 1983:5). Writing for digital media therefore facilitates the reader's entry, and re-entry, into pieces of text based on the objectives of the interaction.

This discussion on entries also brings the concept of an *ending* or *departure* into question, as there is also no conclusive ending when reading hypertext. Hypertext is by nature open-ended and presents a different ending for each reader, or user, although the writer is aware of the intentional path the user should follow. In this context, any part of the text could mark the beginning, or accommodate a departure (Birkerts, 2006). Landow claims that the conventional understanding of completion or finishing doesn't apply to hypertext (Landow, 1992:59). He extends this analysis by establishing three categories to help navigate the reader into and out of the text: "the rhetoric of reader orientation", "the rhetoric of arrival" and the "rhetoric of departure" (Delaney & Landow, 1994:96-98). These categories show the importance of the writer understanding *both ends* of the journey, ensuring the user is constantly orientated when moving through the text and is familiar with how and where to move to achieve a specific task. I propose that even the choice of terminology such as "journey" and "navigation" reflects an appropriate metaphor of the user's movement through the hypertext space. The use of the word "through" rather than "to" implies the user is travelling *within* the information in contrast to the linear movement "from" a single start to finish (Carter, 2000:89).

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A multi-dimensional visual reading experience

I extend this discussion on the openings or endings of text into a multi-dimensional space, and I suggest that the text interacts with words and visuals *on all sides*. The readers of hypertext are given unique and valuable interaction opportunities that represent a radical departure from the conventional reading experience. Hypertext is an "open-bordered" text with an approach to writing that blurs the distinction between what is 'inside' and what is 'outside' a text" (Landow, 1992:63). The concept of linking information, both within a text and in relation to external texts, might involve a process of separation in terms of parsing the thoughts into different categories, but this process actually assists the reader in making semantic connections. This "web of relations" that is intrinsic to hypertext writing influences the way text is read and experienced, which I argue changes the way it should be written (Landow, 1992:62). Birkerts presents an alternative perspective on the reading experience in this context, asking the question; "Do we still call it reading? Or would we do better to coin a new term, something like "texting" or "word-piloting"? (Birkerts, 1994:164). These terms demonstrate the significant shift in control from the writer to the reader; the latter becoming the *operator* in control of each individual journey through the text *en route* to interpretation.

This new type of reading experience changes the activity of writing to a more comprehensive "authoring", which also involves *composition* of text on the interface, and the management of links between nodes of information (Slatin, 1990). Although Slatin made this point two decades ago, I suggest it is of relevance to writing for mobile phones, as the words are always working in synergy with the composition of the interface. Destructuralist philosopher Jacques Derrida (1987) argues that visual elements are significant as a means of preventing the text from being confined by linearity. He claims that the inclusion of non-verbal elements in text could present a means of breaking the constraints of linearity (Derrida, 1987). I suggest that hypertext converges with this theory as it specifically allows for easy integration of verbal and visual elements by creating links between text and images. One of the core graphic integrative elements in hypertext is the presence of the cursor on the screen. This intrusive, interactive visual presents a significant difference in the reader-writer's relationship, compared with the reading of a book. The digital reader becomes physically integrated with the text, and even controls the individual path through the "body of lexias" (Landow, 1992:51). However, this interaction experience changes for the mobile user, as the common method of input on a touchscreen involves a finger tap rather than mouse click.

As I discussed in Chapter 6, the layout of the graphics influences the spatial arrangement of the text and affects the logical force of the argument (Carter, 2000). Bolter (1991:107) uses the term "topographical writing", suggesting that writing for electronic media is both verbal and visual; it involves writing *with* places rather than *in* places. By breaking up the text into small units of meaning, or *topics*, the spaces become a part of the argument rather than just a medium to convey meaning. The etymology of the word topic, *topos*, Greek for "place", accurately reflects the spatial character of hypertext writing. This writing approach permits unlimited levels and varying relationships of topics, and also allows the reader to intersect paths, which isn't possible in printed narrative text. The structuring of the topic outline, network or "tree" therefore becomes integral to the writing process by moulding a visual space for the content (Bolter, 1991:108-112). I argue that this theory reflects the practical methodology utilised in web writing, which begins by creating a site map based on hierarchies of headings (Pritchard & Sitto, 2018).

Information ordering

The ordering of information is a fundamental task of the digital writer, and integral to my argument that effective writing can reduce the cognitive load of the user. What then is the optimum approach to order? Tom McArthur (1986) argues that the structure of a traditional book might not be the "normal" order. For centuries, information was ordered thematically, but the invention of the printing press influenced an alphabetic ordering of information that often resulted in a meaningless and disjointed method of ordering material (McArthur, 1986).

Hypertext shifts the traditional order as the reading experience involves associative rather than continuous thinking, and utilises a series of connecting links that are given order by the reader (Bolter, 1991:106). Non-linear writing represents a sense of deconstruction and a break down of narrative order. Derrida suggests there is an "overrun" of meaning across the boundaries and although a structure is by nature organised, the elements within the structure create their own order (Derrida, 1993:223). These elements could be aligned to what Barthes describes as a "series of brief, contiguous fragments… or lexias…units of reading" (Barthes, 1975:13). It could be argued that these fragments fracture the seamless linear progression, but in hypertext writing, they consequently adopt their own separate, individual identities (Landow, 1992:53). Carter suggests each text unit operates as a self-contained "island of meaning" (Carter, 2000:86). These units of information become

autonomous and begin to take on a life of their own, as they aren't dependent on the preceding or forthcoming information (Landow, 1992:73). The order of interpretation in hypertext therefore works in contrast to traditional narrative structures that gain coherence through neighbouring nodes of meaning, such as the previous paragraph or chapter (Canavilhas, 2007). It cannot be assumed that the hypertext reader will consume all the information in each fragment, or in a particular order and this impacts on the writer's intended interpretation. There is an assumption that sequential reading presents a degree of predictability (Slatin, 1990:871), but I suggest it is the challenge of the digital writer to create a new type of order, or as Carter suggests, "in place of a single argument, a structure of possibilities" (Carter, 2000:86).

