

Towards Designing E-learning Materials based on Multi Learner's Styles

Buthaina Deeb

College of Information Technology
Universiti Tenaga Nasional (UNITEN)
Selangor, Malaysia

Zainuddin Bin Hassan

College of Information Technology
Universiti Tenaga Nasional (UNITEN)
Selangor, Malaysia

ABSTRACT

Although each learner is provided at birth with a certain learning style specific to any of the three main ones, (Visual, Auditory and Kinesthetic). The ideal learning style remains to be a part or a mixture of all the three or any two of the three kinds. Some learners possess strong inclination, while others have a less effective mixture of two or the three common favored styles. The existing systems either follow Auditory, Visual or Kinesthetic type of learning or a static combination, but not a dynamic combination. In this research study, a proposal on a newly designed coursework for benefiting the students according to their preferred learning style and capabilities will be presented. The main goal of this proposed research study is to prepare a courseware material that fits the dynamic learning needs of all learner styles, (Visual, Auditory and Kinesthetic).

Keywords

E- learning; Adaptive E-learning; Learner styles; Learner model; VAK..

1. INTRODUCTION

People who are interested in learning systems will find many of these systems available on the World Wide Web. These systems provide the same learning material to all students regardless of their character preferences. The learning material which is designed to meet the requirements of a specific group of students in a traditional course may not satisfy the need of other students. In order that courses material meet the needs of the majority of students, it must be prepared in a flexible way that depends on students' characteristics.

One of the main roles of the adaptive e-learning systems is to find a solution to the problems by adjusting the material to become suitable for each learner, where learners have their different goals, backgrounds, knowledge levels, learning capabilities and also their own preferred learning styles which we will focus on, in this research.

The learning style is defined as follows: "It is the way how learners perceive and process information in different ways" [1]. In other words, it is based on how we observe and retain information. It may be a great benefit to know what our learning style may be. Therefore recognizing the individual learning styles will improve the quality of the e-learning content, making it more appropriate for the learner's learning style.

Several learning style models have been proposed to convey information in a better way for the learners, such as: Honey and Mumford [2], Klob D. [3], Felder & Silverman [4]. One of the

most important models, is the one produced by Sarasin [5]. It is based on a student's preference for particular types of the external event to stimulate their senses to help them learn.

Sarasin [5] suggested that the user learning styles model can be divided into three preferred styles on learning, organized as follows:

A. Visual Learners

According to Montemayor [6], visual learners are the kind of learners who learn best through seeing the teacher's body language, facial expression and even the visual content of the course materials used by the teacher. Visual learners try to avoid any possible visual obstruction as they want to understand the lesson through seeing.

Among the lessons that will be included in the visual learning style are the following: 1) diagrammatic exercises course, 2) computer visual skills course, 3) patterns and logic course, 4) drawing and arts course and, 5) visual presentation courses. Teachers must also recognize that the learning materials that should ideally be used in teaching visual learning styles are illustrative textbooks, transparencies, flipcharts, models, videos and film, handouts and various kinds of diagrams and pictures. One form of engaging the students is through having them draw and write their understanding of the lessons.

B. Auditory Learners

Montemayor [6] states that auditory learners basically gain knowledge through listening. These types of students learn best via the learning methods including discussions, verbal lectures, monologues, and any form of teaching that requires teachers and students to talk and listen to what each of them has to say. The auditory learners also interpret the messages sent to them by the communicator via the pitch, speed, tone of voice and other forms of communication nuances which explains primarily the reason why any written information may most likely have very little meaning to them. For auditory learners, the course content may include the following: 1) listening and comprehension courses, 2) oral delivery courses (e.g., poems, debates etc), 3) oral reporting courses (oral presentation), 4) stage acting courses and others.

