

## Personalized Learning Environment: Accommodating Individual Differences in Online Learning

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**Abstract**—As the online learning in education field is increasing, research must turn to study the focus upon this emerging trend of teaching and learning process. One of the issues is about the development of online course content and also individualized students' learning preferences. As we know, students are differing in learning styles, skills, and aptitude. Thus, this paper describes the concept of Personalized Learning Environment (PLE) and also discusses the issues on individual differences and personalized in online learning.

**Keywords**—online learning; web based learning; personalized learning environment; individual differences

### I. INTRODUCTION

In recent years, education field have moved rapidly towards integrating technology or computer in the process of teaching and learning. This is because computer has a great potential for enhance teaching and learning outcomes [1,2]. To the greater extent, nowadays the learning process has been moving towards the application of online learning [3,4,5] Online learning as defined by Chang and Fisher [6] is a system and process that connects learners with the materials and information that distributed online.

One of the popular online applications has been emerged for educational use is web-based learning. This is because, the use of the web as an educational tool had provided learners a new learning experiences and educators an interesting teaching environments [7]. The popularity of the web base learning is due to the concept of learning “anywhere” and “anytime”[8]. As mentioned by Killedar [9], web can be globally distributed and has a high personalized media for delivery information. Through that, the time and the physical boundaries of the traditional classroom are no longer existed [10].

Since online learning has different setting from the conventional classroom, educators need to use some special techniques to make students can learn the best based on their preference. Therefore, educators require an understanding on

the characteristics of the learners that might affect how they interact with the learning environment. This also helps educators to design an appropriate learning environment based on student's preferences or differences [11].

### II. PERSONALIZED LEARNING ENVIRONMENT

In this day and age, to cater all the individual's differences in online setting, a personal learning environment (PLE) has emerged in educational field around the world. PLE is a tool that allows for a learner (or anyone) to engage in a distributed environment consisting of a network of people, services and resources [12]. PLE is a new concept in designing and developing an online learning. PLE is more focused on individual learning rather than the instructor, facilities, resources and tools. PLE has also played an active role in improving the effectiveness of learning [13].

According to Atwell [14, 15] PLE is an environment that constructed by individual. Individuals are responsible for their own learning process. They also need to manage the process of learning more effectively and takes a larger stake in the ownership of content. In general, personalize learning approach has the potential to meet the educational needs in the future as well as providing a new alternative to encourage students' learning [16]. Riecken [17] stated that personalization helps teacher to build a meaningful one to one relationship with students, by understanding their needs. The personalized environment also helps students to reach a goal because their individuals' need is well addresses in a given context.

### III. PERSONALIZED AND INDIVIDUAL DIFFERENCES ISSUES IN ONLINE LEARNING

Online learning has changed the ways in which education has been conducted. Unfortunately, many educational websites do not employ principles of effective learning [18]. Since users are moving toward online learning, how to attract them individually? How to give them more motivation, independence and self-directed learning? How to design a website to match the individuals? How to convey

information with different environments to a diverse set of personal types? How different individual learners interact with the web-based instruction? What kind of individual differences that our users have [19,20]. All these kind of questions are the main key when developing an educational web site.

To address these questions, research into individual differences and needs has becoming an important issue in the past decade [20]. As suggested by Magoulas *et al.* [21], he stress on the importance to accommodating individual differences when designing web-based instructions. When the issue about individual differences arises, which we should support individuals to customize the learning environment according to their difference characteristics, hence what come up in the mind is what we called the personalization issue [22].

The emergence of web as a medium for learning has led to student-centered learning and it is hope to improve the learning experience of students [23]. It is expected that enhancement of the learning process can be achieved by recognizing students' learning needs, the diversification of learning styles and students' preferences with respect to specific learning processes. Traditional learning environment is often design for the "average learner" while in a personalized learning environment, the materials and learning sequence are depend on the learner's characteristics such as learning styles, skills, interests and etc [24].

There are still many controversial issues related to the effectiveness of online instruction. One claim that online instruction lacks the ability to satisfy the diverse learning needs of online learners. An investigation of student learning preferences have shown that among the variables influence the success of learning and considered as important are cognitive styles, learning styles and prior knowledge [20,25]

According to Federico [26], students will be able to achieve their learning goals if the pedagogical procedures are adapted to their individual differences. Other than that, the design and the instruction of the online learning also considered as important part to achieve the learning goals. However, the main problem in exploiting information in a web-based learning environment is to determine which attributes should be used and how to attend the diverse type of students [27]. Hence, identifying different types of learner variables and their impact on student learning has been a major area of study in online instruction [28]. Other than that, online learning applications need to integrate the user interface design with instructional design and the development of the evaluation framework to improve the overall quality of web-based learning [29].

Many researchers claimed that the main problem with online learning environment is the lack of personalization aspect [30,31]. Thus, one of the key issues concerning in today's learning is individualized learning [32]. According to Wang [32], individualized learning is a learning model that places student (learner) in the center of the learning process. Students are active participants in their learning which mean they learn at their own pace and use their own strategies; they are more motivated and their learning is more standardized. Else, individual learners will take advantage of

self-paced learning environments in which they have control over their pace of learning, information flow, selection of learning activities, and time management [33]. This is also supported by Dron [34] that stated the current studies are points the need to support and to encourage students' to control the whole learning process.

In order to integrate the individuals' differences in online learning, the concept of Personalized Learning Environment (PLE) has emerged as a concept inline with the Web 2.0 tools that serves to integrate essential learning outcomes such as lifelong learning and self directed learning. The term personalized learning environment (PLE) was defined by Siemens [35] as :-

*"a collection of tools, brought together under the conceptual notion of openness, interoperability and learner control ... PLEs are comprised of ... the tools and the conceptual notions that drive how and why we select individual parts"*

In PLE environment, learner is accentuating to organizing, customizing and shaping the learning environment [12]. In contrast with the traditional learning approach, the PLE learning content is composed, organized and packaged. The idea is for learners to take responsibility also to control over their learning, rather than being controlled by the instructor [36]. According to Sampson, Karagiannidis and Kinshuk [24], the concept of PLE has become popular due to the number of research and development of e-learning. PLE concept of radically change the educational theory and technology from the "traditional" interactive learning environment to the personalized learning environment.

#### IV. CONCLUSION

The web 2.0 features provide opportunities for students to control their own learning process and this advantage are consistent with the characteristics of PLE concept. With the emergence of PLEs' concept which is associated with the raft of Web 2.0, it can be seen to integrate the essential learning outcomes such as lifelong learning, informal learning and self directed learning. Other than that, there are a variety of individual differences that can be emphasized by the educators in making the learning environment more effective. Therefore, educators need to know deeply their students' differences or learning preferences in order to provide them an efficient learning environment.

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