Criticism of hypertext

Traditional reading theorists express several critiques of hypertext writing. Although I argue in favour of hypertext as an effective methodology for mobile media writing, it is important to counteract these benefits with opposing views. Hypertext theorists believe this writing approach gives the reader more control over the retrieval of information, but critics claim that this control results in greater cognitive burden. The reader requires additional effort to locate the information and provide a context within the greater text (Charney, 1994). According to Bransford (1979), the brain organises information in a more sequential and hierarchical pattern. The process of reading hypertext therefore results in a greater demand on short-term memory, and an increase in cognitive load when reading website content (Bransford, 1979). However, the opposing view suggests that hypertext presents a more accurate match for the natural workings of the brain, as information is organised in the memory in a networked format (Bush, 1945).

Critics claim the dispersion of the text into fragments disrupts the flow of the reading experience, results in disjointed understanding and discourages a reflective mode of reading (Birkerts, 2006; Miall & Dobson, 2006). I agree that the reading experience is less reflective, but argue that readers are actually more engaged with the content. The issue of coherence also comes into consideration, as the critics believe the hypertext structure removes the sequential relation between current, preceding and future text (Canavilhas, 2007). This disruption in the "natural" sequence results in a loss of context, forcing the reader to have to continually re-join the pieces of a puzzle (Carter, 2000:90). I suggest this issue can be resolved with effective navigation and formatting techniques. The critics also claim hypertext users become overwhelmed

with too many choices when faced with multiple links in a complex network of information, and lose track of their location within the text. This feeling of disorientation is inherent to the nature of hypertext, which only allows a few of the multiple nodes to be visible on the screen at the same time and omits the "discourse cues" present in books, such as chapter headings and page numbers (Charney, 1994; Conklin, 1987; Foss, 1989). I argue that hypertext in fact *enhances* orientation. The separate clusters of meaning are given a sense of place with effective interface design, navigation and text architecture. The conventional tools that provide coherence to a narrative piece of text might not be utilised, but they are replaced by neighbouring nodes, links and chunks of information. The structure therefore contributes to the meaning, as the form becomes a part of the content (Carter, 2000:90).

Although these theories were discussed in a vastly different communication era, some of the principles can be aligned to writing for digital media with remarkable foresight. However, in the context of hypertext for *mobile* media writing, I believe many of these criticisms of hypertext are now inaccurate and no longer relevant. Charney claims that hypertext demands the user makes "imaginative leaps and connections between disparate texts" that bear no relationship to the reader's needs (Charney, 1994:33). In reality, the mobile media writer is now vividly aware of the reader's needs, particularly in context to the focus on UCD. Furthermore, in contrast to Derrida's claim that the cutting up of text is arbitrary and a matter of convenience (Derrida, 1987), I maintain that the connection between facts cannot be considered arbitrary or "imaginative" as most content written for current digital platforms is meticulously planned with deliberate linking and strategic "chunking", based on extensive user research and specialised UX design. Although the reader is given more control when reading hypertext, the journey should not be an aimless wanderer; as Carter suggests there should always be a *feeling of coherence* whatever the sequence of text (Carter, 2000:90).

Hypertext therefore makes large amounts of information more manageable and easier to find (Landow, 1992). Rather than adding to the load of the user in the reading experience, I argue that hypertext *assists* the reader with simpler navigation and information retrieval. It becomes the job of the writer therefore to construct information into meaningful chunks and create appealing paths for readers to travel (Carter, 2000:89). I build on the research presented to propose that hypertext in the space of mobile media is an entirely new medium with its own unique order of

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information. It is the challenge of the future digital writer to find new methods of establishing relationships and constructing knowledge in a coherent manner within this unique writing platform (Slatin, 1990:882).

Reader response theory for mobile text

A significant connection between literary theory and hypertext writing is found in the relationship between the reader and writer, and the reader and text. In this section I analyse the fundamental principles of reader-response theory, using the work of Bleich (1975), Fish (1980), Iser (1972) and Rosenblatt (1978) to explore the unique relationship between the digital *user* as the reader and presentation of text on the mobile smartphone. I suggest an understanding of these theories provides valuable insights for the mobile media writer to establish writing techniques that facilitate optimum interpretation and consequently minimised cognitive load.

The concept of text in terms of classification, discourse and genres is an expansive field of study that requires more focus than I can dedicate in this thesis, as each discipline defines the functions of text within its own unique framework (Trosborg, 1997). Rosenblatt distinguishes between the "poem" and the "text". The former refers to any form of literary work in which the reader demonstrates a more active response: "a coming-together, a compenetration of a reader and a text" (1978:12). A collaborative definition of text is a sequence of sentences, or linguistic symbols that together create a semantic cohesion to communicate a message (Puchala, 2011; Sager, 1997; Rosenblatt, 1979). This definition reflects the theory of de Saussure, discussed in Chapter 6, that the "linguistic unit" has no intrinsic sense and only gains meaning through the reader's interpretation (de Saussure, 1974). The *function* of text determines its unique characteristics, such as argumentative, expository, literary and informational (Puchala, 2011). In the context of this discussion on writing for digital media, the functional role of *informational* text is the predominant area of focus. Rosenblatt also distinguishes between literary text and "scientific" or "everyday" language (1978:22). The latter aims to get things done, and doesn't draw attention to itself with expression or connotation, but rather depends on denotation – a direct link between the words and the objects they represent. In contrast, literary language uses implication, association and emotion, creating different shades of meaning. The literary writer therefore uses a combination of linguistic tools to create a complex "aesthetic experience" for the reader. These two reading experiences are notably distinctive but in reality most readers are likely to "hover" somewhere between the

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extremes of aesthetic and non-aesthetic, or everyday and literary. Rosenblatt claims the text shouldn't function as a rigid mould, but rather serve as a pattern to guide the reader. This point supports my argument, that the writer has the power to curate, and yet not control, the user's path through the information. Furthermore, I argue that everyday text can also be expressive and utilise language tools to convey meaning in a rewarding way, even if it isn't primarily aiming to be read poetically. The writing of copy in advertising, or text on websites and mobile apps presents an intriguing combination of both everyday and literary writing, as there is most often a practical objective and outcome. However, effective writing for these media channels utilises an insightful understanding of the reader's psychology as well as subtle nuances of language to weave a story around a brand or product, in a way that I contend presents its own unique form of "aesthetic experience".

