Requirement Analysis of E-Content for Visual Learners

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***Abstract*—This paper studies on IT Project Management (ITS510) subject which is taught by using textbook and simple PowerPoint slides. Due to ineffectiveness of teaching materials, this scenario becomes one of the reasons that affect the students' result. Therefore, this study had been proposed specifically for visual learners to attract their attention in class. The objective of this study is to identify the user requirements of visual learners for E-content. ADDIE model which is derived from ISD model had been selected to complete this project. This model consists of analysis, design, development, implementation and evaluation phases. In this study, the researchers only focused on analysis phase while the next phases are planned to be continued in future research. The questionnaire had been distributed to get the requirements from visual learner users. It is hoped that the requirement analysis can be used as an idea to design and develop future E-content for visual learners. At the end, it can give a lot of benefits to learners where they can access the content everywhere and anytime without time constraint. While, for educators, the E-content can help them to improve their teaching styles and it can be used as an aided tool to teach students in class.**

***Index Terms*—E-content, E-learning, requirement analysis, visual learner.**

I. RESEARCH BACKGROUND

This project is about the E-content for the visual learners' students in Faculty of Computer and Mathematical Sciences (FSKM), Universiti Teknologi MARA, Malaysia. In FSKM, some syllabuses are taught by using simple PowerPoint slides for example is IT Project Management (ITS510) subject. Currently, ITS510 subject is taught by using method such as textbook or slides and there is no other teaching aid has been developed yet.

According to the interview session with ITS510's lecturer who taught the Bachelor Degree of Information Technology (CS220) programme, she revealed that the results for the last two semesters (Oct 2010 and Apr 2011) were not encouraging as only four out of 120 students scored A for this subject. In addition, based on the informal interview with the previous CS220 students, they said that they lose their interest to learn as the syllabus of this subject is compact with word and full of theories. The unattractive slides become one of the reasons that lead them to not fully focus in class.

Based on research done by [1], he mentioned that the learning process environment plays an important role for the student to actively participate in the class. Students who have active participation in the classroom will better understand in their studies. There were also reported that the successfulness of a student in class is due to the active participation of the student during the teaching and learning process.

Nowadays, many modern technologies have been used in various fields. The advancement of technology can improve the learning process as it involves the students to actively participate during classroom session. As time grows, most of the higher education institutions tend to focus on delivering a multimedia-oriented classroom and by developing the E-learning, it can be a tool to solve some problems in learning process. The use of E-learning in teaching and learning process also will help to strengthen the students understanding and it can be used in the classroom to provide additional information and students can also use the courseware outside the class [2].

In order to make use of the E-content, student's learning styles should also be studied. As indicated in [3] that learning styles are based on ways learners perceive and process information. This study focuses on visual learners. Visual learners have their own characteristics in perceiving and processing the information. According to [4], visual learners are the kind of learners who learn through seeing pictures, animation, teacher's body language, facial expression and visual content of the material that had been used by the teachers.

Due to the abovementioned scenario, thus, the objective of this study is to identify the requirement of visual learners for E-content. It is hoped that the collected data can give some ideas in order to design and develop a future E-content. At the end, the E-content can give a lot of benefits to learners where they can access the content everywhere and anytime without time constraint. While, for educators, the E-content can help them to improve their teaching styles and it can be used as an aided tool to teach the students in class.

II. LITERATURE REVIEW

A. E-Learning concept

In year 1991, when the World Wide Web (WWW) was launched, there was a surge of interest in the possibilities of electronic learning (e-learning). The use of the web as an educational medium was hailed as a harbinger of profound changes for communities, organizations and markets. By now, well over two decades later, one might expect that the concept of E-learning would be well defined and clearly differentiated from other forms of learning [5][6]. Many studies have proven that E-learning offers better learning experiences to learners [5][7]. Part of the reasons is because E-learning can incorporate many media elements to convey and deliver information [5][8][9].

The trend of using E-learning and teaching tool is now rapidly expanding into education. E-learning covers a

wide set of ICT technology based applications and processes, including computer-based learning, web-based learning, virtual classrooms, digital collaboration and networking [10]. He also ranges E-learning in higher education from technology-enhanced classroom to distributed learning.

According to [11], E-learning is the latest technologies for education field. One of the most effective tools of learning and the latest method of instructional model is E-content. E-content is an outcome of E-learning. E-content is a rapidly growing field. As stated by [12], E-content can be defined as "any digitized content that can facilitate the learning process and/or learning outcome". Today, the digital age has taken learning to a new level-online [13]. "Higher education needs a new framework for promoting the value of information and technology skills for undergraduate and graduate students", [14].

B. Visual leaner characteristics

As indicated by [15], learning styles as the way students prefer to process new information including strategies that are consistently adopted to learn. Although there are many theories on thinking and learning, it is largely accepted that students learn in different ways. While alternative approaches to learning can be used successfully, it is thought that students will learn more quickly and easily if they are able to utilise their preferred style. The value of developing awareness of learning styles can help students to recognize their strengths, acknowledge weak areas, work more efficiently when self-directed and develop effective collaborative relationships with others [15].

