

Interaction With PC Tablets And Possible Emotional Responses

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Abstract: The remarkable developments in mobile-based technologies have brought prominent impacts on human life style. Today, life is running on mobile electronic devices, smart phones, tablets, gaming devices and video-players. Generally, the users acquaint with the features and properties of products after emotionally and physically interacting with the devices. The interaction, in return influencing our moods, depending on the feelings the technology creates. The focus of this study lays on the uses of tablets or also called PC tablets and its effects on its user's emotional responses. To discover possible emotional responses with the tablets, the data in this work were collected through a survey questionnaire from participants belongs to various backgrounds, age groups and genders. The model of emotions was adopted in order to classify the emotional responses. The study has found that during or after the interaction with the tablets, the users may get positive or negative emotional responses of a different kind. The user's mood can also be affected by awakening such emotional feelings as happiness, sadness, frustration, etc.

Index Terms: emotions, emotional interaction, emotional responses, HCI, model of emotions, mobile technology, PC tablets

1 INTRODUCTION

DEVELOPMENT of different mobile-based technology has brought tremendous impacts on human's life and has changed the ways human's accomplishing things today [1]. Modern mobile devices, such as feature phones, smartphones, tablets, netbooks, etc. are allowing people to perform many daily activities in more easy way [2]. It is well-known that the popularity of these devices has increased exponentially [3], and this growth will highly likely continue in the future despite overall falling economic growth rates in many countries of the world [4]. The PC tablets are touchscreen devices, which due to the integration between interface control and other information in a single surface classified as "direct" input devices [5]. The devices are manufactured by different companies, and come with a variety of different Operating systems (OS). For instance, the Android OS is leading in Asia and Europe, while North America shows platform parity, iOS and Windows are next leading OS [6]. It is important to note that both OS and the actual hardware of these devices are equally important in order to provide its user's a pleasant user experience (UX). Therefore, over the past few years, remarkable advancements in the area of OS have also been recorded. Primarily, the main aim of a successful OS is to provide an easy and efficient interface to users in order to utilize and enjoy from the features of the device. However, it shall also be noted that every tablet available in the market is somehow useful and adaptable [7]. Since Microsoft launched the first ever PC tablet in 2001, the mobile industry has undergone huge changes [8]. However, today's advanced mobile devices have larger screens, higher speed processors, huge memory and, consequently, could be applied to many daily life activities [2].

Longer battery life in these portable devices is another factor of their popularity [8]. During the interaction with technology the users obtain certain impressions about it, positive or negative, pleasant or unpleasant and these reflections about technology are best expressed with emotional responses [9]. In this study the focus lays on the PC tablet devices and exploration of positive and negative emotional responses, which users of PC tablets may obtain while interacting with the devices. The structure of this paper is organized in following manner: the paper presents the topic of emotional interaction, later it presents setup and methodology followed by the outcome of the study. Finally, paper discusses and connects the outcomes with the model of emotions, presented among all Rogers et al. (2011).

2 EMOTIONAL INTERACTION

Whenever users interact with technology they experience different emotional responses. This kind of interaction is termed as emotional interaction and is one of the important components [10] in the study of Human Computer Interactions (HCI) [11]. According to Rogers et al. (2011 p. 128), emotional interaction helps to identify different aspects of the user experiences of how users feel when first discovering a product till the time they will get rid of it [11]. It is also found that while users get acquainted with the features and properties of the products through interacting with them, they are also getting emotionally involved [12]. Emotions play an important role in human's everyday lives and present whatever people are and whatever they do. The emotions can be expressed through many kinds of media and one of them are feelings, which affecting directly whatever we do [2]. Although, when it comes to interaction either with humans, or technology, or humans via technology; humans suddenly become more aware of the emotional responses while anticipating it. Therefore, it could be understood that human-technology communication is essentially emotional [13]. Typically, products that require users to interact with them directly have been designed primarily with the user and his nature in mind, and, hence every effort is made to keep its use easy and enjoyable [11]. The enjoyable and usable products are highly appreciated by users. As a consequence several problems and issues, such as the calls to customer helplines will be reduced, fewer training materials will be needed, sales of the products will increase and so on [14]. On the other hand, it is also found that in several cases technology can cause certain