According to Rosenblatt there is a "transactional relationship" between the reader and the text, and both play a role in the event of reading, and production of meaning (1978:6). She argues that there is no proper or expected way to react to any work. The text has an inferred meaning, which is then interpreted individually by each reader (Rosenblatt, 1978). The words evoke a unique response and interpretation for each individual, based on previous life experiences, emotions, knowledge and cultural background. Regardless of the type of text, the reader should use past experiences to draw meaning from the coded symbols of language. Rosenblatt refers to reading as "meaning-making", a process that involves the application, organising and revising of elements "selected from our personal linguistic experiential reservoir" (1978:5). This point supports my argument that the writer requires an insightful understanding of the user to facilitate the appropriate interpretation of information. In the process of writing for mobile or websites, extensive analysis of target audiences is performed, with the intention of developing accurate "digital personas" to communicate to readers in a relevant way (Redish, 2014). An element of this analysis would require an understanding of the inherent interpretation strategy of the targeted readers, with the intention of creating interaction experiences that reduce the cognitive load.

The idea that the reader plays an active role in the reading experience rejects the view of the New Critics or Formalists who believe that meaning is found solely in the text. These theorists claim that meaning is not influenced or affected in anyway by the background, or indeed intentions of the writer, and the interpretation cannot vary according to the individual response of the reader. The New Critics claim that the

focus on the reader's response confuses the intrinsic qualities of the text with its function (Tyson, 2014:170). I claim the views of the New Critics are in direct contrast to the principles of effective copywriting, web and mobile writing, which aim specifically to evoke a particular response or action from the reader or user. Furthermore, within the context of brand communication, a specific "voice" is established in brand writing; a personality and attitude that is developed over time through the consistent application of writing style and visual tone – even the choice of typeface. I argue that this voice is communicated on behalf of the brand, with the writer operating merely as the conduit, which means the personality of the brand becomes integrally linked to the text, rather than the influences of the writer (Sullivan & Boches, 2016; Felton, 2013). In this context therefore, the meaning of the text cannot, and shouldn't, be interpreted independently of the "writer" because the brand and message are inseparable.

It is also worth questioning the reader's stance in the transaction with the text to gain meaning through the process of interpretation. According to Rosenblatt (1978), the stance could either be "aesthetic" or "efferent". The concept of "aesthetic reading" is associated with the experience of the reading itself, including the thoughts, feelings and sensations of the reader at that time. The aesthetic reader appreciates and savours the structure of ideas, the emotional subtleties of the prose, even the rhythm of the words (Rosenblatt, 1988:25). The "efferent stance" of the reader is focused on the information and interpretation that is to be taken away after the reading of the text; the word is derived from the Latin *effere*, to carry away. The efferent reader aims to analyse specific information, make conclusions and act upon it, therefore focusing on the solutions or "residue" after the reading experience (Rosenblatt, 1978:7). I suggest that these theories written by Rosenblatt in 1978 present a fascinatingly prophetic description of the type of writing that is recommended for digital interfaces in 2019. The efferent text correlates with the task-focused writing of mobile media, which is predominantly written to encourage a specific action, solve a problem or satisfy a pre-determined objective.

In contrast to Rosenblatt's view of a direct transaction between text and reader, Stanley Fish (1980) introduces the theory of "affective stylistics", suggesting that meaning of a text is based on how the words *affect* the reader's response and mental processes at each moment throughout the experience. There is nothing immanent in the quality of the text itself that awaits its release through the conscious and unconscious interpretation of the reader (Eagleton, 2011; Tyson, 2014:193). This

theory does give some focus to the text, but not in the same way as the New Critics who consider the text as an independent entity that is separate from its effect on the reader. An alternative view is found in the subjective reader-response theorists, led by David Bleich, who believes there is no text beyond the interpretation created by the reader. He differentiates between the words on the page as the "objects" and the reading experience as a "symbolic object", because it doesn't occur in the real world but in the mind of the reader (Bleich, 1975:99). The interpretation experience is therefore not that of the original text but the meaning that the reader creates in response to the text, or what Bleich calls the "resymbolization" (Mailloux & Bleich, 1979:211; Tyson, 2014). I propose that this theory relates to the internalised meaning interpreted by the consumer in conceptual brand communication. However, in the context of mobile media, there is a more direct relationship between the text on the screen and the response of the reader to simplify the interpretation process.

A further theory on the relationship between the reader and text is presented by Wolfgang Iser who focuses on the role of the reader's *actions* in response to a literary text (1972:279). According to this theory, the reader imposes and projects meaning onto the text so the processes required to construct meaning are built *into* the text (Iser, 1972; Tyson, 2014). It is this "organic unity" between the writer and the reader that the New Critics claim could not be separated from the meaning of the text (Tyson, 2014:152). Iser (1972) also differentiates between the determinate and indeterminate meaning. Determinate meaning refers to the facts, which in a literary narrative could involve the plot outline or character's physical descriptions. The indeterminate meaning refers to the gaps in the text, the unexplained actions or outcomes that allow the readers to create their own interpretations. Iser suggests that the author of a literary text ideally should not set out the whole picture for the reader, as it is the gaps in the narrative that activate the reader's imagination and ultimately involve him in the reading experience (1972:285). Tyson argues that the reading process involves an active interweaving of anticipation and retrospection (2014:174). In contrast, I maintain that the text on mobile media should undoubtedly reflect a "determinate" meaning, as this context of writing doesn't require imaginative conclusions. It therefore becomes the role of the writer to ensure there are no gaps in the delivery of the intended message, as this would result in ambiguous interpretation by the user, and increased cognitive load.

The relationship between the reader and the text is central to the writing process, in context to any media channel or platform. Reader-response theory examines this

dynamic in relation to the literary works, but I suggest it is also applicable to functional text, as seen on a mobile smartphone. Rosenblatt (1979) uses the analogy of a live circuit to illustrate the relationship between the author and the reader, as each element functions as a result of the presence of the other: the specific reader, the specific text, the time and place of the reading experience. I maintain this thinking can also be applied to the context of mobile media as the mobile reader brings individual meaning to the text. The unique context of usage for mobile smartphone users is also integral to the interpretation experience and response of the reader. The combination of these elements consequently impacts the writing approach to minimise the cognitive load experienced by the user.

User experience writing for mobile interfaces

The skills and techniques required to write meaningful and user-friendly text for the mobile phone are unique to this medium. The characteristics and design constraints of the phone, as well as the associated user-mobile relationship, all present unique challenges for the writer. I suggest that there is another aspect of writing for mobile that plays a fundamental role in the development of information for this medium: the actual writing and design *process*.