In this project, the researcher's focus is on an E-content for visual learners. In order to fulfill the visual learner's requirements, the researcher should know the visual learners characteristics. As stated in [16], the visual learners are individuals who think in pictures rather than in words. They have a different brain organization than auditory-sequential learners. They learn better visually than auditorally. They learn all-at-once, and when the light bulb goes on, the learning is permanent. They do not learn from repetition and drill. They are whole-part learners who need to see the big picture first before they learn the details. They are non sequential, which means that they do not learn in the step-by-step manner in which most teachers teach. They arrive at correct solutions without taking steps, so "show your work" may be impossible for them. They may have difficulty with easy tasks, but show amazing ability with difficult, complex tasks. They are systems thinkers who can orchestrate large amounts of information from different domains, but they often miss the details. They tend to be organizationally impaired and unconscious about time. They are often gifted creatively, technologically, mathematically or emotionally.

There are several ways to teach the visual learners. [17] stated that the ways to teach the visual learners is by loading the picture, allows piles, by using colour code, let the learners look away, show the problem solving, show time, practice them to thinking under pressure, let them focus on the whole world, teach keyboarding, make memorization funny and use the resources from the internet. Besides that, teachers should show the visual learners something that they can imagine in their mind and do not just tell them.

Based on the literature review, the researcher had decided to conduct an interview with visual learners' students in FSKM who took ITS510 subject in previous semester. The researcher had distributed a questionnaire where the purpose is to gather information and to know the characteristics of visual learners' requirements towards E-content. The requirement analysis has been detailed out in part IV, results and findings.

III. METHODOLOGY

The ADDIE Model is a systematic approach to the instructional design model virtually synonymous with the basic idea from [18] which was known as Instructional System Development (ISD). ADDIE Model derived a step-by-step process from ISD which provides with instructional designers with a framework so that their products are effective and their processes are as efficient as they can be. As mentioned in [19], many systematic modern instructional design processes are either ADDIE based or derived from the ADDIE process. ADDIE Model consists of Analysis, Design, Development, Implementation and Evaluation phases. Each phase has an outcome that feeds into the next step by sequence. Fig. 1 shows the phases in ADDIE model. For this study, the researcher only focused on analysis phase.

Figure 1. Research method - ADDIE model.
Source: Dreamstime (2013). *Royalty Free Stock Images* [20].

In analysis phase, the researcher had distributed a sample of questionnaire which had been adapted from [21]. In his article entitled *Visual, auditory, kinesthetic learning styles and their impacts on English language teaching*. The questionnaire had been distributed to 16 respondents, Bachelor in Information Technology (CS220) program, semester September 2012 - January 2013 who took ITS510 subject. Based on respondent's feedback, all the information had been analysed and the results had been discussed in part IV.

IV. RESULTS AND FINDINGS

Overall analysis (based on questions) on respondent's opinion towards learning styles that focuses on the visual learners:

Q1: I understand better, when I read instructions.
Q2: When I read Instructions, I remember them better.

Figure 2 shows the respondents' reading instruction characteristic. Based on result, majority respondents agreed that they understand better when reading instructions. Meanwhile, only three respondents answered undecided with the statement. Besides that, more than 50 percent respondents remember better when reading the instruction. The result showed that the majority of the respondents have characteristic of visual learners which can remember better and understand better when learning something using instructions.