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disappointments if proper human-technology relation is not well developed [1]. It can happen for instance, when a technology does not satisfy one's expectations [15]. As the goal of every interface is to enable users to accomplish the intended tasks more effectively [13], the awareness of the emotions brings the fundamental challenge in building intelligent systems [16] and in delivering a user-friendly interface, and, as a consequence receiving positive responses from users [13]. Hence, if the response is positive the user attains feelings of satisfaction, joy, achievement, and so forth [15]. Lee et al. (2012) are pointing out that emotions can be classified into 7 categories: happiness, surprise, anger, disgust, sadness, fear, and neutral with high accuracy. Beside mentioned above emotions there could be identified other negative and positive emotional responses such as frustration, which could be a result of bad design of soft- and hardware [11] limiting the feeling of freedom and enjoyment during interaction. As the use of portable electronic devices had increased in human daily life, it is important to understand how users are interacting with their devices, as well as what feelings do they get during and after the interaction. As a consequence, the field of emotional interaction has gained utmost importance [17], [13]. Therefore, prior to the launch of a product and in order for it to be successful on the market it is essential to recognize and understand, which emotional responses the users are receiving while interacting with digital devices [13].

3 RESEARCH PROBLEM

Referring to the brisk expansions in mobile based technologies, the design of user-friendly interfaces is becoming more and more complicated and challenging. As was mentioned earlier, the pleasant interface will facilitate users' interaction with the product, and, on the other hand, complicated user interface (UI) can create difficulties in interacting with the device and, hence, result in an unpleasant user experience. Unpleasant interfaces can awake negative responses, which may lead to the failure of the product, and, as a consequence create the risks of inflicting heavy losses in the company [14]. It is economically and technologically crucial to create designs that provide more pleasurable and satisfying user experiences [18] and therefore, the creation of pleasurable interfaces is one of the utmost important aspects in today's market research [14], [18]. It could be seen that during the past few years, many companies emerged as leaders in the market, such as Apple, Samsung, LG, HTC, etc. as they endeavoured to create the user interfaces of their products (smartphones, tablets etc.) as easy as possible. On the other hand, there are quite a few famous companies which diminished from the scene as they failed to understand and incorporate the emotional needs of human technology interactions in their products. There have been done noticeable research on human emotional interaction with different technology by using several different methods, however, human emotional interaction with mobile devices and PC tablets in particular has been studied less. Therefore, the goal of this research paper is to provide detailed information regarding the user's habits of interacting with their PC tablets, possible emotional responses that users may obtain during/after the interaction with the device as well as to identify the reasons why the users obtain a certain emotional response. The research presented in this paper is: 1) advantageous in understanding the human-technology aspects, 2) it can be

useful in thriving markets and launching of a product, since it is providing the information about what users may feel while interacting with the PC tablets as well as the reasons why the feelings occur, 3) it may provide valuable information for improving the interfaces of the tablets.

4 MODEL OF EMOTIONS

Prior to present the research methodology used in this work in order to investigate technology user interfaces and their influences on user's moods, it is useful to illustrate briefly an overview of the various models of emotion presented by Rogers et al. (2011, pp. 148-153) and has also been partially discussed by Benyon et al. (2014). The models of emotions are helping to define what an emotion is and how it can be classified [17]. In this paper, the model helped to characterize positive and negative emotions, which users confronted during/after the interaction with the PC tablets, also, by using the models of emotions it was easier to understand the pattern, which findings are following. Moreover, the model helped to facilitate the classification and connection of the emotions.

4.1 Emotional Design Model

This model illustrates that human emotions and behaviours are governed by the different levels of the brain. The model explains how humans respond to stressful and pleasurable situations. It also explains how the human brain and the body switch gear to respond appropriately to different events [19].

4.2 Pleasure Model

This model, which is also discussed by Benyon et al. (2014) focuses on the pleasurable aspects of human interaction with products. It focuses mainly on the potential benefits that a product can deliver. The benefits can be physio - pleasure, socio- pleasure, psycho- pleasure or ideo - pleasure. The model does not explain how pleasure happen in a biological or behavioural level, but it highlights different types of pleasure [11].

4.3 Technology as Experience Framework

This model explains the customer's experience, largely in terms of, how it is felt by the end-user of a product. The model points out that we should think about the user's experience in terms of its interconnected aspects rather than fragmented aspects [11]. In order to deliver a successful version of a product, it is recommended that features of all of three models presented above may be considered and incorporated.