The synergy between the various specialised role-players: interface design, UX design and text writing contributes to the development of an optimum user experience. I argue that the role of the writer in this process is not yet fully understood or maximised, specifically in the South African context. The words featuring on a mobile application are often written by the designer, or other role players in the development team, without an appreciation of the crucial linguistic role of the specialist digital wordsmith. The writer also frequently works separately from the UI designer, which affects the clarity and logic of the presentation or understanding of the user experience. The content writer is often considered as the "poorer relation" in context to other digital disciplines and is omitted until absolutely essential (Bowles & Box, 2010). As UX writer Janet Six (2015) suggests, the technical writer is not able to make a positive impact on a product's success if the writer is ignored until the latter stages of the development process.

It is acknowledged that the responsibilities of each role-player tend to blur and overlap in this field of creative execution. In his research on the *shape* of information space, Andrew Dillon (2002) discusses the divisions between writing and design.

Dillon claims that the text and the interface design shouldn't be thought of as distinct or separated, which supports the central argument in this thesis. There is a natural relationship between the content and its form, as each discipline manipulates and influences the other, by its very nature. For example, a lengthy textual narrative will demand a specific visual layout or the integration of graphics will influence the approach to the textual decisions (Dillon, 2002). It is therefore of essence to involve the writer *before* the design is completed, as UX writing is essentially the design of experiences using words (Berkery, 2018).

I use this theory to support my argument, that the writing, *and the writer*, should be closely integrated in the entire process, and even become the driver of many of the interface design decisions. A typical team approach utilised in the advertising agency environment involves the close collaboration of the copywriter and art director in the development of relevant conceptual communication, maximising the visual and text-driven skillsets (Felton, 2013; Sullivan & Boches, 2016). In contrast, digital design tends to separate the content from the format in which it appears. Based on the multi-faceted demands of human-computer interaction, there are understandably now more technological factors to take into account, such as the linking structure, navigation and visual elements on the interface (Cooper *et al*, 2007, Shneiderman *et al*, 2016). It is therefore even more important for the writer to be involved in the *space* of the words, rather than simply fulfilling a role of content provision, as content shouldn't be viewed as words and images "to be shaped by others into a consumable hypermedia form" (Dillon, 2015:66).

Based on the rapid growth in the demand for effective mobile interaction, there is now an increasing focus on the collaboration between the writer and designer in the creation of meaningful user interface experiences. There is also a growing demand for a mix of multi-disciplinary skills to provide different perspectives on human interaction. Design teams are now including specialists in media, industrial design, sociology and psychology to cater for a new generation of interactive systems (Preece *et al*, 2002). In the USA particularly, there is a new respect developing for the skills of the specialist user experience (UX) writer, who is now acknowledged as a core role-player (Berkery, 2018; Six, 2015; Wolhuter, 2018). The importance of this role was highlighted by a job description that appeared on the official Google career's page in 2017. The description read as follows:

UX Writers advocate for Google design and help shape product experiences by crafting copy that helps users complete the task at hand. They set the tone for content and drive cohesive product narratives across multiple platforms and touchpoints. As our resident wordsmiths, they work with a variety of UX design-related jobs including researchers, product managers, engineers, marketing, and customer operations to help establish connective language and a unified voice (Google design, 2017).

Companies such as Apple, PayPal, and DropBox also now employ specialist UX writers and the role has become a topic of considerable discussion among technical writers. The role of *design* in the field of UX writing is a consistent feature, with collective definitions using terms such as *conversational design* and *creative tools* to develop rewarding and effective user journeys. The principles of UCD are once again relevant, as the effective UX writer requires an intricate understanding of the user's needs, background and usability skill. The content should therefore adopt the mental framework of the user, which considers everything that models the user's world, including use of language and choice of vocabulary (Bjoran, 2017; Kissane, 2011:5; Sanchez, 2017; Wolhuter, 2018).

This thinking is reflective of Rosenblatt's transactional response theories, that the interpretation of meaning is inherently influenced by the reader's previous experiences and personal background to bring meaning to a text (Rosenblatt, 1978). The successful UX writer therefore has the ability to analyse the strategy and semantics of the information, as well as the appropriate user action throughout the journey. Ironically, effective UX copy should guide users intuitively without the words actually being noticed, much like effective typography in print communication (Bowles & Box, 2010; Cooper, 2015; Halvorson & Rach, 2012). I argue therefore, that each word appearing on a mobile screen plays a core role in directing the user to help achieve a specific objective, with the least amount of cognitive effort. The mobile user is already faced with so many distractions and interaction factors, the words shouldn't be the cause of confusion or doubt in the mind of the user (Sanchez, 2017).

The principles of effective UX writing are illustrated in the writing guideline for Google focusing on three best practices: clear, concise and useful (Ligertwood, 2017; Rung, 2015). Clarity of communication is a fundamental objective of all writing, but in this context of writing, the user's needs are often overlooked when working within the

boundaries of technical specifications. There is also a constant risk of jargon terminology that is misunderstood by the user (Ligertwood, 2017). The principle of *conciseness* refers to the importance of writing short, economical text. Although brevity is important, the choice of words should also be *efficient* as "every word on the screen has a distinct job" (Ligertwood, 2017). However, clarity can at times be negatively affected by trying to write too concisely. If the message is not immediately understood with fewer words, it is advisable to rather add more words, as the goal of writing in this context is always to communicate with the least amount of user effort (Carroll, 2014; Redish, 2013; Sanchez, 2017). The third practice of *usefulness* relates to the objective-driven nature of mobile apps. I maintain that these three principles of UX writing are all based on insights driven by the behaviour of the mobile user and argue that the skilled application of these techniques contributes to a reduced cognitive load during the interaction experience.

As discussed in Chapter 6, there is a direct interaction between the words and the visual elements on the screen, which also applies to UX writing. A combination of informative text and visual presentation affects the clarity of communication and efficiency of copy (Yalanska, 2016). The writing of information for mobile media requires specialist techniques and a unique process, which I suggest could be optimised by integrating the writer more closely into the design decisions. I maintain this approach to writing will become critical to the way content is designed for mobile products in the future (Bjoran, 2017).

