MOBILE SEAMLESS LEARNING FOR FUTURE LEARNING MODELS

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ABSTRACT

The learning process that emerges scientifically is one of the current learning emphases. The development of mobile technology such as smartphones supports learning that occurs outside of context, that is, it can occur at any time and anywhere without being bound by time and space. This has the opportunity to create learning that arises naturally. Students can be accommodated to study anytime and anywhere according to the students wishes or learning mood. Therefore, appropriate concepts and designs are needed to provide an effective learning environment. Mobile seamless learning is a learning model that contains the concept of continuity and continuity in the learning process that occurs without boundaries of space and time. This article describes the general concept in developing Mobile Seamless Learning-based learning

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I. INTRODUCTION

Current learning concepts and theories emphasize not only social interactions between students and students with their learning environment, but the emphasis is on learning processes that can arise naturally where students are active agents in the process.

In this era, it is time for students to be allowed to choose their learning methods and styles, where students can determine when and where they will study. Apart from that, everyone's desire or emotional mood to learn can happen anytime and anywhere. so that when this arises, students need to be accommodated so they can learn immediately, including providing learning resources, learning media and learning environments. With these conditions, it is possible for students to learn using various scenarios, the learning process can occur in formal or informal conditions, inside the classroom or outside the classroom, individual or social, digital and non-digital media, as well as physical environments or virtual environments.

Chan et al define continuity of learning with various scenarios, known as Seamless Learning. Chan has used the term Seamless Learning for all activities that are characterized by continuity of learning experiences through different learning contexts using mobile and ubiquitous technology, in this case mobile devices such as smartphones play an important role in Seamless Learning [1].

Basically, in Seamless Learning, students are given the opportunity to collaborate and interact in various ways with colleague, learning resources and the real world (physical world), apart from that, this interaction is also carried out through virtual worlds.

Most of the research conducted so far has focused on formal or informal learning only and has not succeeded in combining the synergistic relationship between these two learning contexts [2].

Therefore, in the interaction between students, students and learning resources, students and the learning environment in terms of the synergistic relationship between learning in the real world and the virtual world, appropriate design is needed for transitions between scenarios and learning contexts. This article discusses the concept and design of Seamless Learning using mobile device technology..

II. RESULT AND DISCUSSION

A. Evolution of Mobile Technology Functions

In this digital era, cell phones or mobile phones as mobile devices have become a pervasive technology that influences every aspect of human life, giving rise to several new terms in digital society, including "society on the move", which appeared by Jorge de Sousa Pires from Uppsala University, Sweden. This term emerged due to the increasing function of a cellphone, which now no longer only functions as a communication tool but has become a multifunctional device that is rich in features. The development of embedded technology, network technology, and ubiquitous technology has played a major role in changing the function of this cellphone, making it function like a computer, so it is better known as a smart phone or smartphone. Smartphones have capabilities like computers that are supported by an operating system, including Android, Windows Mobile, iOS, Blackberry OS, Symbian and others. The operating system functions to regulate and control the work of software and hardware on a smartphone.

The most important feature on a smartphone is high-speed internet access services via Wi-Fi and mobile broadband. Thus, smartphone users can download various applications from the internet. From a physical perspective, it has also undergone evolution, such as touch screens, web browsers, keyboards, GPS (Global Positioning System), in-built cameras and so on.

Equipped with various features that resemble a computer, currently telephone calls and text messages can be used using internet data network facilities. Some free communication services include Skype, WeChat, Line, Viber, KakaoTalk, and so on. Apart from communication services, a smartphone also provides office applications like an office application on a computer which allows users to create new files, edit and save these files. Storage media is no longer a problem for a smartphone, users can now take advantage of cloud computing system-based data storage. Some of the free cloud-based storage services offered include Drop box, Google Drive, Skydrive, Box, Ubuntu One, Sugar Sync, and so on. Not to mention the ability of a smartphone to enjoy video, TV and radio streaming services, which further complements the features of a smartphone.

Klopfer et al [3] put forward five characteristics of handheld computers, in this case a smartphone, namely:
- portability: Lightweight can be carried anywhere
- social interactivity: can enable data exchange and collaboration with other people face to face or not
- context sensitivity: can collect data from various contexts such as situation, location and time including real data and simulated data.
- connectivity: can connect to other devices, as well as connect to the network
- individuality: Unique scaffolding / assistance can be provided that is adapted to each person's device.

The richness of features on a smartphone is what gives rise to the term "world in the palm of your hand". The concepts of portability, mobility, ubiquity and connectedness mean that various activities can be carried out just by using a smartphone, and its use can occur without time and space limits..

