A STUDY OF USER INTERFACE DESIGN PROBLEM IN ELECTRONIC LEARNING AS A THAI CONTEXT

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ABSTRACT

With the growth of multimedia technology, electronic learning (e-learning) appears in society and rapidly grows. E-learning is the learning process created by interaction with digitally delivered content, services and support. Therefore, there is an increasing interest and investment on innovative learning systems that can reach out from the traditional learning methods. However, although e-learning systems have been becoming an influence on the success of learning, these systems confront some problems that are quite different from the traditional learning methods. Most of them should be considered too much with the user interface (UI) design. Then, if an e-learning system is poor UI design, it will become a barrier to effective learning and information recognition. This is because a poorly designed interface leads feeling of learners to be lost, confused, or frustrated. Therefore, an appropriate UI design becomes a discipline of great importance element in any e-learning project. This paper aims to overview study and analysis of UI design problem in a Thai context. The key principles will suggest to guideline as a probable way for improving UI design in this case. In addition, the paper also presents a concerned theory of interface design that can be applied for developing an e-learning layout because the effectiveness of learner recognition also influences on the e-learning UI. Finally, it is a solution that can be helped to provide the success of any e-learning system in a Thai context.

Index Terms—UI design, Human-Centred Design, Graphic design, Visual ergonomics, E-learning, Design solution

1. INTRODUCTION

It is well known that the growth of e-learning has been driven by the demand for faster and sufficient learning processes. E-Learning is the unifying term to describe the fields of online learning, web-based instruction (WBI), and technology-delivered instruction that are the usage of technology to enable people to learn anytime and anywhere. It also includes training, the delivery of just-in-time information, and guidance from experts. Thus, it can be said that e-learning is a possible way to reshape in the traditional roles of learning. This is because e-learning can help learners to make the most of their learning style, building confidence in their skills and knowledge at their own pace, and allowing them to take more informed decisions independently. Then it is seen that a teaching in a classroom (or lecture style) is an inactive learning pattern, while e-learning becomes more learning style rather than sitting in a classroom and listening to others. Therefore, learning style is nowadays transformed from ‘inactive learning’ to ‘active learning’ [1][2].

Unfortunately, many of the current e-learning systems do not seem to take full benefit of the possibility offered by modern technologies essentially because these e-learning systems are designed to reflect the lecture style of learning [3][4][5]. Therefore, it complicates to develop and maintain complete content of e-learning system.

In addition, according to an article on 'http://hrcenter.blogspot.com/search?q=e-learning’ most e-learning systems are focused on linguistics such as the written word and language, while other formats of content tend to become secondary or additional component. This article suggested that imagery on an e-learning system is very significant for learner recognition. Then, Mark Sadoski [6] had investigated the relationship between mental and induced imagery and the powerful impact on comprehension, memory and appreciation of text. This study demonstrated that learning and memory performance improved when applying imagery in reading tests. In addition, this assumption had been confirmed by Anderson and Kulavy [7], Steingart and Glock [8], Gambrell [9], Gambell and Bales [10] and Gambell and Jawitz [11]. All of them found that students’ learning and memory performance are improved through the use of induced imagery when reading text.

As above, those researches actually involve about a UI design problem. With a result of previous study, it can be summarized that if the UI is ineffective designed, it affects for working and learning [12]. In addition, according to [13], a problem-based in e-learning is a useful UI design. Thus, an efficient design should be required in any e-learning project.

Therefore, this paper aims to study the UI design importance in e-learning, including a probable way to improve e-learning system in the area of design. It also presents a concerned theory of design that can be applied for e-learning development. This is because it is a solution that can be helped to provide the success of any e-learning system.

Then, this paper is organized as follows. In Section 2, it is literature reviews. The overview of UI design in Thai contexts is presented in the section 3. The graphic design theory perspective in e-learning is described in section 4. Finally, conclusion is drawn in Section 5.
II. LITERATURE REVIEW

The Internet is a technological development that has the potential to change not only the way society retains and accesses knowledge but also to transform and restructure traditional models of learning. Therefore, e-learning appears in the society. Then, it is the unifying term to describe the fields of online learning, WBI, and technology-delivered instruction that are the use of technology to enable people to learn anytime and anywhere. On the one hand, many of the current e-learning systems do not seem to take full advantage of the possibility offered by modern technologies essentially. This is because they have been faced a problem in the area of the UI design. In addition, it affects for working and learning activities [12][13]. Many researches demonstrated that the effectiveness of learner recognition also depends on the e-learning UI. Therefore, an appropriate UI is very significant for learners [6].

The problem of UI design study can be found in Mark Sadoski.s research [6]. This research proposed that a lot of e-learning systems are focused on linguistics more than imagery but imagery is very significant for learner recognition. This is because it is easy to be recognized. Then, in fact, this assumption had been proposed by Anderson and Kulavy [7], Steingart and Glock [8], Gambrel [9], Gambell and Bales [10] and Gambell and Jawitz [11].