Conclusion

In this chapter, I focus on the role of the writer and text in the interpretation of information on mobile media. The digital user reads text on screens in different patterns to printed media, which influences the optimum presentation and hierarchy of information. I argue that techniques of frontloading and the inverted pyramid contribute to reducing cognitive load by providing the most important information upfront and removing unnecessary effort to achieve a task. I examine the theories of hypertext and the way this approach to writing shifts the balance of power to the reader, and extend this categorical writing approach to the unique mobile writing space. I believe the context of the mobile phone also creates a unique relationship between the text and the reader, and explore this thinking within the theoretical framework of reader-response and literary criticism (Bleich, 1975; Bolter, 1991;

Canavilhas, 2007; Carter, 2000; Delaney & Landow, 1994; Fish, 1980; Iser, 1972; Landow, 1992; Rosenblatt, 1978; Slatin, 1990; Tyson, 2014).

This chapter also situates the role of the mobile UX writer within current industry context as I examine the writing processes involved in the design of information for this medium. I believe this process and the synergy between the writer and design presents a significant influencing factor in reducing the user's cognitive load during the interpretation of information on mobile media.

CHAPTER EIGHT: CONCLUSION

The mobile phone has evolved beyond the role of a communication device; it is now an integral partner in people's everyday lives that enables access to a plethora of information from almost any context (May & Hearn, 2005; Oksman, 2010:14; Pirolli & Card, 1999). Miller suggests that the mobile phone redefines "our perception of ourselves and others, our relationships with others and even our relationship with ourselves" (Miller, 2015:115). I maintain that the revolutionary shift in the role of this channel in everyday interaction demonstrates the value of research relating to the mobile smartphone.

The topic of this thesis aims to enhance the interaction experience through optimum presentation of information on the mobile interface, with specific reference to the text. In this context, the words don't just function to convey informational messages, they also help navigate, encourage interaction, and express personality. When all these functions are achieved, the usability is improved because the user achieves the desired objective with minimised cognitive load. I therefore argue that a focus on specialised writing techniques in context to enhanced mobile usability is a topic that addresses a gap in the current research field.

What are optimum writing techniques for mobile media?

The mobile smartphone presents unique demands on the designer and writer, as a result of its physical structure, context of use, and notably personal relationship with the user. These characteristics require a unique approach to the writing of text, to compensate for the smaller keyboard and vertical touchscreen. The related practical and psychological challenges include eye fatigue, readability, comprehension, and on-the-go input considerations (Budiu, 2014; Kostromins, 2014). An optimum writing approach for this context involves short, simple text without ambiguity in order to eliminate confusion in functionality and comprehension, and consequently reduce cognitive load.

The principles of CLT provide insights into the mental effort experienced by the reader in the interpretation of information (Paas *et al*, 1998; Sweller, 1988, 1994; Sweller *et al*, 1998; van Merriënboer, 2005). A significant element of CLT discusses the concept of schemas, which organises complex units of knowledge into categories; reducing the number of elements the working memory needs to process

(Paas *et al*, 2003:). This theory underpins an effective approach to digital writing, which categorises information into "chunks" with relevant headings to create "scannability" and curate a meaningful user journey. The principles of UCD are relevant as they establish a sense of familiarity and relevance for the user and consequently simplify the user experience (Oviatt, 2006; Roller, 2011).

This research focuses primarily on writing text, but the words cannot be isolated from the visual context of the information or the behaviour of the user (Laurel & Mountford, 1990; Preece *et al*, 2002). The role of design also contributes to the interpretation of words on mobile user interfaces. The writer for mobile media therefore requires a comprehensive understanding of visual elements, such as the graphic icon, which functions as an integral feature in the effective presentation of information in this context. Theories of semiotics and signs provide insights into the meaning of icons and visual symbols (de Saussure, 1974; Eco, 1976; Peirce, 1974, 1992, 2006). I contend that graphic icons and words become so intertwined in the mind of the reader during the process of interpretation, that the role of the writer and the designer begins to overlap. Consequently the optimum interaction experience is created when the *words are drawn* and *visuals are written*.

The visual multi-dimensional "writing space" of the text on mobile media therefore plays a pivotal role in the development of text for this medium. The principles of hypertext provide a relevant theoretical analysis for this discussion. The "open-bordered" nature of hypertext is characterised by a non-sequential network of information "nodes" joined by links (Landow, 1992:40; Slatin, 1990; Yankelovich, 1985). This approach shifts the balance of power *to the reader* by enabling a choice of individual paths through the information, rather than a linear order that is dictated *by the writer*. I suggest, however, that ideal writing techniques *facilitate* the flow by strategically planning the "topography" of information and presenting it in meaningful topics, based on an understanding of user needs (Bolter, 2015).

The composition of different fragments or "lexias" of meaning influence the way text is read and consequently the way it is written (Barthes, 1975; Birkerts, 1994; Landow, 1992). This approach also takes into account the reading patterns of the digital user, which is characterised by the F-shape but can be guided with strategic application of formatting, headlines and hierarchy (Eldesouky, 2013; Pernice, 2017). The writer cannot assume the reader will follow a traditional sequential order, as there is a "de-structuring" of the text in this context (Carter, 2000; Canavilhas, 2007;

Derrida, 1987). The digital writer therefore creates a new type of order (Slatin, 1990); in fact, I argue that the user journey through a mobile application introduces an entirely unique narrative. The user follows a linear, goal-directed journey to achieve a specific task, but the presence of menu icons allows for departures from this flow, resulting in each user forging an individual, non-sequential path through the information. The writer therefore has the power to *curate* rather than control the user's path through the information, with the intention of reducing the cognitive load.

This relationship between the writer, the reader and the text is analysed from various perspectives by the work of reader-response theorists such as Bleich, (1975), Fish (1980), Iser (1972) and Rosenblatt (978). The digital writer operates in a unique writing space compared with the literary writer, as the text in this context balances the functional, task-focused "efferent" stance with the emotional "aesthetic" reading experience that responds to the individual behavioural patterns of the user.

The philosophers, linguists, and psychologists referenced in this research originally formulated their theories over 50 years ago, in a different century, and a vastly different technological age. However, the relevance of their theories in relation to the reading experience of the modern digital user on a mobile phone in the 21st century presents a notable testament to the prescience of their thinking.

Future opportunities and discussions

As technology becomes seamlessly immersed into people's everyday interaction with digital media, there is a greater demand for writers who possess the ability to rationalise individual words and deliver coherent narrative experiences in the creation of relevant, user-facing touch-points. A broad objective of this thesis is to analyse and identify the niche skills required by the future digital writer. Although there are some similarities with website writing, journalism and advertising copywriting, the mobile media writer is required to consider many other factors, as the words cannot be isolated from the technology associated with the interaction design process.

