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Authentic Assessment in Studio-Based Learning (SBL) e-Portfolio

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Abstract: This article takes an in-depth look at the rationale behind the integrating e-Portfolio as an authentic assessment in studio-based learning in higher education institutions (HEIs) which could impact the performance of the studio learners in professional development. In the field of studio-based learning (SBL), the studio learning system is comprehensive as it combines theoretical and practical knowledge which covers various disciplines. Learning in the studio field through a complex iterative process involves collecting, processing, analysis, translation, synthesis, design and delivery of a project or an artwork. Therefore, the complexity of assessment in the field of studio-based learning (SBL) such as architecture, art and design require attention and supervision because of its very subjective nature, which is whether to focus on the process, the student or the product. In order to achieve this target, authentic assessment is used as a measurement tool for studio students to identify the level of job evaluation, performance and progress through e-Portfolio. Literature reviews have been conducted in order to carry out the goal of this article. The results of studies mostly shows a positive attitude towards the use of e-Portfolio as an authentic assessment for learning in the studio-based field. Therefore, this study recommends implementation of e-Portfolio as a platform for studio learners so that studio learners can easily view their assessment regarding the evaluation of their work, performance and progress.

Keywords: authentic assessment, e-Portfolio, studio-based learning (SBL), studio learners

INTRODUCTION

This article takes an in-depth look at the rationale behind the integration of studio-based learning (SBL) e-Portfolio as an instructional teaching and learning tool in higher education institution (HEI). This article outlines the development of e-Portfolio joined with Heutagogy learning which could impact the performance of studio-based learning undergraduates in job interviews as they prepare themselves for the demanding job market. Heutagogy, which is the latest approach in learning theories, is known as self-determined learning as students decides on the learning based on their motivation, which is a key concept in studio-based learning.

Every so often educators in studio-based area find studio assessments a challenge as they will need to clarify what they mean by skills and creativity to students so that they could understand what they are expected to demonstrate (Badiossadat Hassanpour, Nangkula Utaberta, & Azami Zaharim, 2012). This article intents to show that e-Portfolio could be used as a tool to support authentic assessment through the idea of merging Heutagogy in learning as offered in the theory of Connectivism (Siemens, 2004). Strong & Hutchins states that Connectivism is a learning theory for the digital age that explains how Internet technologies have created new opportunities for people to learn and share information across the World Wide Web. As we are now stepping into the world of digitization of manufacturing called Industrial Revolution 4.0, computers play the main role of communicating and storing data as machines are digitally connected with computers and information could easily be shared by anyone. Together with the researcher's interest in the pedagogy of studio-based learning, this article demonstrates that technology and heutagogical support is crucial as teaching and learning tool for both educators and students in studio-based learning.

Therefore, e-Portfolios play a new role as an educational tool that is being implemented in higher learning institutions. Students would determine the degree of an e-Portfolio as an assessment tool used to support and track their learning needs (Rosnadiah Bahsan, Syamsul Nor Azlan & Siti Nur Dini Mahazan, 2018).

ASSESSING AS PART OF TEACHING AND LEARNING IN STUDIO-BASED

Studio-based learning is a problem-based teaching and learning method that is applied when students work on a project or a task. Studio-based learning has been traditionally used in fields like fine arts and architecture where the learners complete their tasks by creating, visualising and analysing the tasks given. These tasks given to students heavily relies on their original creativity. Hence, this brings forth a key issue faced by many educators in the studio, which is the focus when assessing a creative work. For instance, whether the assessment should focus on the processes, the person or the product. It is important for students to be fully informed about their assessments as students deserve to know which part of their work will be assessed and what are the assessment criterias (Nangkula Utaberta, Badiossadat Hassanpour, Mohd. Arsyad Bahar, 2013).

At the same time, in the studio-based learning field, students may possess the abilities, skills, or qualities that are graded or recognized in studio classroom settings. However, the evidences of those strengths could disappear into databases and stacks of papers, or accumulated in portfolios that are unwieldy to navigate. Therefore, determining the right approach in assessment will help both students and educators in grading students' work as the right assessment method will enable students to shape their work appropriately during the design process and enable educators to specify the basis of grading to help provide a rationale for grading judgments after the assessment has been made and the results are given back to the students.

