Personalized Learning Environment (PLE) Experience in the 21st Century: Review of Literature

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Abstract- The needs and responsibilities of the student's role in the 21st century have changed dramatically in the era of technology and globalization. The education should welcome the new trends which would be the parts and parcels of it. For achieving the aims and objectives of education, the teachers and the students may work in collaboration. This paper aim to review out about Personalized Learning Environment (PLE), how to build a PLE, PLE framework, issues and challenges in PLE, roles of student in PLE, the implications of PLE and also the future of PLE. PLE enables learners to organize their learning, provides the freedom to choose content, and allows communication and collaboration with others easily. In addition, PLEs enable learners to continue learning after formal courses have ended, and make lifelong learning possible.

Keywords-Personalized Learning, 21st century, Technology, Education, ICT

I. INTRODUCTION

ICT is becoming increasingly important in our daily lives and in our educational system. Therefore, there is a growing demand on educational institutions to use ICT to teach the skills and knowledge students need for the twenty first century [4]. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy [30]. When used appropriately, ICT can help to strengthen the importance of education to increasingly networked society, raising quality of education by making learning and teaching an active process connected to real life [36]. ICT is not just regarded as a tool, which can be added to or used as a replacement of existing teaching methods, but an important instrument to support new ways of teaching and learning [4].

Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refers to 'computers and computing related activities'. The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and also research. Teachers generate meaningful and engaging learning experiences for their students, strategically using ICT to enhance learning. Students enjoy learning, and the independent inquiry which innovative and appropriate use of ICT can foster. They begin to acquire the important 21st century skills which they will need in their future lives.

A number of previous studies have shown that an appropriate use of ICT can raise educational quality and relate learning to real-life situations. Technology should be used as a tool to support the educational objectives such as skills for searching and assessing information, cooperation, communication and problem solving which are important for the preparation of children for the knowledge society [7]. Hence, every classroom teacher should use learning technologies to enhance their student learning in every subject because it can engage the thinking, decision making, problem solving and reasoning behaviors of students [10].

Other studies show that the adoption and use of ICT in schools can promote collaborative, active and lifelong learning, increase students' motivation, offer better access to information and shared working resources, deepen understanding, help student think and communicate creatively [12].

All over the world, different countries have consistently initiated programs that are directed in making teachers adopt and use ICT in their day-today teaching and learning practices in school. According to [11] countries like UK, Singapore, China, Australia and European Union (EU) have established programs that aim at enhancing teachers' skills important in adapting and using ICT during teaching and learning processes. Research conducted in many schools has established that most of them are not effectively adopting and using ICT to support learning, teaching and management as intended [16].

In practice, the usual teaching and curricular approaches still remain basically unchanged in many schools, while the technology is typically poorly adopted and endorsed in the classroom [6]. [13] notes

that, despite rapid growth in ICT access by teachers and students both at home and school, and substantially improved school ICT infrastructure (connection to the internet, computer labs, availability of educational software, etc.) most teachers are not keen in adapting and using ICT tools during teaching and learning. It appears that their skills and attitudes towards ICT remain a challenge for them to adopt and use efficiently the technology in the classroom [15].
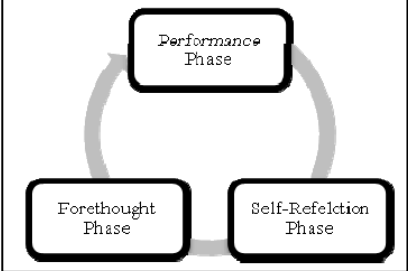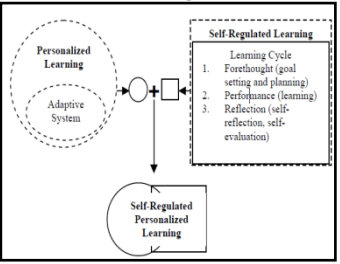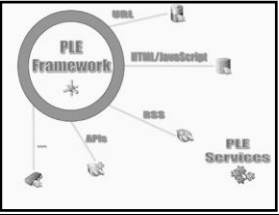
II. PERSONALIZED LEARNING ENVIRONMENT (PLE)