There are also on-going developments in the field of HCI, as well as mobile phone technology that will continue to influence the interaction experience of the smartphone user. Although many of the fundamental principles of human behaviour remain consistent in spite of progressions in technology, it is essential for the writer

of the future to develop an astute understanding of the expectations of the user in relation to each type of media, and context of use.

I acknowledge that this research is limited to text that is *read* on the smartphone interface as a form of information inputting and sourcing. I suggest there is opportunity in the future to analyse alternative interaction methodology, which might not involve traditional writing of text but rather focus on designing conversations for voice-activated input and interaction. Nonetheless, this research highlights the important relationships between the reader, the text and the writer, which remain relevant even when transferred from literary works on printed books to the digital mobile media screen.

It has also been identified in the practical aspect of this research that the role of the writer is not fully maximised or understood within the industry context. This insight leads to other further discussion on the development of appropriate training and specialist education to prepare writers of the future with relevant skills and knowledge related to mobile media. Research has shown that in the South African context there are no formal tertiary education routes or training programmes to become a UX designer (Pretorius *et al*, 2015). I suggest this issue also applies to the digital writer, as there are no definitive training paths or institutionalised education programmes available to teach the niche skills associated with effective mobile and UX writing. This trend isn't surprising, considering the multi-faceted characteristics of this medium and the multi-dimensionality of the user, as presented in this research. The skills and techniques required to write for mobile media are constantly evolving and the digital writer of the future will be required to remain agile in a world of incessant technological advancement, shifting industry demands and revolutionary changes in human behaviour.

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APPENDICES

Appendix one: Current practices in a South African context

Rationale and Introduction

This appendix provides an extension to the theoretical analysis presented in this thesis, as a means of providing a practical perspective on the practice of mobile writing within the communications industry. I suggest it provides valuable insights into the processes currently followed by design teams in various areas of digital communication in South Africa. I conducted semi-structured interviews with digital writers, developers and UX specialists from a range of different digital design organisations in Cape Town. The focus of the interviews aimed to determine the typical processes adopted by digital designers and writers to develop and present content for mobile media. It also endeavoured to determine the specialised skills required by the writer to work effectively for this medium.

Particular attention was given to the role of the mobile writer in the integration of specialist skills, however it is acknowledged that the responsibilities of each role-player tend to blur and overlap in this field of creative execution. In the context of the communications industry in South Africa, there is currently no indication of writers specialising exclusively on writing for mobile. There is a significant demand for "digital writers", however, the skills outlined in these job descriptions typically feature varying combinations of traditional copywriting, social media writing, content strategy and website writing. More recently, however, several specialist companies have begun recruiting writers with more focused job titles, such as UX Writers and Product Writers. These job titles are not yet familiar in South Africa and it is unlikely many writers would be aware of the specialist skills required by the writer for this type of writing role. A digital recruitment agency in Cape Town reported that the applicants responding to digital writing positions often have more experience in technical writing and journalism (Molony, A. 2018. Recruit Digital. Personal communication). As discussed, these writing jobs are already prevalent in developed countries and companies like Google, Apple, PayPal and DropBox all employ specialist UX writers. The role is not yet clearly defined and will likely continue to evolve in the agile climate of rapid technological development.

Interviews with industry role-players

1. Interview one:

Ruth Gathercole: UX and Business Analyst, Isoflow. 10 July 2018.

Isoflow is a small app development company based in Cape Town.

Ruth majored in philosophy and completed a post-graduate in business management.

The work process in mobile content development

The UX content at the company is developed in a very collaborative process where everyone works together to refine the user journey. UX designers primarily focus on functionality and layout. Ideally the copy gets written at the stage of the initial framework development, featuring black and white prototypes without visuals. The UX design and copy is then given to UI designers who implement appropriate styling and fonts. The focus is first on functionality and then aesthetic design.

It is important for the copywriting to be done at this stage as early in the process as possible, but it doesn't always happen that way. It's more productive for the writer and designer to sit together to make decisions. The text is so embedded in the user experience, the writer should work closely with the UX team, bringing an understanding of the product and the actual flow – to get the user to move to a specific destination and understand the action needed to take them there. Once the first prototype is created, the client is used as a first round of testing, who then picks up if there are any miscommunications. Clients know their product best but they can't actually write the copy so the writer needs to bridge that gap.

What skills are considered important?

Isoflow currently don't employ a specialist writer, but the writing is done by "anyone in the team with first-language English who enjoys writing or has some experience in it". Two members of the team have a journalism background, but the team members have a wide range of different backgrounds.

An important differentiation was made between writing for mobile sites with long-form marketing copy, compared with UX microcopy for mobile applications, which is more task-focused. For the development of apps, it is important to have an understanding of the correct language used in UX, such as "tap this" rather than "click". The action words are important as they aim to take the user on a defined journey.

The tone of the brand should also be consistent throughout and create a clear personality. For example, for a financial app, the text for a calculator used the words,

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"find your balance" to create a friendlier action instruction. It is also important to know the target audience; older users need more explanation whereas younger people are more inclined to just tap and explore. The challenge is to say a lot in a very small space, without losing the clarity of the message. Users on apps are not there to spend a lot of time reading, they want to get something done. It's best to use short punchy lines of text and always try to break them up with visuals or different layout options. Sometimes to explain something, more words are needed with the option to expand or collapse so the screen doesn't look too copy heavy – which adds to the cognitive load. There is a lot of psychological thinking required to find out why the user makes decisions at every stage of the journey.

When designing the navigation, the desktop experience allows the button descriptions to be written out, whereas on mobile it's condensed to a strip at the bottom with icons. Common icons can be used without labels, but mostly it's best to include words with icons. The choice of words and icons relies heavily on the conventions already established by Apple and Android. The style guide www.material.io is utilised as a standard to leverage the terminology, icons and vocabulary that the Android user is familiar with, such as swipe and tap. Even the use of micro-animations needs a specific approach to the copy to tie in with the tone and visual message.