AUTHENTIC ASSESSMENT AS STUDIO BASED ASSESSMENT TOOL

Among the existing types of assessments, authentic assessment is one of the most popular alternative. This new approach in assessment associates learning with real and complicated situations and contexts (Olfos & Zulanta, 2007) that is based on student practices in which real world performances are repeated (Svinicki, 2004), such as answering short questions, essays, performance appraisals, oral presentations, exhibitions, and even portfolios (Kinay & Bagceci, 2016). Authentic assessment is seen as an approach

that measures students' performance directly and relevantly to meet the learning objectives of the educationalists. Hence, projects such as reports, journals, speeches, videos, and interviews with the students are carried out to measure students' understanding of the subject material. These tasks are a part of authentic learning where reflection and assessment are considered as important components of the learning environment that provides more realistic experiences for students.

On the other hand, due to the limitation of the studio space, there is no specific space such as discussion spaces or display areas within the studio area where educators could bring students together to share ideas. However, this part of the learning process could help improving knowledge, design creativity and social relationships between learner (Shanthi Muniandy, Tareef Hayat Khan, & Abdullah Sani Ahmad, 2015). Learners are also not exposed to the work of fellow learners from different groups either during presentation (pre-post), critic sessions, or displayed work. Nevertheless, the nature of studio-based learning (SBL) heavily relies on assessments that happens throughout the completion of a project or task, whether it comes from the educators or fellow learners.

Therefore, a platform is needed for studio-based practice learners where they can view previous assessments of themselves and other fellow learners as well as to view the feedback given for their own improvement as part of their learning process. The goal of authentic assessment, in this context, is to adhere to an approach that integrates the marking of both the learning process and the finished products (Herrington & Herrington, 2005). This article gives an overview of authentic assessment measure to address this issue by using the e-Portfolio method.

E-PORTFOLIO

According to Chanpet & Chomsuwan (2013), e-Portfolio is a new concept, with the "e" part of the term refers to an online environment laden electronic tool that can be used to develop and present a portfolio package. In the researcher's opinion, this is the best definition that defines what an e-Portfolio is. In analysing the history of e-Portfolio development (Barrett, 1999, 2000) summarised by (Krause, 2006), this phenomenon is divided in

two distinct strands of definitions: multimedia development which includes the tasks of designing, developing, publishing and evaluating e-Portfolio; while another meaning of a traditional portfolio development is the activities of collection, selection and reflection. Barrett completed that these processes are complementary, and all should be present for a successful e-Portfolio development. Thus, Barrett identified some of the additional processes enabled by e-Portfolio as illustrated in Table 1 below:

Table 1. The development of e-Portfolio in traditional and technology process

Traditional portfolio processes	Adding technology allows enhancement
Collecting	Archiving
Selecting	Linking/Thinking
Reflecting	Storytelling
Projecting	Collaborating
Celebrating	Publishing

In brief, there are numerous definitions for the term e-Portfolio. In higher education, students are developing e-Portfolios as an evidence-based and assessment to support their learning needs (Syamsul Nor Azlan Mohamad, Mohamed Amin Embi & Norazah Mohd Nordin, 2015). Hence, based on the researcher's own in-depth reading regarding the subject, the researcher found that these definitions for the term e-Portfolio reflected the purpose of e-Portfolio in this article, which is as an assessment tool. Electronic portfolio, or also known as e-Portfolio, is one of a new range of educational instrument that has been gradually implemented in a few higher education institutions for curriculum, teaching content and assessment.

Although most local universities in Malaysia already have an online system which is e-Learning that functions similarly as an e-Portfolio, it could not be fully used as an e-Portfolio as it was designed mainly for lecture-based teaching method in which educators usually use to upload materials, lectures or topics every week while students download and use the uploaded files given (Amier Musstaqim Sawalludin, Roliana Ibrahim, & Khairul Anwar Mohamed Khaidzir, 2017).

Therefore, through all the literature readings on studio-based learning (SBL), the researcher intends to implement e-Portfolio as a platform for learners to view their assessment and feedback in studio-based learning as a way

to respond to studio learners' concerns regarding the evaluation of their work. The e-Portfolio is perceived as a tool that will make the design studio an fruitful context for learning social innovation. Most resources that are used to create an e-Portfolio are located online and are easily accessible by anyone, thus making it an assessment a direct learning tool for everyone, especially learners.

STUDIO-BASED LEARNING IN DESIGN EDUCATION

Studio-based learning is not an exception in education when it comes to the demands and needs that changes over time. Studios are expected to produce students who are not only skilled in design, but also who are socially and practically a productive person that could contribute to the society. (Boyer & Mitgang, 1996) in (Olweny, 2017) reported that one of the most popular and commonly-used teaching strategies in design education, is design studio. In design studio, students work individually and in teams to design new processes and products that solve real problems.