Today's students prefer more customizable and interactive systems for learning [19]. As a result, in opposition to obsolete learning theories and concepts, modern and learner centered concepts and approaches such as 'Personal Learning Environments (PLE)' and 'connectivism' have emerged. There are a lot of definitions for PLE. According to Peña-López [25], "PLEs are not just tools, but ways to understand learning on the net". According to McLoughlin and Lee [18], "digital-age students want an active learning experience that is social, participatory and supported by rich media." PLE is an emerging learning concept that allows learners to control and manage their own learning processes and provides support to (a) set their own learning goals; (b) manage their learning; managing both content & process; and(c) communicate

with others in the process of learning and thereby achieve learning goals [34]. Personalization and appropriation of technologies and learning goals are necessary to PLE. Personalization and a sense of control are key factors of the successful use of Web 2.0 technologies. Importantly, if students did not find the technology or platform provided by their institutions useful they are now in a position to bypass it in favor of their own personalized approach and preferred tools [3].

Collaborative learning which in the online environment is typically referred to as online teams or online groups, refers to instructional activities for getting students to work together online to achieve common educational goals [38]. However, if students are not clear with their learning goals and are uncertain how to appropriate, relevant technologies to achieve these goals, an effective PLE would not occur at all. Clearly, a PLE requires learners with competent self-regulatory skills. In addition, some services such as forums and wikis are components of PLEs that provide for sharing informal knowledge and interaction among users [19]. Table 1 describes and reviews the related existing research in Personalized Learning Environment (PLE). Following that, the summary of the literature review is presented as tabulated in Table 1.

TABLE 1: LITERATURE REVIEW IN PERSONALIZED LEARNING ENVIRONMENT (PLE)

Author(s)	Aims/Objectives of the study	Methods & Results
Shaikh, Z.A. and Khoja, S.A., 2012).	To discuss the changing roles and competencies of a teacher in the context of prevailing developments accomplished by the vast availability of social software, which makes easy the development of Personal Learning Environments (PLEs).	**Method:** 1. Preliminary theoretical study, 2. Centering on teacher roles and 3. Competencies in PLE settings **Results:** 1. Planning and Design 2. Instruction and Learning 3. Communication and Interaction 4. Management and Administration 5. Use of Technology. This study contributes and clarifies to the growing body of research on teacher competencies and roles in PLE settings, while linking them with the notion of situated learning. The decision of adopting applications, the development of matching learning activities, the moderation and facilitation needed, and teacher's own confidence level in integrating these web 2.0 based learning technologies in instruction are all roles and activities that directly contribute to the success implementation of PLEs.

(Noor Azida Sahabudin & Mohamad Bilal Ali, 2012)	To discuss about the combination of two learning approaches which are self-regulated learning and personalized learning.	**SRPL Process:** **Combination Self-Regulated Learning and Personalized Learning:** **Results:** Many of the positive feedbacks are given after the merger of the two learning approaches.The merger of these two learning approaches is one of the efforts and strategies to improve the student learning process. Further research is needed to aim at how the learning approaches are appropriate for both of the learning approaches are complemented and support each other.
(Norazrena Abu Samah et al., 2011)	To report the importance of individual differences. Based on the review of previous research, online PLE is the best learning medium for individual difference approach, in that it has impacted on students' achievements and satisfaction in learning.	**Model:** Learning orientations model. Focuses on the whole-person perspective and can be used as a framework to examine the dynamic flow between 1. Deep-seated psychological factors, 2. Past and future learning experiences, 3. Subsequent choices about cognitive learning preferences, 4. Styles, strategies and skills, 5. Responses to treatment, and lastly, 6. Learning and performance outcome. **Results:** In order to develop a learning environment, individual differences need to be taken into consideration to ensure the impact on students' achievements and satisfactions. Therefore, the learning environment must be suitable for their differences, to include their learning styles, learning orientations, preferences and needs in learning.
(Chatti, M., et al., 2011)	To present theoretical, design, implementation, and evaluation details of PLEF, a framework for mashup personal learning environments. The primary aim of PLEF is to help learners create custom learning mashups using a wide variety of digital media and data	**PLEF Implementation:** •Authentication •Pages and Elements •Social Tagging, Commenting and Sharing •Views •Search •Access Control **The Personal Learning Environment Framework (PLEF):** **Results:** Most of the evaluators were quite satisfied with PLEF in terms of system reliability, stability, and recoverability.