Approach to user inputting methods

Considering the small keyboard of the mobile phone it is recommended to eliminate the need for typing wherever possible. If the user is asked a question, it is best to make the answer options very visual, with only one question on the screen at a time. For example, one app needed to find out if the user is male or female, which was solved with two big visual blocks featuring male and female bathroom signs that could be selected. The form fields for lists also present important UX decisions, for example, when asking for birthdates, a drop-down menu is appropriate for short lists but a numeric keyboard is better for longer lists, such as the year of birth. It also isn't necessary to say "back" or "search" as users are familiar with arrows and search icons. The importance of the information dictates where it appears, as the user might not scroll all the way. If it's just explanatory, that information can be hidden and revealed if selected. The instructional approach should be consistent across all screens, including elements such as terminology, colour, typeface and input methodology.

2. Interview two:

Andries Bester: Marketing development lead, GetSmarter. 18 September 2018
GetSmarter (2U) is an edutech company developing online short courses for leading
international universities.

Andries has studied socio-informatics and has a background in web development
before the position of development lead in the marketing department was created for
him at GetSmarter.

The role of mobile at an edutech company

The communication platforms in this organisation include: corporate marketing
website, blogs, mobi-sites, social media, email marketing and the student online
learning centre. The mobile sites are built with responsive design, using programmes
such as Bootstrap, which is considered one of the world's best responsive
programming frameworks for mobile friendly design. There are no specific mobile
applications at GetSmarter, but the mobile content and navigational elements are
adapted to work in an "appy" way. For example, the blog was rebuilt with different
code in "Media Query" in CSS3 to adapt the size of the text. Three form fields with
filters for search queries appear underneath each other, for example, "search by
category, search by subject or search by date". On the desktop design, these fields
appear side by side. The search bars are wrapped into an element that floats to the
top and shrinks into an icon to save space on the screen. The user psychology
behind this design decision is that users will know how they want to choose their
content and are likely to make the correct choice the first time, so it isn't necessary
for the search options to stay on the screen. The icon would read as "explore tool",
however, it was acknowledged that ideal wording in contexts such as this are not
always properly resolved as there isn't a dedicated UX writer involved in the team.

Content is created on blog posts for the company, which is optimised with key words
to be found by search engines. The challenge with mobile apps is that the content
cannot be crawled by Google, as the content isn't refreshed. There is a programme
called AJAX that allows crawlable content to be refreshed. Andries suggested that a
"Model View Controller" (MVC) can be utilised to create a different front-end "view"
but the backend architecture is separated so the content can be crawled by Google.

The role of UX in the company

There are two core UX functions at GetSmarter, in the OLC (Online Learning Centre)
and in marketing communication. However, Andries considers UX to be an umbrella
term that should be an over-arching, user-focused approach that reaches into every

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department in the company. The UX specialist should be responsible for research to ensure the work aligns with the business needs and the developers are given accurate models and specs. The term UX is a very intangible and opinion-driven field that is perception focused and comprises non-tactile elements. The term adopted by 2U is "conversion rate optimisation strategy" which helps to add an element of science and measurability to UX by creating tools that are specifically for optimising. For example, the tool "hijacks" a page before it gets served to the user. The page can be used for specific research and testing purposes allowing for more data-driven design decisions. There are many other measurement tools, such as Google Analytics for measuring factors such as bounce rates and session times. Other programmes are available to measure the user behaviour associated with specific "events" such as the clicks on "Add to Cart".

Role of writer in the process – current and ideal

The writer should be involved at the conceptual stage, but mostly isn't. The Business Systems Analyst (BSA) decides on the needs of the business and objectives of the product. The BSA works with the UX specialist to plan the user flow and predict the scenario of each potential journey. This thinking is transformed into a wireframe with a mock-up in Balsimiq, and then Invision gives it a live prototype feel with clickable wireframes that the user can navigate as if actually in the site. At this stage the coding specialists are given the framework and preferably further changes won't be made. Andries suggested the need for a UX analyst who works with a UX designer: someone who thinks from a data driven perspective working with the front-end designer.

What skills does the writer need?

Other than obvious writing skills, it would be invaluable for the writer to have a high-level view of the project to understand how the systems work together. The writer should have a broad UX thinking approach and predict how the user is likely to behave for each possible scenario. The writer should also know how code fits into the picture and understand the jargon to be able to communicate this information between departments. In the South African economy, it isn't feasible for a writer to only work on UX as it is too specialised. Most South African companies require the writer to have a broader range of writing skills as well as an understanding of how systems work.

2. Interview three:

Maru Fourie: UX writer with ABSA Bank Digital. 17 September 2018.

ABSA bank is one of top four biggest banks in South Africa. ABSA Digital develops all digital content for the bank, including the website and mobile application.

Maru's background involved studies in psychology and previous work experience on project management for app development. Her initial interest was in UX research, which offered a good entry into the multi-faceted skillset of UX writing. The team at ABSA features a range of disciplines: UX designers, customer experience designers, UI designers, prototype engineers and service designers.

Issues experienced in the design team

The UX writer is involved with designing "user conversations" based on extensive user research. For example, a scenario is established by considering a possible conversation of a potential customer who contacts the call centre. The fact that it is called a "conversation" suggests that the writer should be involved at this stage. However, the content and design isn't always developed or initiated at the same time, which results in the team painting themselves into corners and discovering that a specific element doesn't work when it is too late to make changes. The writer is mostly involved too late in the process and is often expected to "make things work". This is especially problematic in mobile with the limitations in screen space.

Role of the writer in the digital design company for a bank

There are many different types of apps in the banking business, retail, corporate, business and consumer. It is important to establish a common design language with a consistent voice and tone across all these platforms, which involves a combination of UX design and content strategy. In the South African context, the role is more of a generalist than a specialist position, as the writer needs to work on marketing copy, UX research as well as microcopy for all the different channels. Maru suggested the role of the UX writer at the company is still being figured out; there is currently quite a lot of co-authoring taking place. It's a space where psychology and technology overlap. When building content strategy, one of the most important tasks is to know where the links are and how things fit together, to have a bird's eye view of the context. These skills are learnt in service design, which doesn't only focus on the end user, but also the organisation and the employees. For example, when working on content for an article, it is essential to know the context in which it appears, what preceded this specific contact point with the consumer and what is likely to follow.

Contextual research is particularly important when designing the transactional flow, as the user should only see content that is relevant to that specific stage in the journey. The usage of mobile is also influenced by the context of use.