Studio-based learning centers around students as students work on real-life project that is self-motivated as students are required to solve the project using their skills and creativity. Peer collaboration and mentoring by the educator help students to achieve their learning goals and contribute to the outcome of their projects. Studio-based learning is a promising approach to designing learning environments that can promote both deep disciplinary learning and creativity (Chee-Kit Looi, Joseph Polman, Ulrike Cress, 2016). Recent ethnographies of studio-based learning have found that the studio has a particular set of norms as a community of practice, where students are expected to: (a) Iteratively generate and refine design solutions by incorporating peer and instructor feedback; (b) Frequently communicate design ideas visually and verbally, and (c) Collaborate with peers to give and receive help in achieving learning goals.

Studio-based learning can be defined as a center or a space for teaching and learning where interaction between learners themselves as well as faculty takes place. Learners experience the space as an observer and as participants. In other words, studio is an interactive classroom where students work individually or collaborate in small groups to execute design solutions for

an assigned task. Therefore, studio-based learning (SBL) promotes flexible learning and has greater learning impact on learners.

5.1 Assessment Criteria in Studio-Based Learning

Design studio education requires a specific setting that facilitates learning activities (Muniandy et al., 2015) and the studio format usually involves a single design discipline, like architecture. Studio instructors functions as guides or facilitators rather than indisputable experts holding the center stage (Burroughs & Franz, 2009). In studio-based learning, studio instructors support activities via assignments that limit the complexity of problems, provide coaching through feedback, and constantly reminding learners of these cultural norms during critiques. In the meantime, studio learners receive ongoing feedbacks through brainstorming sessions as well as informal and formal reviews commonly referred to as planning, crits, and pin-ups. The critique session, or crits, is a format of self- and peer-critique as well as receiving critique from the coaches and external experts. Typically, crits and pin-ups, formal reviews take place in a public forum and serve as midterm and final examinations (Shraiky & Lamb, 2018). During this session, studio learners present their completed designs to a preselected review panel comprised of instructors and community experts. Feedback is typically fast-paced and direct and is intended to identify strengths and areas for improvement. Additionally, crits are integrated with ‘‘pin-ups’’ in which studio learners display their documents and illustrations around the studio. Faculty and studio learners rotate among the pin-ups while each team formally presents the drafts of their design solutions.

From (Badiossadat et al., 2012) research, the design process in architectural studios is based on some small well-defined projects during the semester and one final project at the end which is well-defined and done in a larger scale. Studio learners should finalize their project before the deadline given and present it on the submission day with proper documentation. A research by (Hassanpour et al., 2011) stated that based on the studio educators experience, some studio learners who are concern about their grades will skip discussions as they feel anxious and they do not want to be disappointed by the

comments about their project. Hence, that is why studio learners often complaint about the unfairness and inequitable of grades as they are unaware of how their work is evaluated or graded. For that reason, determining the most appropriate assessment method is important to ensure their work are being graded fairly so that the learners can improve their work for future projects or tasks. Having a good platform to document all of their work and progress would be helpful to the learners as well as their educators in providing assistance for continuous improvements of the learners.

LEARNING THEORY ADOPTED IN THE STUDIO-BASED LEARNING E-PORTFOLIO

In this article, it is important for the researcher to find the most suitable learning theory that supports the use of e-Portfolio as an approach that is in line with the concept of studio-based learning.To find the most suitable learning theory and model, the researcher had to find the instructional root of studio-based which will determine a successful implementation of e-Portfolio in a studio-based learning environment. For Studio-Based Learning and e-Portfolios, terms such as self-regulate and life-long learning are often tied to these pedagogical approach. Therefore, the researcher had shortlist some of the learning theories that might suit the studio-based learning approach as fundamental elements in producing the e-Portfolio design and development process. Through this process, the researcher found that Heutagogy by Hase and Kenyon and Connectivism by Siemens and Downes are the most suitable theories to be used in this article.

Heutagogy, which is developed by (Hase and Kenyon, 2000), defined learning as self-driven and self-determined, has become more popular in learning and teaching framework over the last decade (Blaschke, 2012). The basis of Heutagogy is about how one learns best and using strategies such as active and reflective learning. The learning approach proposed in this research contains the aspect of Heutagogy that connects to the attributes of Connectivism (Betsy Duke, Ginger Harper, & Mark Johnston, 2013) that also contribute to the e-Portfolio learning experience. The Heutagogy and Connectivism theory provide a guideline to outline the features that need to be put into practice in order to provide an occupied e-Portfolio application

in studio-based learning.

Through the use e-Portfolio, these two theories are brought together as the guideline to design, implement and evaluate the use of e-Portfolio as a learning and teaching tool in higher education institutions. The influences of these two theories will be explained in the following contents.