C. Kinesthetic Learners

According to Montemayor [6], the kinesthetic learners actually belong to the category of learners who grasp, learn and understand things by touching, doing and moving. They are very hands-on and experiential type of learners who learn via exploration of the physical world around them. In line with this,

the best course content materials for this group of learners are the following: 1) experiment-type of courses (laboratory/scientific experiments etc), 2) activity-based or application based courses, 3) experiential based courses (computer learning, acting, debates, drawing etc), 4) skill enhancement course (singing, dancing, ballet and sports-related activities).

2. RELATED WORK

The majority of the e-learning environments and systems nowadays rely on the type of adaptive management system. It usually supplements or supports the learning and teaching process. These systems have influenced the e-learning and when utilized within a framework of constructive learning, they can actively engage the learner in the content interpretation and the reflection based on their given instruction.

Verdu et al. [12] conducted a study and examined the evidence for the adaptive e-learning. The study showed that the analyses of the different classification existing in literature, had focused later on Intelligent Tutoring System (ITS) and the Adaptive Hypermedia Systems (AHS). In a later step, the Effect Size (ES) was used to analyze the effectiveness of the system. The General Teaching Community leaves only little chances for the adaptive learning systems to become a main stream. The assisting systems and the automatic services can be provided if all are integrated in e-learning tool and platforms.

Surjono [7] discussed the implementation of the adaptive e-learning system through a study that he had conducted. His study was based on the use of the open source learning management system of Moodle. The combination of two learning styles models the (VAK) and (Felder) were taken into account as a basis of adaptation. Course materials will be presented in different ways by the adaptive e-learning system depending on the students' learning style. The advantages of the conventional e-learning (web-based instruction) will be extended by the system. These are the classroom and the platform independence. The standard Moodle doesn't see the individual differences among learners to be of great importance. In order to accommodate the learners' learning styles of Visual, Auditory or Kinesthetic the Moodle needs to be customized.

L. Krstuski [8] presented a framework for effective and adaptive e-learning by his study. The study implemented this framework assuming that the student had already taken the lectures for the given course, having the main goal of preparing the student for passing the course successfully. The main parts of the framework were discussed, and the outline plans for the successful integration were prepared in the form of an existing system for knowledge evaluation. The criteria used for characterizing students were different features, learning styles and prior knowledge. According to the students' needs, the systems adapt and generate profiles in order to extract the maximum learning outcome.

Dekson & Suresh [1], both worked together and their study was, making a survey of the various means of offering the adaptive content in an e-learning environment and exploring any possible ways to achieve adaptability in learning systems. Another study was conducted on the various models of adaptive content delivery system proposing more recent methods of delivering adaptive content in an e-learning environment. In future, learning will be demonstrated through the media. So, it is clear

that the right time for initiating an adaptive learning environment for improving the efficiency of learning through an e-learning environment, is due and challenging.

Meanwhile the study conducted by Y. Mustafa [9] presented a new approach to integrate learning styles into an adaptive e-learning Hypermedia. Developing an adaptive e-learning system was the main objective of the study. It also aimed to assess the effect of adapting educational materials individualized to the student's learning style. To improve the learning process, the proposed approach utilized the adaptive hypermedia technology.

Figure 1 (a) shows the existing systems. Either follows Auditory, Visual or Kinesthetic type of learning or a static combination, but not a dynamic combination. In this research, it is proposed to build up an Adaptive E-Learning Material for benefiting the students according to their preferred learning style and capabilities as in figure 1 (b).