Skills needed for the UX writer in this context

It's a very functional type of writing, logical and psychological rather than conceptual or creative. It's a natural evolution from technical writing, but is a lot more human. Writing for mobile requires the ability to understand complex information and translate it into simple, succinct messages. It's important to ask lots of questions and research what the user knows and the type of language and vocabulary used. The language and terminology of the developers should also be clarified, as there can be internal jargon that is not understood by consumers. For example, the design team referred to a component on the banking site as "account tiles" which wouldn't be a term that is relevant or meaningful to the user. The writer should ideally oversee the strategic guide for vocabulary usage, which should be consistent across a range of different platforms. This terminology would even filter to the support centre staff, as they would need to know what words to use when interacting with customers.

It is also valuable for the UX writer to have a basic understanding of the main software that is used to develop user journeys, wireframes and prototypes, such as Balsamiq, Invision and Axure. This allows the writer to refine content and make changes to microcopy as an integral part of the design process. Knowledge of SEO is also useful, although not with apps but mobile site content.

The challenges specific to writing for mobile

Considering the limitations in the screen space, the user is now accustomed to a multi-step interactive process that wouldn't be effective with desktop interaction. It is also important to consider the accessibility of the user in terms of data usage, visual impairment and non-first language speakers. The context of usage should obviously also be taken into account as mobile implies usage in places with more distractions than desktop interaction. It can be assumed the user of a banking app is relatively tech savvy as users initially become comfortable with digital banking on a desktop, then migrate to using an app for banking transactions. Younger users are more comfortable with the interaction of an app as they grew up with the technology, however, they don't always understand banking concepts or financial terminology. Users don't care how banking products work so it's important to help them achieve a task without giving unnecessary information

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Conclusions from interviews with industry practitioners

The objective of this appendix is to provide a practical element to the theory relating to the writing of text for mobile media. Three interviews were conducted in Cape Town with a range of specialists working in different areas: banking, tech-education and app development. The interviews provided basic insights into some of the processes currently adopted in the development of content on mobile media. All interviewees concurred that mobile usage is increasing at a rapid rate and digital communication is now predominantly planned and designed with a "mobile-first" approach. It was a common sentiment that the psychology of the mobile user is unique to this medium, and requires extensive user research to develop an astute understanding of the user's behaviour and expectations in a mobile context. The physical characteristics of the mobile phone also need to be considered, such as the limitations presented by the smaller screen and the practicality of input interaction options on a smaller keyboard.

Although each interviewee worked for a different type of organisation and performed different roles in their respective organisations, there was considerable agreement in the "ideal" processes for developing content on mobile. It was agreed that there isn't yet sufficient understanding or acknowledgement of the writer in the field of mobile UX and UI in the South African context. It appears to be common practice that the writer is involved too late in the process and it would be preferable for the writer to contribute from the initial conceptualising and strategic planning stage.

The background of the writers in this field is notably varied, both academically and in terms of previous work experience. This fact is not surprising, considering the role of the mobile writer is constantly being redefined as it adapts to the rapid changes in technology and shifting industry needs. There is also currently no formal or institutionalised training available to teach the niche skills associated with effective mobile writing. It was agreed that the field of UX and specialised mobile writing involves a range of different disciplines and in the South African industry it is not yet viable to specialise exclusively in this type of writing. The optimum UX writer will need to take on a range of cross-functional tasks, with a foundation in traditional writing skills, such as research, editing and structuring coherent narratives. One specific skill that emerged from all the interviews is the need for the UX writer or "content strategist" to have a "big-picture" view and understanding of the entire process, including the many different components associated with the user's journey.

Appendix two: Questions for semi-structured interviews

Interview one:
Ruth Gathercole: UX and business analyst – Isoflow design

1. Are there specialised writers employed in the creative team?

2. Who are the main role players involved in developing the content for mobile apps and websites?

3. What is the general process involved for this department in the development of mobile apps and websites?

4. Is this process any different for mobile compared with desktop websites?

5. At what point does the writer get involved during the development of content for mobile sites or apps?

6. Do you think this process is optimum and could it be improved in anyway?

7. Do current digital writers have sufficient understanding of mobile, web design and UX?

8. What should the digital writer be expected to know about mobile UX to make a more effective contribution to the team?

9. What type of training would be ideal to produce writers with the relevant skills for mobile writing? Is there a need for specialist training?

10. Are there any trends that are predicted that will change the role of the writer in the context of mobile design and information presentation?

11. Are there any specific obstacles experienced in the development of optimum mobile content for sites and apps – specifically in the South African industry?

Interview Two:

Andries Bester: Marketing development lead – GetSmarter

1. What is the role of mobile in your organisation and industry?

2. Are there any specialised UX or mobile writers employed in the creative team?

3. Who are the other main role players involved in developing the content for mobile apps and websites?

4. What is the general process that takes place in this department?

5. At what point does the writer get involved during the development of content for mobile sites or apps?

6. Do you think this process is optimum and could it be improved in anyway?

7. Is the process any different for mobile compared with desktop websites?

8. Do current digital writers have sufficient understanding of mobile, web design and UX?

9. If not, what should the digital writer be expected to know about mobile and UX to make a more effective contribution to the team?

10. Do you think there are trends relating to mobile design and information presentation, globally and in South Africa?

11. Are there any specific obstacles or challenges in the development of mobile content for sites and apps, globally and in South Africa?

12. What type of training would be ideal to produce writers with the relevant skills for mobile writing? Is there a need for specialist training?

Interview Three:

Maru Fourie: UX Writer – ABSA Digital

1. How did you become a UX writer? What is your background?

2. Are there any other specialised UX writers employed in the creative team?

3. Who are the main role players involved in developing the content for mobile apps and websites?

4. What are the general processes involved in the developments of apps and websites in your team?

5. At what point does the writer get involved during the development of content for mobile sites or apps?

6. Do you think this process is optimum and could it be improved in anyway?

7. Is the process any different for mobile compared with desktop websites?

8. Do you think current digital writers have sufficient understanding of mobile, web design and UX?

9. If not, what should the digital writer be expected to know about mobile UX, and what skills would be useful to make a more effective contribution to the team?

10. What type of training would be ideal to produce writers with the relevant skills for mobile writing? Is there a need for specialist training?

11. How would you describe the ideal writer of the future in the context of mobile design and information presentation?

12. Are there any specific obstacles faced in the development of optimum mobile content for sites and apps, globally and in South Africa?