6.1 Influences of Heutagogy Approach in Studio-Based Learning e-Portfolio

Heutagogy is a form of self-determined learning that consists of practices and principles rooted in learning approach that received limited attention even after a decade of its establishment. In a heutagogical approach, learners are highly self-directed and self-determined and the emphasis is placed on the development of one's capacity and capability with the goal of producing learners who are well-prepared for the complexities of today's workplace (Radhika Kapur, 2018). In the Heutagogy approach, the learner will set the learning course, design and develop the map of learning, from curriculum to assessment (Hase, 2009).

Heutagogy is an approach founded in Andragogy and can be considered as an expansion of the existing concept. Therefore, the e-Portfolio design and framework supports a Heutagogical approach by allowing learners to direct and determine their learning path and by enabling them to take an active role rather than a passive role in their learning experiences. Thus, this approach has been proposed as a theory to emerge with the application of e-Portfolio in studio-based learning.

6.2 Influences of Connectivism Theory in Studio-Based Learning e-Portfolio

George Siemens, the founder of Connectivism theory said that Connectivism pave the way for a new model of learning, adequate to knowledge society, in which "learning is a process of connecting specialized nodes or information sources, Siemens, 2004, Principles of Connectivism in (Bell, 2011). Connectivism is a theoretical framework of learning in the digital age where it uses internet technologies

such as web browsers, search engines, wikis, online discussion forums, and social networks contributed to new ways of learning. A connectivist understanding of the educational system in the future is explored and shown by Siemens, Downes and Cormier when they constructed the first massive open online course (MOOC), partly to explain and model a Connectivist approach to learning (Herlo, 2018) which is something that is quite similar to e-Portfolio. Downes has studied connective knowledge that he characterizes it as an interactive knowledge of a connection within a network (Downes, 2005). From this, Constructivists believe that knowledge occurs as a fusion of internal mental models and observation and reflection on external experiences, thus merging the tenets of Behaviorist and Cognitivist perspectives (Christian Hartmann, Jennifer Charlotte Angersbach & Nikol Rumme, 2015)

In this article, the current and future directions of the education and training environment and the theories of distributed knowledge and Connectivism were well matched to provide a platform for adapting teaching/training and learning to meet the needs and demands of the 21st-century world of growing information complexity. Therefore, Constructivism suits the use of e-Portfolio in studio-based learning as a viable theory for 21st-century learning, while exploring its main critiques and criticisms. E-Portfolio reflects and represents many Connectivist principles from the learning design, deployment, and delivery.

CONCLUSION

This article intends to improve the assessment criteria for studio design project by developing e-Portfolios as an assessment tool in studios. The current teaching method that is being used in the studio will be enhanced through a new guideline to support students' learning in studio-based practice and to facilitate the continuous assessment format. The studio-based learners might not fully understand the significance of e-Portfolios in the beginning of the journey of their higher education learning, but they will surely learn the importance of it as they build their work collection via e-Portfolios throughout their learning process. For educators, the e-Portfolios promises

a new environment with tools to demonstrate and assess students learning. Thus, it helps to map teaching and learning outcomes that are in line with the principles of learning established by each institution. It also facilitates educators to help graduates produce work are in line with the assessment criteria in order to produce better outcomes of their work.

Chanpet & Chomsuwan (2012) defined that a portfolio is a storage mechanism for a student's work with clear criterias for performance which are evidences of students' effort, progress or achievement. Authentic assessment does not only provide true and rich information for reflecting and assessing the true performance and achievement of learners, but it also helps engage students in meaningful learning. Through the application of the Heutagogy and Connectivism approach in designing and developing e-Portfolios, both learners and educators would learn to take advantage of the digital society to produce better work outcomes. This article aims to implement e-Portfolio in studio-based learning through appropriate process of assessments for students' learning as it helps record, display, search and analyse the process of students' learning.

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Content Presentation Techniques for Learning Experience Enhancement in Massive Open Online Course (MOOC)

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Abstract: MOOCs (Massive Open Online Courses) are a new and innovative technique of disseminating knowledge to millions of people all over the world. Despite being a fantastic learning tool with a global reach, MOOCs have their own set of restrictions, resulting in an extraordinarily low course completion rate. Personalization and engagement are lacking in traditional material presentation strategies. Hence, MOOCs must adopt advanced learning approaches in order to create a more engaging experience for the learners. This study introduces Augmented MOOC (A-MOOC), an enriched learning MOOC environment. A-MOOC explores Active Learning, Augmented Reality, and Gamification techiques, and show how these strategies can be combined with MOOC content in both online and offline modes. It demonstrates the favourable influence of creating interactive and more engaging content in the current learning setting to increase learners' motivation to complete a MOOC.