B. Seamless Learning

Literally Seamless means continuity that occurs smoothly. The term Seamless Learning was first not associated with the use of technology in learning, as stated by Kuh regarding Seamless Learning [4]:

The word "seamless" suggests that what was once believed to be separate, distinct parts (e.g., in-class and out-of-class, academic and non-academic; curricular and co-curricular, or on-campus and off-campus experiences) are now of one piece, bound together so as to appear whole or continuous. In seamless learning environments, students are encouraged to take advantage of learning resources that exist both inside and outside of the classroom...students are asked to use their life experiences to make meaning of materials introduced in classes... (p. 136)

Only in 2006, Chan et al [1], defined Seamless Learning as continuity in learning with various scenarios using mobile devices. Experts' definitions of Seamless Learning vary, but in general this concept refers to transitions between learning contexts and scenarios that occur as smoothly or seamlessly as possible.

Seamless learning supports students to learn when they want to learn, even across multiple scenarios and they can move from one scenario to another quickly and easily. Therefore, the space for Seamless Learning consists of various scenarios where students are active, productive, creative and can collaborate across different learning environments at any time and wherever the students are [5][6].

The emphasis in Seamless Learning is on supporting students to optimize their learning experience and concern for abstract and concrete experiences.

C. Flow Experience in Seamless Learning

According to Csikszentmihalyi [7], there are two reasons a person learns, namely external reasons (exintric) and internal reasons (intrinsic). The connection with seamless learning is flow which is a type of intrinsic motivation. Flow state is a person's mental condition where he is immersed and focused in an activity that he enjoys, so that he understands what moments will happen. It's like a tennis player when they are engrossed in the game, will concentrate highly and will understand where the ball will be directed or headed towards him.

Csikszentmihalyi [7] created 9 indicators of flow state conditions, these conditions can be interpreted as flow of learning, namely:

- Goals must be clear at each step
- There is immediate feedback on an action
- There is a balance between challenge and skill
- Action and awareness (care) are combined
- Ignore distractions
- Mistakes are normal
- Loss of Self-consciousness
- Time becomes distorted
- Activities become "autotelic"

In flow state conditions, students are involved in the learning process in all learning contexts where they are sensitive to physical (from non-virtual learning to virtual learning), temporal, social and technological changes. Learning designers need to understand how students enter this flow state, and how this condition can be maintained despite changes in the learning setting or context, which ultimately leads to a contribution to effective and efficient learning.

Seaw et al [8] define six components of Seamless Learning, namely:

- Space: Seamless learning supports students to be able to move smoothly and continuously between different physical and virtual spaces
- Time: time plays an important role in developing an observation. It may be that physical data collection is carried out at the same time in the same context, for example by collecting data at a museum or zoo
- Context: Context design is very influential on the learning process. For example, data collection can be done in a formal context at school, and continuity of this learning can be done informally outside of school.
- Community: the community within the scope of Seamless Learning consists of students, educators and domain experts.
- Cognitive Tools: Tools used to improve cognitive abilities, such as smartphones. Smartphone features are generally used to record data, take pictures, upload data to online portals, and so on.
- Artifacts: objects in the form of student work produced in the learning process

D. Mobile Seamless Learning (MSL)

The impact of technological developments has changed the paradigm in education, learning has developed outside the context of traditional learning in general. So the challenge of education in this digital era is that it is no longer just focused on what content will be studied but has evolved into how and when learning occurs. Teaching and learning is no longer limited to a fixed space at a predetermined time, but learning can occur anytime and anywhere without being bound by time and space. The existence of mobile devices such as smartphones supports learning outside of this context.

Still according to Looi et al [5], the portability and flexibility of a mobile device has the potential to support a shift in pedagogy from teacher-centred learning to learner-centred learning. In this case, educators are no longer the only source of learning, but educators act as facilitators and partners in learning.

Rogers and Price stated several advantages of using mobile technology in implementing Seamless Learning, namely: it can increase student motivation; increasing student participation in learning activities and developing students' social and cognitive processes; opens students' horizons to various forms of information. They concluded that there are three challenges in designing Seamless Learning using mobile technology, namely: 1) avoiding excessive information, 2) avoiding clutter that can cause the focus of students' attention to be diverted by the device, 3) understanding the obstacles in supporting student collaboration that occurs simultaneously. natural in relation to social context.

It is important to understand how social interaction processes can impact collaboration-based learning situations

that occur in Seamless Learning scenarios. This socio-affective process becomes increasingly important when different physical and social learning environment constraints occur in different contexts, places and times. In essence, how educators can increase the involvement of students/learners in complex social interactions by using various types of equipment including digital and non-digital in increasing learning activities [9][10].