(Dominique Verpoorten et al., 2010)	To report on the use of a Web 2.0 artifact by nine 14/15 year-old pupils in a formal learning context.	**Methods:**
		Pupils aged: 14 to 15
		School: European School Mol (Belgium)
		Methods were used to collect data
		    1. Questionnaires
		    2. Analysis of a consequential task.
		    3. Observation of the activity outputs
		
		Results:
		•Judgment of learning
		•Self-efficacy judgment
		•Tagging and generic skills development
		•Contextualization of the tagging activity

Based on Table 1 above, we can see there are some variations in terms of methods, models, approaches, framework and tools for the PLE implementation. It can be concluded that, most of the result shows very positive effect for PLE implementation. Students always seek information to address a problem at school, work or to justify a curiosity. They are not only to seek information but also to share information by taking advantage of digital and networked technologies. It can connect with other personal spaces for collaborative knowledge creation and effective knowledge sharing [37].

III. BUILD A PLE

PLE is not an application. A PLE is comprised of all the different tools we use in our everyday life for learning. Many of these tools will be based on social software. Social software is used here in the meaning of software that lets people rendezvous, connect or collaborate by use of a computer network. It supports networks of people, content and services that are more adaptable and responsive to changing needs and goals [1].

Social software adapts to its environment, instead of requiring its environment to adapt to the software. Social software underpins what is loosely referred to as Web 2.0. PLE uses many content sources, applications and tools for qualified learning [19]. People may use PLEs for formal and informal learning, sharing, communicating and collaborate with others. Social networks, bookmarks, start pages, blogs and etc may all be considered components of PLE. Furthermore, PLE is useful for:
• Socializing with other learners.
• Customizable content.
• Different, easy and interactive way for learning.

Personalized start pages should continue broadcasting and working, since they provide easy access to sources and allow multiple connections for learners. Apart from these, the other eminent web 2.0 tools:
Search engine: Google Search, Yandex, Yahoo Search, Bing
E-mail: Gmail, Hotmail, Yahoo
Photo sharing: Flickr, Deviantart
Blog: Blogger, Wordpress.
Paper/presentation/article sharing: Scribd, Slideshare.

Online document storage: Google Drive, Dropbox, Sky Drive.

Figure 1 shows some Web 2.0 technology tools and some amazing that students can achieve with them.

FIGURE 1: WEB 2.0 TOOLS

Explanation some of Web 2.0 tools:
    i.   Flickr| www.flickr.com - Hosting, more than 3 billion images, Flickr offers students and teachers a way to share their photos from a recent field trip, class project or creative presentation. Many Flickr users, offer their work under a Creative Commons license.
    ii.   Ning| www.ning.com - Ning helps students and teachers build a social networking site that is customizable, attractive and easily created.
    iii.   Twitter | http://twitter.com - A free social networking and micro blogging service that enables its users to send and read other users' updates known as "Tweets." Create a school-only account and this instant-update site allows teachers to post links of interest for homework or project research, set up polls and quizzes, or conveys other timely information.
    iv.   YouTube| www.youtube.com - YouTube is an online public communications site. The site allows for registered users to upload and have

available for the public their videos for viewing. Anyone who goes to the site can view the videos that are posted on this site. The videos are anything from beginner videos to more professional videos.

v.   Google Docs | docs.google.com - Google Docs is a free, web-based office suite offered by Google within its Google Drive service. It was formerly a storage service as well, but has since been replaced by Google Drive. It allows users to create and edit documents online while collaborating with other users live.

