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Bridging the Digital Gap in South Africa: Fitts's Model Impact on Usability

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Abstract. Handheld computing systems are relatively new compared to existing computing systems. While their miniature size makes them ideal for mobility and connectivity, it also poses an enormous challenge to first-time users. For some, it may well be the solution to the huge digital gap that exists in South Africa. For others, the solution to the digital gap relates to issues of in computing usability, and in increasing the numbers of new or first-time users mostly in remote and impoverished communities. When it comes to systems usability, Fitts's law enables To assess the success rates, numbers of usability errors, the amount of frustration that any user may be experiencing., This model would be used to determine whether or not first-time users are able to overcome the usability challenges associated with handheld systems, and if in the way, the existing usability gap can be reduced.

1 Research area

Human computer interaction; First-time user; Adaptation; Remodelling Fitts's law;

1.1 Brief Description

This research project is about the impact and re-modelling of the Fitts's law on first-time handheld users in developing countries such as South Africa.

1.2 Description of the research

In the past few decades, new and innovative technologies in the field of ICT has emerged with specific regard to mobile handheld devices such as the tablet computing system (Tegarden & Dennis & Wixom, 2013). This appears to have reactivated the debate on systems usability, efficiency and effectiveness. Developers are not always aware of some of the challenges of first-time users, especially those who had never used any computing system in their lives (Lazar, 2007). Most, if not all of these devices, are imported from developed nations with different social, economic and technological realities. User needs

and aspirations are meant to be at the centre of usability studies for any computing systems development Indeed, it is expected that people everywhere in the world, including those in remote and impoverished places would have access to computing devices to enable them perform simple daily tasks (Lazar & Feng & Hochheiser, 2010). The question then is: if all potential users are provided handheld computing system in an attempt to close the digital gap, would they be able to such devices effectively?

Some scholars claim that the polarisation of societies makes it difficult if not impossible for every individual to have access to the same technological tools and facilities thus rendering such people technologically isolated (Reiss, 2012). The challenge is to narrow the existing technological gap by enabling access to new users at a higher rate thus increasing the number of first-time users who are in the process of mastering available ICT tools in a reduced time frame (Preece & Rogers & Sharp, 2002). For a number of years, many academics around the globe debated the impact of the digital gap in their respective communities with regard to local challenges (Preece & Rogers & sharp, 2015). One may wonder though, whether the gap is now closed in South Africa with the decreasing connectivity costs and availability of low-cost handheld computing devices (Oz & Jones).

Fitt's model was developed four decades ago to explore and understand the ability of new users to adapt to existing machinery. The theory that underpins this model is still valid in our lives today, especially when it comes to understanding the time it takes people to master computing systems, the rate of error, and the speed of processing once a task is repeated.

1.3 Prior research

Many computing usability studies have been conducted in different parts of the world. In most cases, usability testing focuses on average users and power-users, and less attention is paid to first-time users, especially those without previous access to any form of computing in their lives (Freeman & Freeman, 2005). These are often people living with high levels of poverty. It has therefore become essential that a unique study focuses on such people who can be considered as new entrants in the field of computer usage. This project is unique in that similar studies have not been done in this area that incorporate Fitt's model as well as the living conditions, levels of education, and the overall socio-economic conditions of users (Olivier, 2006).

1.4 Central research question

What are the usability challenges faced by new or first-time handheld device users given the current digital gap, and in view of the social, economic and education backgrounds of such users?

2 Method used (one example only, due to space constraints)

To demonstrate what a handheld computing device is and what constitutes new computing trends?

2.1 Research method

A qualitative research method was used in this section, motivated by the fact that the researcher needed to collect pertinent data on current trends of handheld computing business devices.

2.2 Data collection techniques

For this section, the researcher interviewed developers of computing systems, programmers, designers, and retailers.

2.3 Research population

The population was essentially ICT professionals who were involved in solving digital problems on a daily basis. The sample population consisted of individuals who sell computing devices and those who design, manufacture, and test handheld computing devices.

2.4 Research sampling

Probability sampling was used as a method of narrowing the sample down to the expected target group. This provided an equal opportunity to participants of the target population to participate in the project.

2.5 Research design

A quasi-experimental design approach was used.

2.6 Research location/area

In line with the main research objective, which was to conduct a nationwide research study on the usability of handheld computing devices, nationwide interviews were conducted with all participants.

2.7 Data collection techniques

Interviews were conducted and recorded at the participants' place of preference during the course of their working day.

3 Research hypothesis

Computing systems including handheld tablet systems manufactured in developed countries do not pay attention to usability challenges faced by first-time users in low-income communities in developing countries.

4 Expected contribution

This research will assess the current levels of usability of handheld computing devices for first-time users who are based in remote communities in South Africa. People in such communities who are less exposed to new technologies are the primary target of this research. The following will be taken into account – the ergonomic system, the relationship between human beings and computing, adaptation, error rates, task completion times, user satisfaction, and the cost of handheld computing devices in South Africa. Most importantly, the design of the user manuals of low-cost handheld devices will be assessed as well as their levels of user-friendliness, design, usability features, and cost.

5 Proposed solution

Closing the digital gap between those who have access to ICT devices and those who do not is a challenge for many governments around the world, regardless of continent, the state of the local economy, natural resources, or political policy or demographic make-up. The solution may not simply be the availability of, and access to, computing systems, but of effective and efficient usage of the handheld device. The goal is that there will be more new users that would later reduce or close the digital gap

It is anticipated that this study will contribute towards an understanding of the reason for the digital gap in South Africa, a situation that exists in spite of the availability of low-cost handheld devices. The researcher will apply Fitt's law to assess the success rates, task completion times, error numbers, and degree of frustration that first-time users experience. This will inform proposals for an innovative low-cost handheld computing framework specifically intended for the tablet that will contribute to the adaptation of handheld computing devices to first-encounter users in the future.

6 Statement to date

The following chapters and sections have either been completed or are in the process of completion:

- Chapter 1: completed
- Chapter 3: completed
- Chapter 2: completed
- Data collection: in progress.
- Faculty research ethics clearance: completed
- Questionnaires: completed.
- Data analysis: in view

7 Questions for discussion at the DC:

1. What is the importance of Human Computer Interaction (HCI) when it comes to computing?
2. What impact does HCI have on handheld computing systems usability?
3. How can computing systems designers balance systems learnability, efficiency, memorability, user satisfaction, and sound computing design principles?
4. What is Fitt's law?
5. What implications, if any, does Fitt's law have on computing systems adaptation?
6. What is STEA analysis?
7. What impact does it have on handheld computing?
8. What is the link between Fitt's law and STEA?

9. How should Fitt's law and STEA be calculated and applied to handheld devices?

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