Keywords: MOOC, Active Learning, Augmented Reality, Gamification, Learning Techniques, Self-Instructional Materials

INTRODUCTION

Massive Open Online Courses (MOOCs) are online courses delivered through platforms that aim to provide a variety of pedagogical content to a wide range of audiences. MOOC's inception and expansion have altered the traditional model of knowledge delivery in formal education. MOOCs provide an environment that allow lifelong learners to gain unrestricted access to the current information they require for professional and personal development.

There have been numerous MOOC platforms established to date. Coursera, edX, and Udacity are the three forerunners, followed by a slew of others from around the world. According to Class Central, there are 16,300 courses offered worldwide by various platforms in 2020, with 180,000,000 online enrolled learners. The figure indicates that many institutions have put significant effort into MOOC development, advertising, and course delivery. However, there are still unanswered questions about MOOCs and their efficacy.

Accreditation and certification of learners, a high dropout rate, learning quality assessment, personalization and individual teaching support, learner performance assessment, long-term administration and oversight, and ethical and privacy considerations for learner data are only a few of them (Chauhan et al., 2015). One of the most concerning features of all of these issues is the extremely low rate of course completion (Feng et al., 2019). On average, only ten percent of learners complete the MOOCs they signed up (Khalil et al., 2018). Low motivation is one of the factors that has been recognised as a contributing factor to the situation (Ejreaw & Drus, 2017). As a result, more engagement tactics are required to motivate a learner to stick with a course from start to finish. When learners are more motivated to learn, they are more likely to engage in learning and complete a MOOC (Tang & Chaw, 2019).

This paper focuses on enhancing MOOC content presentation techniqoes in order to improve MOOC quality. Active Learning, Augmented Reality, and Gamification are the three techniques that were investigated. These techniques have been used in a variety of learning models and have had a significant impact on the learning experience of learners. Active Learning promotes the idea of encouraging learners to interact and become more engaged. Augmented Reality allows people to interact with both real and virtual objects and enhances their ability to grasp and digest information through improved visualisation of the topic, which keeps learners engaged during the learning process. By incorporating exciting game features and aesthetics into the learning environment, Gamification ensures that learners are encouraged to complete the assignment. This paper also emphasised the Augmented MOOC (A-MOOC) concept, which shows how these three techniques can be used in MOOCs in online and offline modes.

The following is a breakdown of the paper's structure. The techniques of Active Learning, Augmented Reality, and Gamification in MOOCs are briefly discussed in Section 2. Section 3 represents the structure and implementation of A-MOOC and explains how these techniques can be used to improve MOOCs. The conclusion is found in Section 4.

CONTENT PRESENTATION TECHNIQUES

This section will go over the three content presentation techniques discussed in detail. The techniques are Active Learning, Augmented Reality, and Gamification. Aside from that, the concept of Self-Instructional Materials in MOOCs was also explored.

2.1 Active Learning in Massive Open Online Course (MOOC)

Engagement is promoted when active learning is emphasized and supported. Bonwell and Eison (1991) define active learning as any task or activity that involves learners in doing things and thinking about the things they are doing. It is a process whereby learners engage in learning activities that promote application, analysis, synthesis, and evaluation of new knowledge of course contents (Prince, 2004).

Instructors can use a variety of instructional strategies to encourage active learning in MOOCs. Group discussions, problem solving, case studies, reflective scientific writing, and self-assessment are some of the strategies that can be used to actively engage learners in the learning process. Instructors can use digital affordances to drive students to engage in critical thinking and meaningful learning, increase retention and transfer of new material, and improve interpersonal skills by employing these tactics.

A study from Aji et al. (2019) found an improvement in student academic performance as an effect of the implementation of active learning methods. Fernanda Bonafini (2017) investigated the prospects for active learning in MOOCs geared for effective statistics teacher professional development. The findings revealed that active learning allows learners to interact with one another on MOOC content,

exchange their experiences with learning content and teaching technique, and reflect on their practise.

2.2 Augmented Reality in Massive Open Online Course (MOOC)

Augmented Reality (AR) refers to a concept in which the real world is enhanced by combining it with the virtual world. To improve the user's experience, real-world static items are dynamically transformed with context-sensitive virtual information like as video, music, or a visual overlay (Chuhan et al., 2015). AR's most commonly mentioned benefits included increasing learners' motivation, comprehension, and involvement, as well as lowering their cognitive burden.

MOOCs use conventional instruction delivery such as recorded videos, lecture slides, discussion boards, and web-based collaborative tools. These systems facilitate fundamental collaboration among students. However, student involvement with other students and course participation are poor. Immersive environments produced using augmented reality can foster collaboration by creating a shared place for learners, resulting in a more engaging learning experience (Chuhan et al., 2015).

