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**IMPLEMENTING INTERACTIVE GAME CONCEPT DESIGN IN
QUESTIONNAIRE**

LEE AH CHUNG

This project is submitted
in partial fulfilment of the requirements for a
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ABSTRACT

The main focus of the project is to implement the idea of game concept design as another alternative for the researcher to be used into questionnaire. The application of game concept design has made research and development of this new idea into different fields significant to enhance the interactivity and effectiveness of the questionnaire in certain task. In the field of academic, game concept design is the new idea to be implement into the questionnaire as to enhance the information and data collection of the researches. This thesis presents the design and implementation of the interactive game concept design in questionnaire, the system will generate a game concept design incorporates with demonstration to allow users on having better understanding of the application of game concept design in questionnaire and also hoping that the system would be able to increase the interactivity and effectiveness of the questionnaire through a new alternative method.

Keywords: interactivity, questionnaire, game, game-based learning, paper-based questionnaire, web-based questionnaire.

ABSTRAK

Fokus utama projek ini adalah untuk melaksanakan konsep dan reka bentuk permainan yang interaktif dalam soal selidik dan juga sebagai salah satu cara yang digunakan atas soal selidik. Aplikasi konsep dan reka bentuk permainan yang interaktif ini telah memberi peluang kepada bidang-bidang lain untuk menggunakan idea ini sebagai salah satu cara untuk meningkatkan keinteraktifan dan keberkesanan dalam soal selidik bagi menjalankan kajian dan tugas tertentu. Dalam bidang akademik, konsep dan reka bentuk permainan ini merupakan satu idea baru yang bakal dilaksanakan dalam soal selidik bagi membantu pengumpulan data dan informasi kajian. Kajian ini akan membentangkan pelaksanaan konsep dan reka bentuk permainan yang interaktif dalam soal selidik, sistem kajian yang dihasilkan akan digabungkan sekali dengan demonstrasi bagi membantu pengguna untuk mengetahui lebih lanjut mengenai aplikasi konsep dan reka bentuk yang interaktif ini dalam soal selidik, kajian ini juga mengharap bahawa sistem yang dihasilkan mampu meningkatkan keinteraktifan dan keberkesanan soal selidik sebagai salah satu alternatif yang boleh digunakan atas soal selidik.

Kata Kunci: interaktiviti, soal selidik, permainan, permainan berasaskan pembelajaran, soal selidik berasaskan kertas, soal selidik berasaskan web.

CHAPTER ONE

INTRODUCTION

Background of Research

The questionnaire has been widely used in academic field on researches where the researchers used questionnaire to collect data and information from the respondents (Cheng, Goto, Koide, Nagahama, Someya, Utsumi, & Shionoiri, 2007). Questionnaire also used as a research instrument to measure the data and further used on data analysis for the particular study, researchers used questionnaire as an instrument where the questionnaire needed to undergo certain procedures to test on validity and also reliability before used on as a research instrument, the data and information for relative research was collected through the research instrument or questionnaire for that particular study (*Research & Consultation Guidelines*, n.d.). In addition, the questionnaire was used to evaluate the produced system or products where the data collected and information collected was used on further data analysis (Lew, Abbasi, Rafique, Wang, & Olsina, 2012).

The questionnaire was first used as an instrument for researches to gather and collect information through the traditional way of paper-based questionnaire (*Data Collection*, 2008). It was introduced to the respondents and the paper-based questionnaire was then further studied and the alternative ways to collect and gather information has been directed towards the web-based questionnaire, the questionnaire was altered from paper-based questionnaire into the web-based questionnaire as the researchers found out that the web-based questionnaire brought another alternative ways to the researchers as an useful and effective instrument in generating an interactive questionnaire towards the respondents and questionnaire (Croteau, Dyer, & Miguel, 2010).

As the advancement of technology, researchers are looking for another alternative method of collecting information and data where the idea of game-based learning system was studied and the idea will be integrated into the further study (Dai & Paasch, 2013).

Statement of Problem

The web-based questionnaire and traditional way of paper-based questionnaire has been a problem to the respondents where the respondents agreed that the set of questionnaire in the paper-based questionnaire was too long and boring. Moreover, the alternatives ways of questionnaire through paper-based questionnaire and web-based questionnaire unable to attract the attention of the respondents and also creating a condition of lack of interaction between the respondents and the questionnaire which might eventually lead to the low quality of research data (Dai & Paasch, 2013).

General Objective

The main purpose of this research is to identify and develop an interactive questionnaire through game concept design that enhances user's or respondent's interaction.

Specific Objective

1. To implement an interactive game concept design in questionnaire.
2. To evaluate the effectiveness of the application of game concept design into questionnaire.