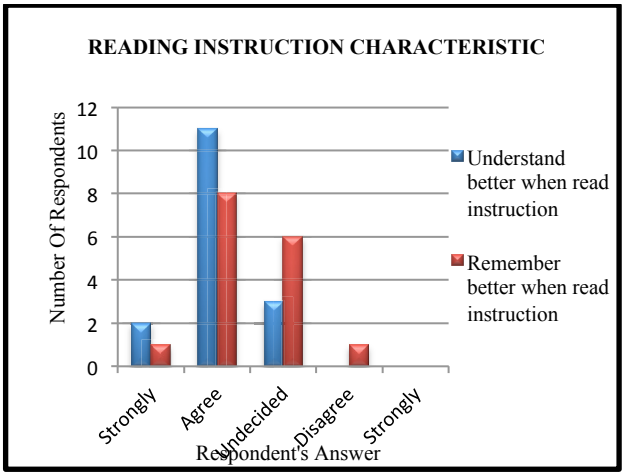

Figure 2. Reading Instruction characteristic

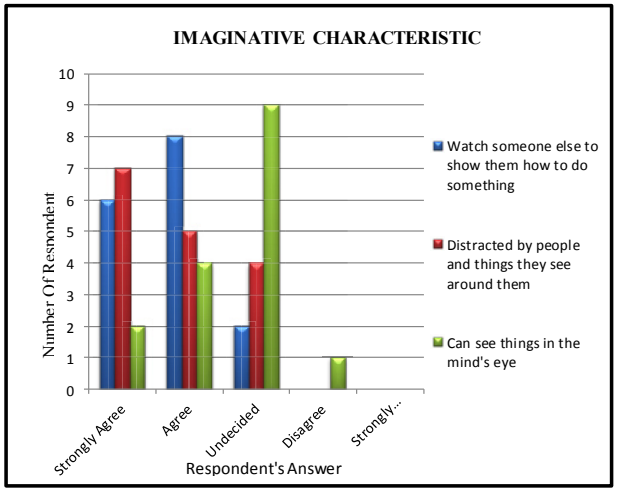

Figure 3. Pictorial characteristic

Q3: I prefer lessons where there is something to look at (picture, chart, diagram or video) or something to draw.
Q4: I would prefer to see a comic strip of a story.
Q5: I prefer teachers who use diagrams to show us things.
Q6: I understand better at academic subjects by studying the picture, diagram, graphs or visual directions.

There are four questions that are related to pictorial characteristic as shown in Figure 3. All respondents agreed that they prefer lessons where there is something to look at for example picture, chart, diagram, chart or video and even something to draw. Likewise, more than 8 percent of respondents agreed on seeing a comic strip of story and prefer using diagram while learning. Moreover, majority of respondents understand better at academic subjects by studying the picture, diagram, graphs or visual directions. Conversely, only few respondents' undecided to these questions related to pictorial characteristics. Hardly any of them disagreed on pictorial characteristics in learning. It showed that majority of the respondents are visual learners who prefer using pictorial characteristics in their learning.

Q7: When learning a new skill, I prefer to watch someone else show me how to do it.
Q8: When I am trying to concentrate, I am most distracted by people and things I see around me.
Q9: I can see things in the mind's eye from different perspectives.

Subsequently, for imaginative characteristic as shown in Figure 4, greater part of respondents preferred to watch someone else to show them to do it when learning a new skill. While two respondents answered undecided. Another characteristic of visual learner that is shown in the above figure is, there are a vast number of respondents agreed that they tend to be distracted by people and things they see around them when they tried to concentrate on learning. However, it is a bit contradictory result upon imaginative characteristic when more than 50 percent respondents undecided for question that they can see things in the mind's eye from different perspectives. Therefore, it is shown that the respondents prefer to see by using their own eyes rather than imagine things in the mind.

Q10: When I am trying to memorize something, I prefer to write it repeatedly.

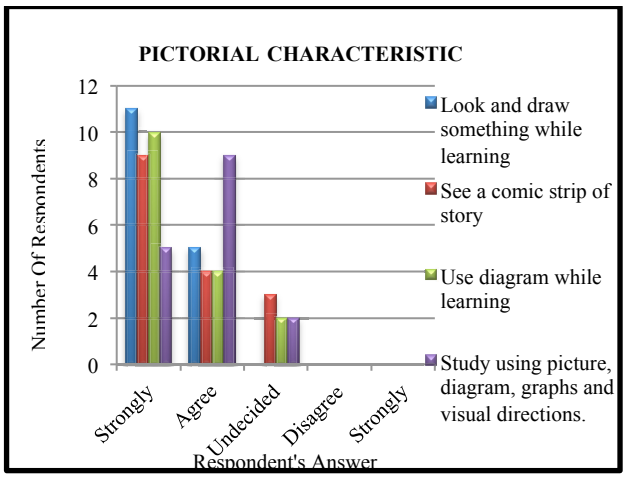

Figure 4. Imaginative characteristic

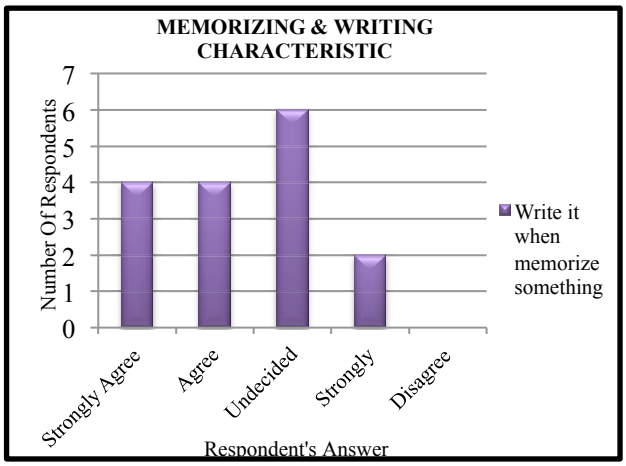

Figure 5. Memorizing and Writing characteristic

Figure 5 showed only half of the respondents agreed that when trying to memorize something, they prefer to write it repeatedly. Another six of the respondents answered undecided. Perhaps, they are having different methods of memorizing. Though, only 12 percent of respondents answered disagreed.

V. CONCLUSION AND RECOMMENDATION

Based on result, it can be concluded that, majority of respondents are visual learners according to characteristics given in Q1-Q10. This requirement analysis phase is a good idea for future research. As a recommendation, the researcher can increase the quantity of target group in order to get a variety of response. The feedback from respondents is useful to be used in designing and developing the E-content. Motivation to design and develop the E-content has to be continued as the visual learner students are eager to use the E-content.

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