A pilot study at Georgia Tech used Augmented Panorama technology to teach structural reading to participants in a MOOC course. Panoramas give a natural and intuitive experience that simulates the real world for consumers who are interested in certain areas and information (Gheisari et al., 2015). Fauzi et al. (2018) proposed The Augmented Biodiversity Lab, which aimed to combine entertainment and learning by providing learners in the Biodiversity MOOC with an immersive learning experience. Several Augment Reality applications were used to enable learners to explore and discover the intricate anatomical details of selected fauna and flora through the Augmented Biodiversity Lab.

2.3 Gamification in Massive Open Online Course (MOOC)

Gamification is defined as the use of game features in non-traditionally recreational contexts in order to make an impact and solve problems. Points, badges, and leaderboards are common gamification features in education, but rewards, acknowledgements, levels, and feedback are also common (Rughini et al., 2019).

The factors of gamified designs in this educational modality increased social engagement by providing fun, interactive, and significant experiences for participants, resulting in more unique visitors per day and longer average connection time in activities, according to Zichermann and Cunningham (2011). Rughiniş (2013), who describes how gamification improves productive engagement for specific types of participants in e-learning environments, shares this viewpoint. Chang and Wei (2016), on the other hand, identified 40 gamification mechanics typologies in MOOCs from Coursera, Udacity, and edX, demonstrating that their cross-course inclusion in course activities and challenges boosted student immersion and commitment to gamified content. Through an A/B testing planned task, Vaibhav and Gupta (2014) investigated the use of gamification in a MOOC. In terms of the number of quizzes submitted, the researchers discovered that the gamified quiz attracted a bigger number of learners than those without gamification. In addition, they discovered that the quiz success rate was greater for the cohort who received gamification support, resulting in a modest increase in retention when compared to the control group. Table 1.0 summarises the three learning techniques by providing examples, benefits, and drawbacks for each.

Table 1: Summary of Learning Techniques

Technique	Examples	Advantages	Disadvantages
Active Learning	• Simulations • Research • Creative projects • Case studies • Problem-solving activities	• Provides the context that helps learners recognize the relevance of the learning • Promotes better retention of learning • Deepens understanding and enhances learners' ability to transfer knowledge to "real-life" situations • Engages the learner more, and is thus usually more enjoyable • May address a greater variety of learning styles	• Often require more time for the instructor to prepare well • Less efficient than didactic learning for presenting foundational knowledge • May be frustrating for learners who are not prepared to participate
Augmented Reality (AR)	• Simulations to explore specific sites • Remote virtual laboratories • View scientific phenomena • 3D object creation	• Promotes collaborative learning • Increases proximity to virtual objects • Enables visualizing the unviewable processes • Promotes pervasive learning • Friendly for all age groups • Helps visually impaired learners by augmenting virtual audio objects	• Design, implementation, and integration of AR with learning systems is challenging • Requires more time & effort • Needs technical expertise with domain specific knowledge.
Gamification	• Points • Leaderboards • Badges • Levels • Stories • Goals • Feedback • Rewards • Progress • Challenges	• Develops problem solving skills • Strengthens critical thinking • Builds team working skills. • Makes routine work interesting • Enhances learner experiences • Spur learner motivation	• Categorizing appropriate gaming elements for specific audience is difficult • User dissatisfaction arises if unsuitable game tactics or approaches are used • Demands training of instructors to integrate games meaningfully into their total learning activities.

AUGMENTED MASSIVE OPEN ONLINE COURSE (A-MOOC)

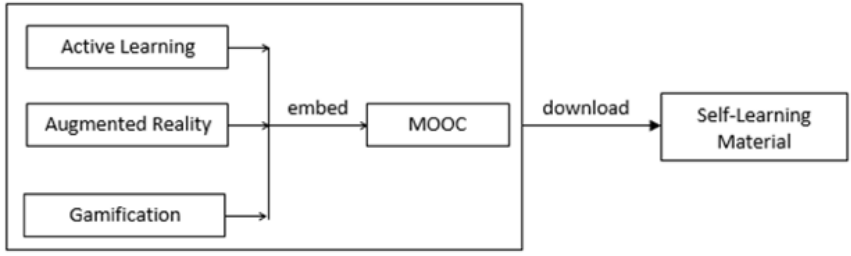
Augmented Massive Open Online Course (A-MOOC) is an enriched MOOC learning environment. It is a concept that investigates the adoption of three different learning techniques in MOOCs. In this study, the term “augmented” refers to the use of several types of learning strategies to

improve the MOOC learning experience by enhancing learner engagement and motivation. A-MOOC, on the other hand, demonstrates how MOOCs may be used both online and offline modes. The structure of A-MOOC is depicted in Figure 1

3.1 A-MOOC Structure

The MOOC's entire content design was infused with Active Learning, Augmented Reality, and Gamification approaches. The additional features of A-MOOC include the ability to download and print all of the MOOC's learning activities. This would allow learners to continue their MOOC learning activities even when they are not connected to the internet.