5 RESEARCH METHODOLOGY

There are various research methods could be applied in order to collect and analyze the data pertaining to users' experiences. However, in order to gather comprehensive point of view of the user survey questionnaire has been chosen for the collection of the data from users belonging to diverse backgrounds, which is according to Love (2005, p. 42) is a most frequent tool that is being used for the gathering of the data in the area of Human Computer Interaction. The survey questionnaire tool is being used to obtain factual information from participants in relation to their experience of using named above technology [20]. Nonetheless, it should also be noticed that it has certain disadvantages, such as lower response rate or verification of the answers [21]. In order to obtain a useful amount of data for this research study, a survey questionnaire

was carefully designed in order to encompass all the intended aspects. The link to the questionnaire was distributed among the selected sampling frame through e-mails and was open in 10 days. The questionnaire had adopted both structured and semi-structured questions where the participants were able to leave their personal opinions. In this research study every effort was made to enable to approach a large group of participants belonging to different backgrounds by profession and also of various age groups. In order to reach diverse groups of people a random sampling strategy was adopted, which means that every element in the population of interest had an equal and independent chance of being chosen [22]. Survey participants were chosen through researcher's personal contacts, social media as well as different websites where the e-mail addresses of the users were accessible. The sampling frame for this study is individual adults 18 years or above belonging to different ethnicity and backgrounds and using PC tablets.

5.1 Research Sample

The participants of this survey belong to different ages, gender and professional backgrounds. As a whole, 51 people were invited to participate in the survey. It turned out that out of these 51 participants, only 27 were using PC tablets. Among those 27 participants, there were 12 males and 15 females. The participants were grouped into 4 age groups, namely 7 people belonging to the age group of 18-30, another 7 participants belong to the age group between 31-40 years, 9 people were from age group 41-50 years and 4 people were from age group 51-70 years. In order to ensure that valuable feedback from the participants of diverse backgrounds is obtained, all the participants were also asked to answer a question about their occupation. 16 out of 27 participants were skilled, where only 1 was unskilled, 8 participants were students and 2 participants were retired. As 24 participants in the study have not been using the PC tablets, it was interesting to know the reason behind this. The people who were not using the PC tablets were 17 females and 7 males. 16 out of 24 were skilled and 8 were students. The primary reasons for not using the PC tablet by these 24 participants were: 5 participants do not have a PC tablet to use it; 10 people were using their smart mobile phones, and do not have any need in having a PC tablet. 4 people were thinking that PC tablets are not suitable for them, whereas 5 people were not interested in using it at all.

5.2 Limitation and Generalization of Current Study

The current study focuses only on discussing the emotional interaction with the PC tablets, e.g. no other technology is discussed here. There participated 27 participants who used named above technology, and therefore the results may differ if a larger amount of participants would have participated. The current study does not focus on any particular brand or OS.

6 RESULTS AND DISCUSSION

The survey, conducted in this research provided useful data for further analysis. The post processing of the data highlighted the various aspects of user's emotional interaction with PC tablets and the model of emotions which was introduced in the book of Rogers et al. [11] also helped to discuss the results on at a later stage. The recent trend clearly pointed out that PC tablets are portable and flexible technology and its market is growing with tremendous pace.