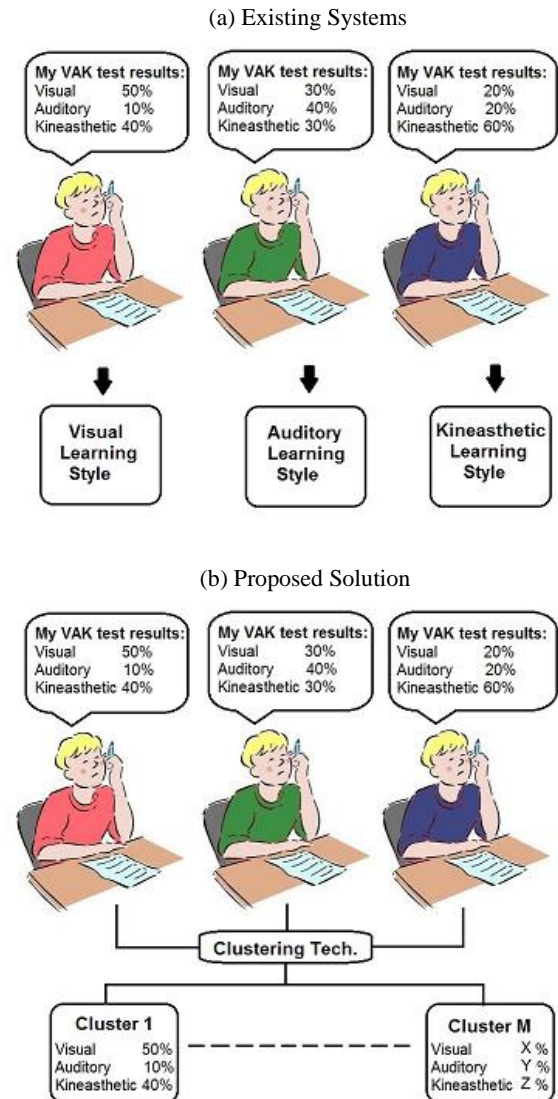


Fig 1: Existing System VS. Proposed Solution

For example, based on the VAK questionnaire a user might be 40% effective in the auditory mode and 60% towards visual. So we would alter the e-learning material in a dynamic way accordingly. Where the course material in the existing systems is presented in one style or with static combination of them. Our goal is to present each topic in the three learning style models (V, A and K) so we can do the combination based on VAK questionnaire which is used to identify the student learning style (Visual, auditory, or kinesthetic).

3. RESEARCH METHODOLOGY

A combination of qualitative and quantitative study with the use of descriptive approach will be utilized mainly for this research study to achieve the aim of preparing a courseware material that fits all learners' style, which means that it is a combination of all three learning types: the visual, the auditory and the kinesthetic. A substantial number of respondents with a total of 100 respondents who have met the qualifications or criteria set by the researcher of this study will be randomly selected and participate in the qualitative study that will be conducted for this research process.

The research process will be divided into two phases: the first phase will involve a collection and gathering of the most relevant academic literatures that are related to the topic on the structured courseware e-learning material that maximizes the learning potentials of learners. The other phase of the qualitative-quantitative study will then involve a floating survey questionnaire on the recruited participants and respondents for this particular research study. The main purpose of the survey questionnaire, distributed among the students, is to acquire proof on the mixing of the learning styles for each student. The survey questionnaire will basically inquire the students individual learning styles and find out how many of them fall under the visual learning style, the auditory learning style and the kinesthetic learning style. This will somehow give an idea on how to build a single courseware that will combine all the three learning styles.

One hundred and six students in a private school in Jordan filled up a VAK test "learning styles self-assessment questionnaire" which was developed by Victoria Chislett [11] a specialist in performance psychology.

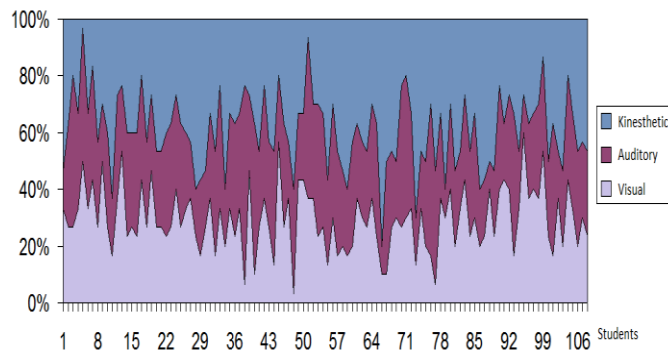


Fig 2: VAK survey results

The experimental group consisted of 65 (65%) male and 35 (35%) female students from the sixth grade. Figure (4) explains the collected results which show that the learning style will be part of a blend of all three or even two styles. Some people have

a very strong inclination; others have a more even mixture of two or less commonly, the three styles.