Figure 1 : A-MOOC Structure



The remaining sections will explain how these techniques were implemented.

3.2 Active Learning in A-MOOC

Learner involvement and engagement in the learning process are essential components of active learning (Prince, 2004). Different types of learning activities are available in MOOCs. The essential task is to grasp the concept of the course being delivered. The learning movies, which were made using video design-related methodologies, cover all of the major concepts. Using "bite-size" movies that cover the major concepts or learning objectives is one of the ways. Learners can better follow the presentation of materials by employing optional subtitles on video. To avoid an online stall or crash, learning videos can also

be downloaded. Learners will be able to adjust the speed of the video presentations. Additionally, slides or notes summarising the major concepts taught are provided to aid learners throughout their learning process.

A-MOOC also includes activities that require students to put what they have learned into practice. For instance, MindMapping, Fun Activities, and Case Studies are just a few examples. The learners will gain a better understanding of the course as a result of the ongoing exercises. A-MOOC, on the other hand, uses computer-graded quizzes that delivers instant response. Quizzes that work don't just assess recall. Unlike some other MOOCs, A-MOOC focused on the following cognitive processes: understanding, analysing, applying, and evaluating. These activities and quizzes are designed to help students review course material.

3.3 Augmented Reality in A-MOOC

The learning environment is being transformed by augmented reality (AR), which augments the learner's real environment with virtual information. When scanned with AR equipped devices, the overlaid information is hidden beneath the cues, bringing the static environment to life and providing a better learning experience for learners. Adding links to photographs, videos, or text to an image of a real thing on a computer or smartphone screen is known as augmented reality. There are several ways to activate the augmented reality connection, but the simplest and most common is to utilise a QR (Quick Response) code.

Quick Response (QR) and 3DQR codes are used in the A-MOOC. 3DQR code (https://3dqr.de/) is a programme designed specifically to view AR using a QR code. The augmented reality learning videos are linked to the 3DQR code, which the learner can scan to watch the videos in AR and 3D perspective. MOOC students can use mobile devices and wearables to immerse themselves in the world of augmented reality. The remainder of the learning activities, on the other hand, are linked to the QR code. This strategy will present learners with a more immersive learning environment, as well as more fun, and hence better engagement.

3.4 Gamification in A-MOOC

The learning process can be gamified to help encourage and engage students. Ranking, course progress, levels, and certification are just a few of the gamification features that can be beneficial. The problem in embedding gamification in MOOCs is to use the proper gamification components in the most effective way. The Gamification aspects were used in a variety of ways by A-MOOC.

In A-MOOC, learners are ranked for each quiz and for the entire course. Every learner's progress and status is displayed in a progress bar, where they may view the activities they have completed and those that are still pending action. Instead of having a long content with no intermediary goals, levels break down the course content into smaller chunks. Each level must be finished before moving on to the next. Levels usually begin with simple information and activities and progress to increasingly harder tasks when each level is completed successfully. Learners will get a sense of success after completing each level. They will be more motivated to learn. Once a learner has completed the course, they will be given a Certificate of Completion.

3.5 Self-Instructional Materials in A-MOOC

Self-instructional materials (SIM) are defined as "any learning resources that may be used by a student without the physical presence of a teacher". The definition is published in a World Health Organization report titled "Availability and utilisation of self-learning materials in continuing education". By delivering learning experiences similar to the classroom-based teaching-learning process, self-instructional material performed the functions of an effective classroom teacher. As a result, the invisible instructor embedded in the learning materials assists students in their studies in the same way that a classroom teacher does in face-to-face classes.

Course notes and self-instructed learning activities make up the SIM. Learners can complete all of the MOOC learning activities offline rather than doing them online. When there is no online connection, learners can use A-MOOC SLM. The learner will only need an internet

connection if they want to complete all of the activities in the MOOC. A-MOOC gives learners the freedom to learn at their own pace, whenever, whereever, and however they want.

CONCLUSION

The utilisation of Active Learning, Augmented Reality, and Gamification creates a favorable learning environment for students by keeping them engaged throughout the learning process. These strategies emphasise stimulating participant involvement, facilitating interaction between actual and virtual items to improve content visualisation, and incorporating enjoyable features and aesthetics into the learning environment. The study combines these techniques with MOOC content to create an enriched learning environment which is known as Augmented MOOC (A-MOOC). A-MOOC demonstrates how these strategies were combined in both an online and offline mode. The goal of this combination is to increase learner engagement, which will eventually drive them to complete the course.