IV.   PLE FRAMEWORK

A PLE can be created independently, building and collecting content sources from the Web, including creating content through blogs, podcasts, Slideshares, etc. A natural extension of one's PLE is the development of relationships with individuals that emerge from the process of building the PLE.

Figure 2 shows a conceptual view for Personalized Learning Environment Framework (PLEF). PLEF leverages the possibility to plug learning components from multiple sources into a learner-controlled space [2]. PLE is a new learning approach based on "personal environments, loosely joined" and mentioned that a PLE is characterized by the freeform use of a set of lightweight services and tools that belong to and are controlled by individual learners. The idea is to provide the learner with a myriad of services and hand over control to her to select and use the services the way she deems fit to create her integrated PLE better adapted to her own situation and needs.

Based on the technical question of how PLEs can be best deployed, there is a challenge is how to design a PLE as an extensible framework that can be complemented with different supporting components. In a software development context, a framework is a collection of abstract classes and interfaces that are used to express abstract design [2]. The design of a PLE can be similar to the design of an integrated development environment (IDE) such as the Eclipse IDE. Similar to Eclipse which has plugins for different programming languages such as C\C++, Python, Perl, Ruby, PHP, design tools and many more plugins, a PLE can be designed in such a way that it can easily be extended with new learning services and tools.
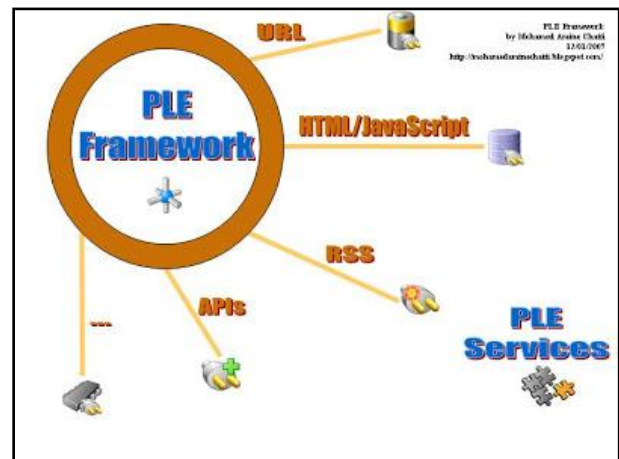

FIGURE 2: PERSONAL LEARNING ENVIRONMENT FRAMEWORK (PLEF)

VI.   ISSUES AND CHALLENGES IN PLE

Students will contribute meaningfully in the curriculum design process if they receive support from teachers and as long as their suggestions are taken seriously. For many teachers, constraints on their time will be a barrier to them trying new approaches that appear to be time consuming [24]. Skrabut [29] stated that "some of the issues are due to the institutional climate, and other infrastructure issues are due to training and support needs, and yet others are due to the vast array of options available to a learner."

PLE is based on a self-directed learning approach and the process of self-directed learning requires a degree of self-awareness [9]. The Networked Student Model of constructing personal learning environments is reflected in many connectivist principles [8]. PLEs need on the one hand to focus on technical issues, regarding information exchange between services and user interface problems [32].

For some teachers, there is concern that they are the people responsible for ensuring the programme is taught. Because students are acquiring more power to direct their learning, PLE were perceived as more informal learning. Both students and instructors wonder if learning should be formal only. If anything goes wrong, the perception is that it will be deemed their fault. However, teachers and students who have co-created the curriculum, they will get experiences of working together and the shared responsibility for the curriculum that emerges from the process.

Students are likely to get the most from actively participating in curricula that are their own courses this helps them gain the greatest ownership over their own learning. However, by definition this implies that for each new course or program, students need to actively participate in creating their own curriculum, raising concerns about the sustainability for this kind of collaborative approach to curriculum design.