Significance of Study

The application of the game concept design in questionnaire might be able to help on to create a positive impression to the respondents where the respondents will have a positive impression towards the questionnaire, the significant of this study might also be able to help on to attract the respondent's attention and gain a positive impression towards the questionnaire so that the respondents able to give a positive feedback and attitude towards this

questionnaire. Moreover, the interaction of the respondents or users might be able to improve and maintain an effective data collection.

Table 1

Definition of Terms

Conceptual Definition	Operational Definition
<p>Implementation</p> <p>Implementation is to execute or carry out with a plan, method or design by performing thing and the implementation must according to the preliminary thinking for an action to be completed (Rouse, 2014).</p>	<p>Implementation</p> <p>In this research context, implementation refers to the building of a propose idea into the system to be able to come out with a solution system towards the respondents or users.</p>
<p>Game</p> <p>A system that involved artificial conflicts of players which defines by rules and regulations to result in a quantifiable outcome (Juul, 2003).</p>	<p>Game</p> <p>In the research, the game refers to the production of the system that allows users or respondents to play and interact with.</p>
<p>Design</p> <p>The design is the use of plan and innovative knowledge into changing the existing situation to the prefer situation through an action (Hardt, 2006).</p>	<p>Design</p> <p>In this research, the design is the proposed plan into the developed system of game-based questionnaire to allow another idea of design incorporated into the system.</p>
<p>Questionnaire</p> <p>The questionnaire is an instrument</p>	<p>Questionnaire</p> <p>In this research, the questionnaire is the set of</p>

<p>to collect and gather information regarding particular issue to be investigated (<i>Research & Consultation Guidelines</i>, n.d.).</p>	<p>instrument as well as the tool to collect the data from the respondents through alternative methods of questionnaire.</p>
<p>Concept An idea considering of particular thing, how it works and what it refers to (<i>Learner's Dictionary</i>, 2014).</p>	<p>Concept In this research, the concept refers to the idea or new thoughts to the system where the idea of the design questionnaire is introduce in this study.</p>

Summary

As a conclusion, this chapter gave a clear picture to a start off on this research, it defines the background of the study, problem statement, objective of research questions, significance of the study, and definitions of terms. Each of these components had its own significance towards this research. For instance the background of the study consists of a brief discussion of our background issues and the objectives which are vital for us to understand on what are this study about and also the purpose of conducting this research in order to achieve the objective of the study.

CHAPTER TWO

LITERATURE REVIEW

Paper-Based Questionnaire

Questionnaire is a set of questions that used to gather information from individual also known as participants or respondents, it is widely used in academic, medical, commercial, political survey, researches and also engineers to collect information and data (Goto & Cheng, 2014). There is alternative method of data collection method to be used in a research, the set of questionnaire can be distributed through mail, interviews by face-to-face and also through electronic which is also through online. Questionnaires are needed for evaluation when the resources are limited and data is needed from the people around, gather information and knowledge about the related field of study and also to research on the beliefs, behaviors and attitudes of the particular research area. Moreover, questionnaire also needed to make sure that the privacy of the respondents is protected especially when it deals with the sensitive information that must not be revealed or abused (*Data Collection*, 2008).

The questionnaire is a method to investigate and re-search on the relative area of research, the interactive questionnaire as an effective method been discussed to actively ponder on the responses of the respondents and also the impression towards the research. The pen-paper questionnaire has been the starting of the research and been used to test on the relative research field with data collection to obtained the results of the research. People around has started to wonder that whether the method used is a factor of effecting the data collection as some of the researchers found out that the respondents are agreeing on that the questionnaire is tediously long and also boring which causes them to loss attention and at the same time this has also contributed to the low quality of research data, the impression towards the questionnaire to be answered as well been perceived to be long and boring which led to the low quality of research data (Dai & Paasch, 2013).

Web-Based Questionnaire

In order to solve this problem the researchers are looking forward to obtain and find another alternative of method of data collection and therefore the web-based questionnaire or online questionnaire is introduced to the respondents. The web-based questionnaire is known to have advantages on solving the previous found problems of producing a low quality of data; the web-based questionnaire is found to be able to produce a relatively better quality of data. The reason of the quality of data to be able to improve through web-based questionnaire is because of the data will be validated to check for the implausible data, incomplete data and non-response data and to prompt and alert the respondents in producing a good quality of data (Gelder, Bretveld, & Roeleveld, 2010).

Moreover, according to Gelder et al. (2010), the common ways of web-based questionnaire such as giving personalized feedback, follow up questions, randomized respondents to different questionnaire are also provided to ease on the method of web-based questionnaire. The visual, pop out windows and audio aids provide extra information to the respondents while this is impossible to be done in the paper-pen questionnaire or also known as the traditional way of questionnaire.