However, despite all the benefits as mentioned by Cortimiglia et al., it is found in this research that people are not using PC tablets for longer time, and the majority of participants in the current study using this technology maximum for 15h/ week. It was also observed that half of the participants in this study are using this technology 1-5h/ week. It is also found that one third of the participants are not using PC tablet every day. Despite all the portability and flexibility benefits more than half of the participants are using them inside the house, which identify a critical aspect for discussion why the users use PC tablets less frequently outside the house even though the technology is primarily designed for on-the-go lifestyle. It is found that this may be due to the shorter battery time, visibility of a display screen of tablets in outdoor environment and non-user friendly graphical interface issues. Therefore, it is envisaged that by properly addressing these issues the market of PC tablets may grow manifold. There is no visible relation to the age, occupation or gender found regarding those matters. It is observed that one third of the users get emotional responses after interacting with PC tablets. The age of users may also play a certain role in what kind of emotions users are getting whenever interacting with the technology. It has been observed that the participants over 31 years of age are highly likely to be more affected by emotions than the participants below 31 years. The results of this study revealed important findings regarding the users' emotional interaction with their PC tablet devices. Based on the survey results, the interaction process could be summarized with the help of Fig. 1 below. The figure shows that it is no matter if the users of the PC tablets are receiving any emotional response or not they will continue interacting with their device. In the first case it is shown "emotion-free" interaction, where the user does not receive any emotional response and he/she continues to interact with the technology. In the second case it is shown that after interacting with the PC tablet, the user is obtaining a certain emotional response, which can be either positive or negative. On the assumption of the study outcomes, regardless what kind of response the user will receive he will continue interacting with technology anyway, but certain emotional responses will affect the extent of interaction – either in a positive or negative way. In this study was found that the most frequent types of positive and negative emotions primarily include: enjoyment, motivation, satisfaction, happiness, relaxation, sadness, tiredness, mental fatigue and frustration. Found in this research positive and negative emotions could be effectively classified and grouped into the categories in Fig. 1.

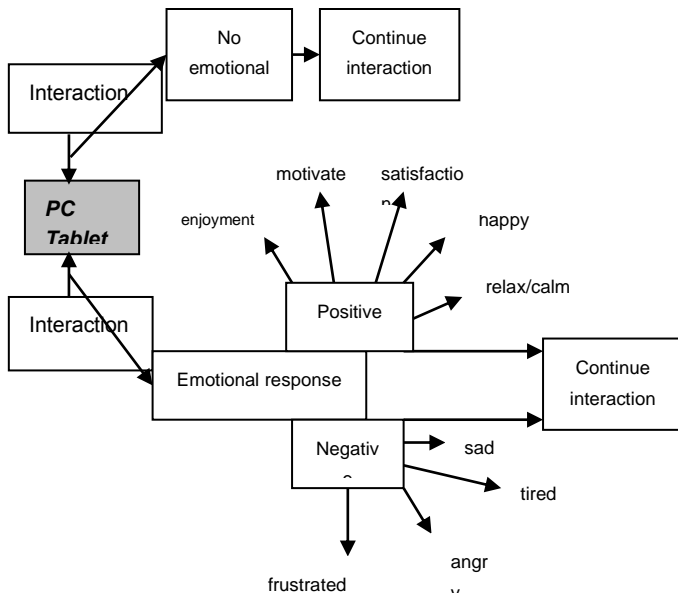


Figure 1: Most frequent emotional responses when interacting with Tablets

It is important to note that only one third of the participants was feeling relaxed when using PC tablets. This highlight the disadvantages of poorly designed graphical user interfaces of PC tablets which were needed improvements in order to make it user friendly for all kinds of users. However, more than half of the participants enjoyed and felt motivated using their PC tablets and this could be seen in summarized results from the research in Fig. 2. The reasons behind feeling enjoyment and motivation are depending purely on the situations. The feelings of positive response were mainly ought to the advantages of PC tablets, such as portability and the possibility to use it instead of a laptop. From the conducted research the feelings of happiness were generated in the users since the PC Tablet technology was viewed as a quick and easy tool for quick interaction as shown in Fig. 2.