At present, the design UI has become a discipline of great importance in any e-learning project. Then, the use design interface can be evaluated equipment of success e-learning system [14]. The UI design is important not only the way of learning but also to concern the e-learning market enlargement. Therefore, principles of instructional design, graphic design, and information management design should be integrated into any e-learning system [15].

According to [16], when learning on the new materials is used by adult audience, attention to a professional level of artistic detail is crucial [17]. In addition, Doubleday et al [16] found that a poorly designed UI made students spend too much time for learning. That means UI design becomes a barrier to effective learning [18]. In Granil and Nakii [19], they also presented that most of the current e-learning applications are static and inflexible system. Then, a design pattern of e-learning is vital individual learning activities because it can help the learners to reach efficient working and learning with an e-learning application, but current e-learning applications still lack of considering users' preferences and abilities [20]. In this point, if UI designer can understand and aware of the learner's mental and the physical, physiological and psychological of users; they e-learning will acquire a well-designed software interfaces, like good educators and instructional materials. It can be building a relationship between 'Teacher-Student' which motive users to learn and enjoy what they are doing [2].

Based on above, many researches turn back to carefully consider about the UI design. It is the challenge for designers and human computer interaction researchers to study the appropriate UI design. It is able to support the learners to reach an advantage during learning [21].

To sum up, user-centered design and learner-centered design guidelines are required in any e-learning applications. It is also the important factor to evaluate the effectiveness of e-learning [16]. The design of UI in e-learning system also needs to be user as a center of design process; in order to create the easy access with the UI design. It also increases a five quality components: learnability, efficiency, memorability, user satisfaction and reducing of user errors [22][23].

III. UI-DESIGN IN THAI E-LEARNING CONTEXT

This section presents an overview of UI design in Thai e-learning context, which includes a discussion point to indicate a design problem in each case study. However, as described in the previous section about the UI design problem in the e-learning contexts. These scenarios also emerge in a Thai e-learning context. Most of their designs pay more attention on the organizing the learning contents and course management system; rather than consideration on the legibility skill of learner. In Fig 1 showed a problem in a designing of navigation system and organizing of a color system on the display screen.

Figure 1. The problems on the e-learning screen case 1

In this case reflects that the designer lacking of comprehension in UI design skill. The designing of navigation zone on the left side cannot make the menu bar outstanding from the background and hard to read. The using of color shades cannot make the bottoms as the first area with the eye contract. The selection of typeface looks similar between the heading and sub-handing fonts.

The second case presents in Fig 2 that indicates the problem with the organizing composition art on the screen. This problem issue can make user get confusing which one is the menu bar. This is the major problem lead to make the learner lost the way how to access with the right menu. It is the main barrier to get entry the learning contents.

However, many UI designs in Thai e-learning context are going with design error. Because, they e-learning mainly focuses on how to approach the principle of: 'course management system', 'learning management system', 'formative/summary evaluations' distance learning model [24]. Therefore it can be seen that the study on human computer interaction was pointed as the second subject in Thai e-learning system.
IV. A STUDY OF INTERFACE DESIGN PERSPECTIVE IN E-LEARNING

In a previous study, James Coplien of Bell Laboratories had given his opinion that the pattern discipline has become one of the most widely applied and important ideas of the past decade in software architecture and design [25]. In addition, he also commented that focusing on objects had caused us to lose the system perspective. Preoccupation with design method had caused us to lose the human perspective.

In the late 1960s, according to Christopher Alexander’s research [26][27][28], these embarked on a search for a new method of architecture and planning, studying how people interacted with physical spaces. This is because he posits that our lives consist mainly of patterns of events, and that architecture which supports these patterns helps us feel more “alive” or “whole.” Thus, the first at all of his work is to study about a pattern language for interaction design because it is really nothing more than a precise way of describing someone’s experience of a building.” This approach of focusing on people relates directly to the Razorfish philosophy [25] of creating user experiences. Finally, Alexander recorded his observations in a format called “design patterns” which summarize the context of a problem and its solution. In fact, the concept of pattern languages crosses over to the computer science field not via UI designers but actually through the efforts of the programming community.

Based on Alexander’s pattern, interest in pattern languages for computer interaction design continues to grow for several reasons [25]. First, design patterns provide an accessible format to document design knowledge on a personal, project, or organizational level, creating a complete but accessible reference source. Second, the format of design patterns simplifies communication with other participants of a design project. This is because design is a distributed social process. Then, an effective communication has become an important role. Lastly, pattern languages serve as a tool to practice actual design. They impel the designer to an abstract level to help escape repetition and encourage innovation because design patterns transcend particular implementations, they assist the designer in moving easily among platforms, devices, and media (e.g. visual, auditory, haptic, etc.).