In addition, the researchers also agree that they are able to resolve the unforeseen problems immediately and to look for the preliminary results and also the initial development of the research. Next, the researcher also stated that the web-based questionnaire has gained lesser rate of responses from the respondents compared to the paper-pen questionnaire, but since the usage of internet and websites are increasing rapidly and thus the lack of responses of the respondents towards the web-based questionnaire will change over time where the researchers stated that the alternative method of web-based questionnaire is comparable to the traditional way of questionnaire. The reliability and validity of the data collected through the web-based questionnaire is comparable to the traditional method where the online

questionnaire also giving privacy and this can solve those respondents dealing with the sensitive issue of questionnaire, the respondents are given privacy with anonymous and also alone at that time and the data is also secured to protect the respondent's privacy. The traditional way of modes of data collection evolved from pen-pencil questionnaire into web-based questionnaire as an alternative method (Gelder et al., 2010).

The concern of the respondent's privacy is crucial where there were several cases of respondent's private information is abused and revealed. In order to prevent this problem, the cryptographical protocol for secure electronic election (Nakazato, Fujimoto, & Kikuchi, 2005) is introduced. The web-based questionnaire is low in cost and reducing the cost for the relative research where the marginal costs to add in the respondents are low (Gelder et al., 2010) and at the same time it is automated processing and producing real and accurate results (Nakazato et al., 2005).

The research also found that the respondents were having a sign of enjoyment of answering to the web-based questionnaire where they agreed that the web-based questionnaire is easy to use compare to the paper-pen traditional way of questionnaire. Moreover, they also agree that the respondents are feeling comfortable to use the web-based questionnaire as it is easy and ease on their answering session of the questionnaire and at the same time saving their precious time by making it easier and quicker. The recent workers have been busy with their working life and facing the internet and computers all the time has been an issue, thus the research suggests that the web-based questionnaire is relatively to be an enjoyment to the respondents where once a while a questionnaire might be a way of them to rest and give a break before go on to their works (Croteau et al., 2010).

The first web-based questionnaire was created for young children due to the reason that the web-based learning system able to bring in affective learning and also create a positive learning with the ease of answering the questionnaire for the respondents. The

KidActive-Q is a questionnaire that developed for the young children to access on their physical activities as well as describing that the set of questionnaire was easy to fill up, feasible and user friendly that ease on the answering of the questionnaire. This is where the idea of web-based questionnaire was first generated and introduced to the people through young children and further developed into another research area (Bonn, Surkan, Lagerros, & B äter, 2012).

Game-Based Learning System

The game-based learning system is the concept that was to bring into the questionnaire to attract the respondent's attention and motivate them to answer the questionnaire in the form on game method (Cheng, 2011). The study of researcher has developed a learning system of "Game of Life" and the results have shown that the game-based learning program was effective where the participants has shown positive motivation towards the learning program and the program worked effectively (Hata, Ushijima, Hiraga, & Watanabe, 2007).

Moreover, the same method of learning program through game based learning was introduced to the respondents where the mathematical game was given to them and the pretest and posttest were tested on the respondents, the results shown that the respondents have positive results towards arithmetic climbing game where the respondents learning towards mathematics has been improved and the respondents were motivated to learn more on this mathematics through mathematical games, the respondents were well explained with both game-based learning program that incorporated with entertainment and also the most important part was to educate them on the knowledge about arithmetic, the result stated that the respondents of that particular study were having positive attitudes and feedback towards the learning program through game concept (Lo & Lin, 2012).

The recent academic institutions have started to investigate and advance explored on the effectiveness of the potential of game-based learning to ease on the motivation of the

students. The facts that students nowadays are highly immerse into the world of technology and the internet and computer seems like a basic tool of information to them. The results of the study shown that the platform of the game-based learning method given positive affective learning to the respondents and also suggested that the respondents were better in learning through the game-based method than the traditional ways of learning method. This also suggested a new platform to the researcher to look into the application of the game-based learning into the other educational field (Aziz, Corter, Chang, Esche, & Chassapis, 2012).

In addition, Chen, Wu, Wang, and Su (2008) found that the respondents were able to understand the process of the software development through the game-based learning method where the respondents were having positive achievement and attitude towards the learning process after the implementation of the game-based learning system into the system software development. The system itself incorporated with a strategy of role playing in the gaming strategy, the digital gaming environment are created through the game-based learning method integrated with the pedagogical, content and technical knowledge. This study focused on the implementation of the educational theory into the field of software and formed a new academic platform of collaborative model engineering and at the same time it created a new platform to the production of the systematic analytical framework and also design procedures on the development of the concept of game-based learning system. Other than that, the experts from the relative field of study also able to work on a new colaborative model to involve a development team into the game-based learning system. All these platforms of ideas were to be accessed and focused on into the future research by exploring in depth of the effectiveness of the game-based learning method and also incorporating into other platform, method, ideas, or field of study to enhance the outcomes of the research area. This is where the idea and concept of the game-based questionnaire starts to generate and explore in depth.