Wong and Looi (2011) created 10 dimensions of the Mobile Seamless Learning environment, as follows:

- MSL1: includes formal and informal learning
- MSL2: includes personal/private and social learning
- MSL3: learning that occurs over time
- MSL4: learning that occurs by crossing locations
- MSL5: ubiquitous access to knowledge (a combination of context-aware learning, augmented reality learning, and ubiquitous access to online learning resources)
- MSL6: covers the digital and non-digital world
- MSL7: Combines the use of various device types
- MSL8: Seamless and fast switching between multiple learning tasks (such as data collection + analysis + communication)
- MSL9: synthetic knowledge (previous and current knowledge as well as multiple levels of thinking skills and/or multidisciplinary learning)
- MSL10: includes multiple pedagogical or learning activity models (facilitated by educators)
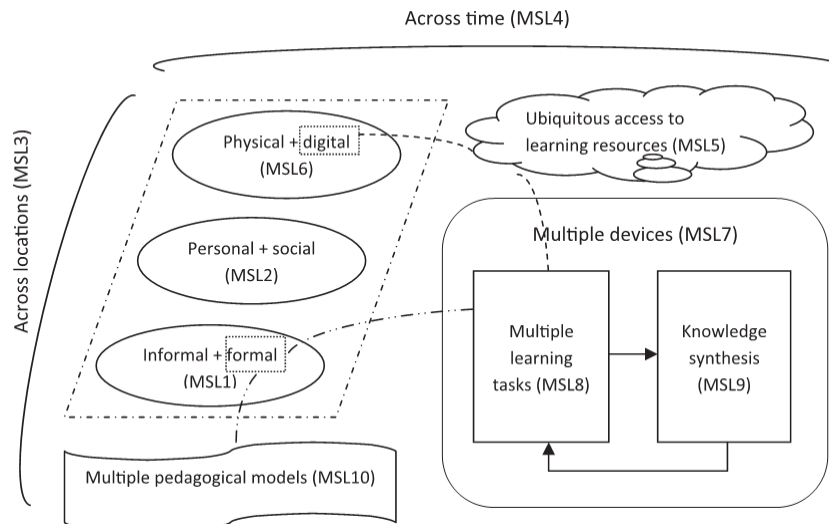

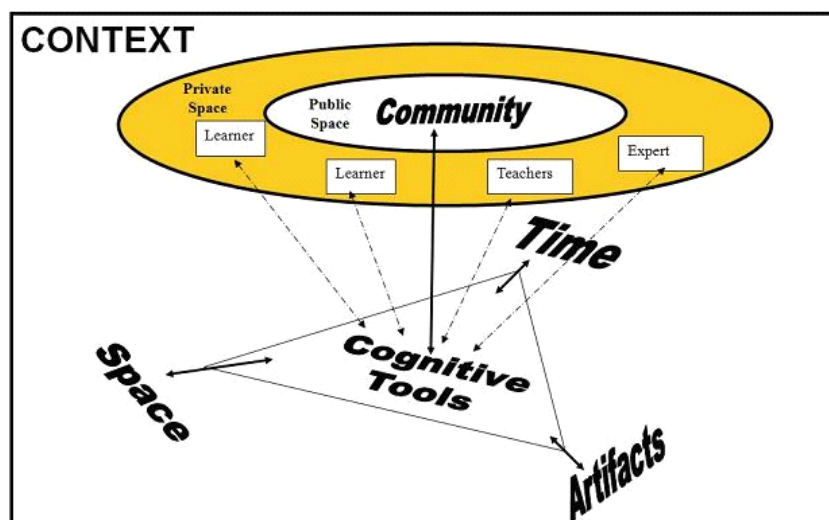Figure 1. Visualization of 10 Dimensions of Mobile Seamless Learning (MSL)

Figure 2. Seamless Learning Framework

Mobile Seamless Learning For Future Learning Models

According to Wong [11], the MSL visualization in Figure 1 is an ecological depiction of MSL which places students as the center of learning or learner-centric. Placing students as learner-centric does not mean that they are the center of attention of educators alone, but are the center of generating knowledge that occurs in various contexts in the multidimensional learning space. In this case, MSL is not only about learning anywhere and at any time, but learning is something that occurs continuously across contexts.

Several research articles related to Mobile Seamless learning have been widely published, including research conducted by Seow et al (2008), namely designing and developing learning activities that enable 4th grade elementary school (SD) students to learn about reduce, reuse and recycle (3Rs) by using smartphones in Environmental Education lessons. The aim of this learning activity is to enable students to understand the 3Rs concept practically at school and at home. Smartphones here function as a scaffolding tool in improving students' processing skills. In general, the Seamless Learning framework designed by Seow et.al [5] can be seen in Figure 2, where all Seamless Learning components appear in a framework.

III. CONCLUSION

Learning with the concept of continuity gives rise to a term in the world of education, namely Seamless Learning. The Seamless Learning concept emphasizes continuity in the learning process which occurs in various contexts, including: formal and informal, personal and social, across time and location, real world and virtual world, digital and non-digital, etcetera. Seamless Learning emphasizes that learning is learner-centric, and supports students to optimize their learning experience and concern for abstract and concrete experiences. Mobile technology such as smartphones are devices used to implement the Seamless Learning concept in learning. There are three challenges in designing Seamless Learning using mobile technology, namely: 1) avoiding excessive information, 2) avoiding clutter that can cause the focus of students' attention to be diverted by the device, 3) understanding the obstacles in supporting student collaboration that occurs naturally in connection with social context..

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