According to Jennifer Tidwell’s research at the Massachusetts Institute of Technology [29], she summarized one of her patterns that pointer shows at the Massachusetts Institute of Technology [29], she summarized one of her patterns that pointer shows affordance, e.g. finger pointer over a hyperlink, especially pictorial links and buttons whose borders change when you point to them. This study focused on static affordances because they are not always enough to indicate the presence of a manipulatable control, especially when space is tight or when an aesthetic design is of paramount importance. Change the affordance of the thing as the pointer moves over it. Then, this is can be done by changing the pointer to communicate what action can be performed or by changing the artifact to make it stand out perceptually. In final, she proposed her language that can support this pattern with the resulting context, an illustration, references, and examples of well-known interface designs. Her pattern contributes to a pattern language spanning all of UI design, including patterns such as “Background Posture,” “Status Display,” and “Progress Indicator.”

However, Alexander’s architecture design patterns did not just contain patterns; the patterns formed a language. His language was hierarchical and started out on the level of cities, then neighborhoods, houses until the level of windows or seats was reached. In Alexander’s perspective, the language actually “generated” the design by traversing from high level patterns to the lowest level of patterns. From the design of cities are transformed to the design of window seats, a hierarchy of scale. Therefore, a question is now whether we can create a similar sort of pattern language for interaction design [30]. A big difference with architecture is that user interfaces are not precisely hierarchical in a geometrical sense. There is certainly a 2D display involved but what is shown on it varies over time. Therefore, a strict hierarchy based on the usage of screen estate is not possible for interaction design. However, the hierarchical nature of architectural patterns can also be interpreted as a hierarchy of problems. The highest levels of problems are broken up in smaller problems for which solutions appear to exist. They just occur to map directly to a geometrical metaphor in architecture, working from large areas to small areas. The important detail to understand is that such a problem-hierarchy approach can be applied to other domains as well [30].

In general, UI design is in the format of hierarchical model. It is called top-down design. This is because it starts with gaining understanding of the users and their tasks, the client’s wishes, technical environment, business content, etc. In a case of web design (including e-learning interface design), design continues by laying out the foundations of the application in terms of the application concept, information architecture, and basic functionality. The concept outlines is the basic characteristics of the application that will be filled in later on up to the point where individual screens and widgets are laid out. Such a top-down approach will ‘generate’ a design when patterns are available at all levels. Then, there are four levels [30] such as posture, experience, task and action. **Posture Type pattern:** it describes about what the essentials of that posture should be? What kind of site structure is usually used? Which elements typically make up the homepage but also the main experiences that such a site is supposed to offer? In the case of e-learning, it is similar deciding whether you are going to design a structure of ‘course or subject’. It can be expected characteristics and experiences on the course. **Experience pattern:** it is not just about tasks and goals but also about how the users reach their goals using an e-learning application concept, how they recognize information and whether it gives them the appropriate
satisfaction. Thus, experiences should be understood as a broader design for which we are designing. The experience level patterns describe common experiences and which lower level patterns can be used to create that experience. Typical experiences are activities such as ‘learning’, ‘testing’, ‘browsing’, ‘problem solving’, ‘answering’, or ‘sharing thoughts’. Significantly, the interaction designer needs to balance these experiences and create a consistent user experiences for the application.

**Task patterns**: it is the level that is started to see most concrete and well-known patterns such as course outline or course content in e-learning. These will point to lower-level task patterns such as WIZARD or SET BUILDER that are needed in high level task patterns. Task patterns are describing solutions to small user problems that are part of a higher level ‘experience’. Typically a task pattern describes a series of interactions on one or more objects for solving a problem. Such a series corresponds to a task sequence needed to achieve a task goal. It is also relatively domain independent.

**Action pattern**: it is a pattern that not really related to a clearly defined task and related to tasks. It is also the actions that are meaningful in real tasks e.g. ‘go the next Step’, etc. These tools are often similar to widgets. Their occurrences are almost all task patterns and are the lowest level of building blocks.

**Finally**: the approaching of ‘Human-Centred Design’ method (ISO13407) can enhance the design process of UI design. This method can help an UI designer investigate the user experience (UI) from the end-user as the center of a design process. These variables called ‘Human factors’ that defines towards three factors: physiology (ergonomics), psychology (cognition) and culture/society (personal background) [31][32]. However, the usability test is one of the key successes to evaluate a product can be used by specified users to achieve the goals with effectiveness, efficiency and satisfaction. Therefore, both methods are the key concept that e-learning system should be concerned before plan an e-learning project [33].

**V. CONCLUSION**

The major emphasis in this article is to present a study of in e-learning. Then, the UI problem becomes a discipline of great importance element in any e-learning project. This is because the poorly designed in UI affects for working and learning of learners. Thus, it has become a barrier to effective learning. In this paper, it aims to study the working and learning of learners. Thus, it has become a project. This is because the poorly designed in UI affects for study of in e-learning. Then, the UI problem becomes a probable way to improve e-learning system. Furthermore, this paper also presents a concerned theory of design that can be applied for e-learning development. This is because the effectiveness of learner recognition also influences on the e-learning user interface.

**REFERENCES**