The interactivity of the questionnaire plays an important role as to produce a high quality of research data and this needed the participation of the respondents and also their impression and perceptions towards the questionnaire given to them during the data collection. According to Lin and Wei (2011), the interactive game-based learning able to magnetize the user's will of participation into the research and at the same time their motivation and also performances to integrate towards the positive feedbacks (Lin & Wei, 2011). All these motivation, impression, perception towards the game-based learning system and will of participation of the respondents are inter-related and the study of Lin and Wei (2011) has also suggested that the interactive of game-based learning able enhance the will of participation of the respondents, their impression towards learning system producing a positive result through the method of game-based learning, the focus of the study has proven that the game-based learning system able to improve the learning will of the respondents and most importantly the method of learning through games able to improve their academic performances. This is another research that gives idea to bring in the concept of game-based learning method into the game-based concept design of questionnaire.

Moreover, according to Cheng (2011), it is proven that there was studies that supported on the idea of game-based learning system able to enhance the will of participation and also the motivation of the respondents. The researcher found out that the challenging, unpredictable and competitive games created through the game-based learning method produced curiosity and motivation that triggered respondents to work harder and intended to get more and more challenges where the will of winning and challenging towards the games will be increased. This is where the respondents able to increase their interactivity towards the system itself and also improving their own knowledge, internal recognition and also providing problems for the respondents to strive for excellence and also develop their natural skills of solving problems. These are all the advantages created and able to incorporate into the game-

based learning system to guide and enhance the respondent's abilities and human skills to produce positive feedbacks.

The game-based questionnaire should consider on the human computer interaction where the idea of interface design from the study of Diah, Ismail, Ahmad, and Dahari (2010) has stated that the game-based concept design questionnaire should have an attractive interface design that able to attract the respondents attention as well as producing an interface that considering on the interactivity, efficiency, effectiveness and satisfaction towards the interface of the design so that it can produce a usable and well designed computer games-based questionnaire to the respondents, this is able to make sure that the respondents always did not felt demotivated and instead boosted up their will of participation and attracted their attention to participate in the game-based questionnaire.

Comparative Review

The paper-pen questionnaire is tediously long and boring, this has caused the paper-pen questionnaire to be giving an impression to the respondents that the questionnaire was long and boring and the will of participation of the respondents were not active. Moreover, the respondents also thought that the paper-pen questionnaire unable to attract their attention and did not catch their attention towards participating into the questionnaire. The interactivity of the paper-pen questionnaire did not meet the level of satisfaction on interactivity where the respondents did not interact with the paper-pen questionnaire instead led them to feel that the traditional method of questionnaire through paper and pen is boring, unattractive, long and not productive, this indirectly led to the low quality of research data (Dai & Paasch, 2013).

On the other hand, web-based questionnaire was able to satisfy some of the problems that were not able to solve through traditional way of questionnaire. The web-based questionnaire able to generate questionnaire through online or electronically, but there has been an issue of interactivity of the questionnaire that has to be improved and further explored

to produce a productive and positive quality of research data (Lin & Wei, 2011). There are issues to be considered such as the privacy information of the respondents, the interactivity of the web-based questionnaire whether the set of questionnaire through the web-based questionnaire able to have a better interactivity between the respondents and questionnaire through alternative method of web-based questionnaire (Goto & Cheng, 2014).

Moreover, the will of participation of the respondents whether the respondents have positive will of learning, their attitudes, behaviors, assure, satisfaction, level of interactivity towards the set of questionnaire Thus, the web-based questionnaire is further studied and incorporated with different idea and this is where the different platforms provided from the traditional way of questionnaire and web-based questionnaire to further study and explore into the application of game-based concept design into the questionnaire as an alternative method (Chen et al., 2008).

Summary

As a conclusion, the paper-pen questionnaire was first introduced to ease on the data collection but since the problems arised and there were some problems that were not able to solve through the traditional ways. Thus, the web-based questionnaire was introduced further to solve the problems faced by the traditional ways of different factors such as the interactivity between the respondents and questionnaire itself, the affective of the learning produced through the method of data collection, assurance of the information of the respondents, long and boring impression on questionnaire, unable to attract respondent's attention and low quality of research data. Thus, the idea from the game-based learning system was integrated, explored and further studied in this research to ease on the data collection as another alternative way.

The literature review of the alternative ways of concept design of questionnaire consisted of the paper-based questionnaire, web-based questionnaire are reviewed whereas the

web-based learning system are discussed with the comparative review on the alternative ways of questionnaire as the idea of application of web-based learning system into the web-based questionnaire is considered specific to the study.