4. COURSE MATERIAL DESIGN

The Coursework Material Designs that will be proposed for this study will basically comprise of the course content addressing the specific needs of each of the three main learning styles which are the visual learning style, the auditory learning style and the kinesthetic learning style.

The course consists of a syllabus and lessons. Each lesson consists of five parts: overview, several topics, Summary, practice, and assessment. Each topic should be presented in the three learning models (V, A and K)

The material should be presented online in many different ways, including text, visual images, website links, video clips, audio clips, animation and flash [10].

Create Shortcut On Your Desktop

Fig 3: The developed material example

An example of the courseware will be designed for Computer Skills course as the given figure 3. The sample courseware below basically shows the methods of creating shortcut on the desktop that combines the three learning styles which are visual, audio and kinesthetic. The visual students are taught to right click on their desktop. The audio students are taught how to listen to the instructions by pressing a button and the kinesthetic, students are taught to experience the act of creating shortcuts on their desktop.

As for the approach, the courseware materials will be prepared in combination. The learning content for each topic will be

comprised of the following: 5 lessons under Visual, 5 Lessons under Audio and 5 lessons under Kinesthetic to cover all topic skills. However, if the results of the VAK questionnaire for the students is 40% Visual, 20% Audio and 40% Kinesthetic, we will be giving the students the dynamic combination of the three styles (e.g. 2 Visual, 1 Audio, 2 Kinetic). In the old approaches either no (Visual Or A or K) are combined or the combination is static and based on the preferred learner style.

5. PROPOSED SYSTEM ARCHITECTURE

The proposed system architecture in figure 4 is basically comprised of three main components: the learner, the adaptive e-learning system and the learning materials that support the three learning styles which are visual, audio and kinesthetic. In the learner component, the learner's profile has to be defined at first. Afterwards, in the adaptive e-learning system, the learner would have to undergo five modules: first, the learner style questionnaire module, which will be used to determine the learning style of the participants. Then, the user clustering module based on the preferred learning styles. Afterwards, they would have to undergo the knowledge test module, which will determine the knowledge level of the participants. The adaptive engine module is responsible for offering the material according to the learning styles, preferences and capabilities of the learner. Finally, the lesson module, exercises module and the progress report. Furthermore, it must be noted that the learning materials are to be used in the courseware involving three learning styles, the visual, the audio and the kinesthetic .

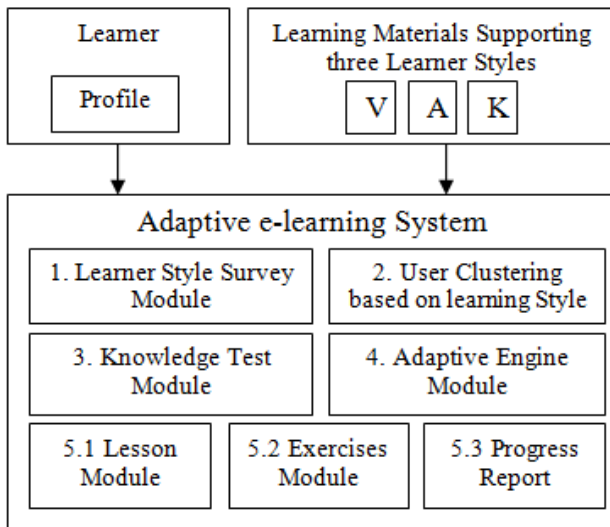


Fig 4: Proposed system architecture

6. CONCLUSION

The different learning style models that have been proposed to convey information in a better way for all learners, the auditory, the visual and the kinesthetic are useful classifications. In order to deem the best kind of learning styles to be implemented for

each learning student, teachers should ensure the maximum potential of learning.

In relation to this study, a possible future work may involve an assessment or evaluation of the effectiveness of the applied learning system architecture that has been proposed for this study.

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