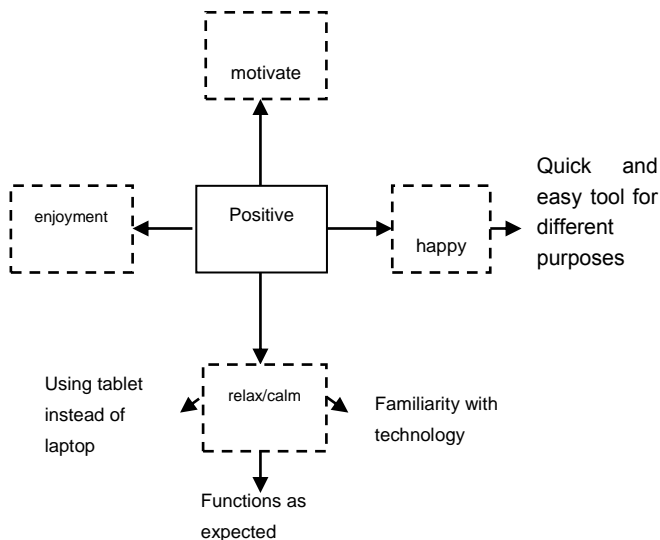


Figure 2: Positive responses in users in regard to Tablet usage

Having discussed the positive and pleasant responses of the PC tablet's users, there has been identified several negative responses, which were experienced by the users when interacting with PC tablets. Among all, frustration is seen as the most common negative response and is mainly caused due to different technical- and internet problems. Apart from the technical issues, frustration was also caused due to several human factors, such as anxiety and stress. Feeling of sadness and anger was also observed due to bad quality of touch screens, bad technical support, non-user- friendly interfaces, limitations in installing new programs and slow speed of the PC tablets. The negative responses and its pertinent emotions observed in this study are presented in Fig. 3 below. Apart from the factors mentioned another important aspect causing negative responses is the data security issues. The people who participated in the study showed their serious concern regarding fear for the security of their data and other sensitive information. It was found that more than half of the users started to feel uncomfortable after interacting with PC tablets for 2 hours or more due to their concerns of non-secure internet surfing. The security related issues also create a major hindrance in the prolonged usage of technology.

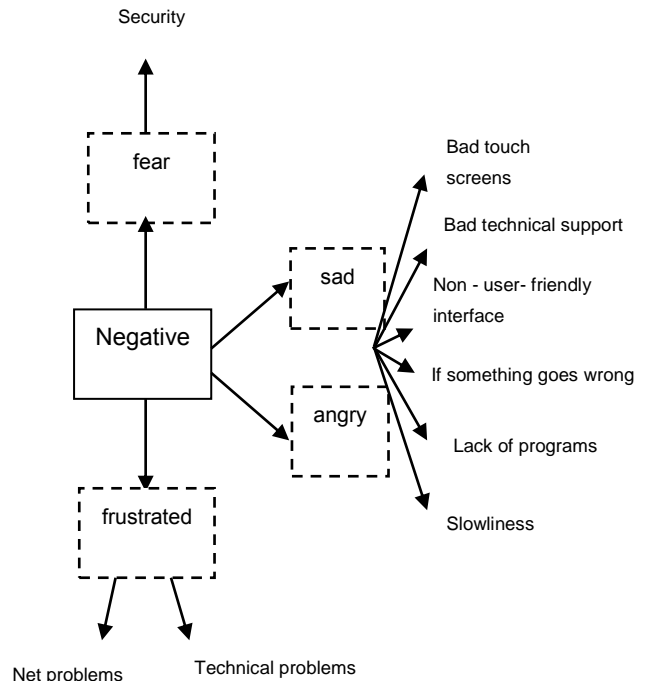


Figure 3: Negative responses in users in regard to Tablet usage

7 RESULTS AND THE MODEL OF EMOTIONS

Having discussed the results of this study, it could be seen that they could be classified in the context of the three models of emotion introduced in section 3. This will help to understand and summarize what types of emotional responses of PC Tablet usage have been found in the study. Moreover, the models of emotion are helped to understand the results of the current study in an easy way.

7.1 Emotional Design Model and the Results

Emotional design model relates to the following aspects found in this study:

- Different emotional responses in relation to different contents while interacting
- Different emotional responses, depending on for what purposes PC tablets are used for
- Technical problems, including lack of support, net problems can lead to negative responses
- Loss of personal contact, human issues while interaction or stress can lead to frustration

7.2 Pleasure Model and the Results

Pleasure model pertains to the following emotional responses:

- Feeling of freedom with portability
- Feeling of easiness, relaxation
- Pleasant user- interface
- Quick start, easy applications

7.3 Technology as Experience Framework and the Results

Technology model in relation to this study explains the following:

- Familiarity with applications and user- interface
- Portability and less time- usage of PC tablets
- Possibility to quick interaction and satisfaction
- Technical problems and their influence on emotional interaction

8 FUTURE RESEARCH

Exploring positive and negative responses of the users of PC tablets is a new and emerging topic and has plenty of space for further work. Primarily, the future research may investigate what are the major factors that are responsible for the limited usage of PC Tablets despite all its portability advantages. There is also the further possibility to explore in-detail the pleasant and unpleasant user- interface issues (operating systems, buttons, etc.) and its relation to the emotional responses of users. Another interesting topic may also be to investigate what factors can play a major role in order to increase the frequency of usage and number of hours.

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