V. Roles of Students in PLE

As far as higher education is concerned, there is a growing interest in students becoming more active participants and co-creators of their learning experiences. One of the key areas where students could have greater engagement and impact on their own learning is in curriculum design. For the betterment of current structures the collaborative reforms of curriculum design are necessary.

By doing this the students will demonstrate high levels of self-directed learning and autonomy along with improved levels of confidence and motivation with an improved student performance. Students will change their views of curriculum design as a result of their active participation in curricula processes. They will understand course design to be a complex process and will have a greater understanding of the demands of academic within this process. The process of collaborating with students will demand a lot of teachers. However, all teachers will have a rich experience of learning for students through opening up more meaningful dialogue with them.

VII. The Implications of PLE

The concept of the PLE marks a fundamental change in the role resources such as people and media play in teaching and learning. The goal for the student shifts from a need to collect information to a need to draw connections from it to acquire it, disseminate it, and collaborate in its use. Furthermore, the use of PLEs will be enabling students to actively consider and reflect upon the specific tools and resources that lead to a deeper engagement with content to facilitate their learning.

In a study conducted by [33], college students' perceptions of the pedagogical affordances of social media in supporting the development of PLEs were examined in order to evaluate a course design that was premised on social media. Findings showed that students' perceptions of the affordances of PLEs changed as they navigated the course landscape of social media tools to construct and perform learning activities aligning with the researchers' operational definition of affordances of social media. Specifically, PLEs require the development and application of self-regulated learning skills because PLEs are built bottom-up, starting with personal goals, information management and individual knowledge construction and progressing to socially mediated knowledge and networked learning [5];[31].

VIII. The Future of PLE

As stated by [26], "the concept of LMS limits the role of learners to the possibilities of the learning management system and the creativity of the teachers, the concept of PLE focuses on active, self-directed, creators of content." In this regard, Siemens [28] stated that, "PLEs aren't an entity, structural object or software program in the sense of a learning management system." According to Van Harmelen [34]," ideas about PLEs are still forming."Although PLEs are a new notion for learners and educators, when compared to LMSs, these environments are more robust and offer interactive tools absent in LMSs.

According to McLoughlin and Lee [20], "digital-age students want an active learning experience that is social, participatory and supported by rich media." In this respect, PLE is an interesting and intriguing experience for students whom are shaped by technology [19]. In fact, PLE is often used in our online lives unintentionally. Consequently, PLEs can be perceived as a manifestation of a learner's informal learning process via the Web, or, as a single learner's e-learning platform allowing collaboration with other learners and instructors and coordination of such connections across a wide range of systems [17]; [34].

IX. Conclusion

According to Higgins, & Moseley, [14] inability of teachers to understand why they should use ICTs and how exactly they should use them is a barrier to the implementation of ICT in schools. The effective implementation of ICT in schools is a multifaceted, complex process that just not involves providing the technology to schools, but also involves teachers' competencies, school readiness, long term financing and curriculum restructuring, among others [36]. Traditional learning theories have become unpopular compared with modern learning theories such as connectivism [19]. Nowadays, new theories environments and notions will change the future of education.

The adoption and use of ICTs in education have a positive impact on teaching, learning, and research [30]. Moreover, PLEs can provide a more holistic learning environments, bringing together sources and contexts for learning hitherto separate. Students learn how to take responsibility for their own learning. Critically, PLEs can bridge the walled gardens of the educational institutions with the worlds outside. In so doing learners can develop the judgments and skills or literacy necessary for using new technologies in a rapidly changing society.

As a conclusion, education should respond to societal needs, advances in technology and globalization. Teaching and learning should help learners develop their abilities, motivation and desire to play an active role in finding solutions to problems and issues in the society [21]. Teachers should have learning area or subject matter knowledge, pedagogical knowledge and knowledge of content. However, studies suggest the benefits of adopting and use of ICT in schools all over the world has not been automatic.

ACKNOWLEDGMENTS

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