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Educators' Needs And Perceived Readiness For Teaching In A Pandemic Emergency

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Abstract: The Covid-19 outbreak has forced teachers in Malaysia to abruptly shift from face-to-face teaching to online teaching. To teach online and to ensure lesson learning outcomes were met, it is vital for the teachers to be prepared with online teaching competencies. Due to this scenario, the objectives of this study are: (1) To investigate teacher's readiness in online teaching based on their online teaching competencies, (2) To identify demographic factors that are related to teacher readiness in online teaching, and (3) To determine what are the teachers' needs for them to be ready with online teaching competencies. There are 4 dimensions of online teaching competencies which are (1) Instructional Design, (2) Communication, (3) Time Management, (4) Technology Proficiency. The demographic factors that were identified in this research are (1) Gender, (2) Academic Rank, (3) Education Level, (4) Years of Teaching. This research used a quantitative approach involving a sample of 226 primary school academics in the district of Kuala Selangor, Selangor where they were asked to complete a questionnaire. The findings revealed that teachers have a high level of readiness in online teaching resulting in a mean value of (mean=3.67). However, it was also found that despite their high level of online teaching readiness, the teachers feel that they could achieve better outcomes if they have gone through techno-pedagogy related trainings, and if they are provided with better internet connectivity.

Keywords: Online teaching competencies, Online teaching readiness

INTRODUCTION

The immergence of the Covid-19 pandemic and the closure of schools in March 2020 nationwide caused major disruptions to the educational experience of all students (Leonard, 2020). In the period of movement restrictions were implemented due to Covid-19, online teaching and learning is no longer an option but a necessity (The Malaysian Insight, 2020). This caused a shift in the mode of education and resulted in an extraordinary rise of online teaching and learning as the teaching and learning activities were conducted in distance via digital platforms. Many believed that the unplanned and rapid move to online learning – with no training, insufficient bandwidth, and little preparation – will result in a poor learning experience that is unconducive to sustained growth (Cathy, 2020).

Online teaching is quite different as compared to teaching in a physical classroom. Not all teachers, parents and schools are prepared for online teaching and learning (Bangkok Post, 2021). In a survey conducted by Class Tag Cooperation (2020), early education teachers are not ready to teach online. More than half of the teachers (56.7%) said that they were not prepared to deliver online lessons. Furthermore, the survey also shown that (42.8%) of the teachers said they are solely responsible for deciding on the selection of online tools to be used and they do not have access to the proper tools needed at that moment (Zura, 2020) which results in a bleak picture (Newton, 2020).

Even though the conduct of online classes is much required, most students and teachers think that online teaching and learning are not as effective when compared to face-to-face instruction. Students and parents believe that many educators lack in competencies, preparation and the tools required to make online learning a success (Arumugam, 2020). Teachers in Malaysia are still having a lack of competencies in advanced ICT skills including the graphics, animation, and multimedia production (Irfan Naufal Umar, 2014). However, teacher-made videos could be a good method to assist all students, especially the 1 in 5 students who learn and think differently. When teachers make their own videos, they can customize the instruction to the needs of their students. Teachers can also bring personal connection to the online learning environment (Vierstra, 2020). Hence, it is important for teachers to have online teaching competencies for effective learning to

take place.

According to Irfan Naufal (2014) male teachers use ICT in the classroom more frequently than their female colleagues. It may be due to the reason that female teachers are struggling to conduct online teaching or that they are not familiar with online teaching competencies. It was also reported that older teachers continue to struggle with online teaching tools as their schools have not organized any training sessions to help them make a seamless transition from physical to online classes (Magzter, 2020). Hence, it raises the question whether demographic backgrounds could influence teacher readiness in online teaching. If so, which group will need more support for them to be ready with online teaching competencies?

Not much research has been done locally to study the teachers' needs to be equipped with online teaching competencies. Experts states that teachers should receive several days, weeks or better, months of intensive training before beginning an online learning program. The training offered to teachers should include strategies to make the instruction engaging and ample time should be given to the teachers to practice using the technologies before going live (Adams, 2020). Hence, it is a need to identify the teachers' needs and the type of support required for them to be ready in online teaching so that teachers could conduct online teaching effectively.

RESEARCH QUESTIONS

The research is conducted to answer following questions:

1) What are the teacher's readiness in online teaching based on their online teaching competencies?
2) What are demographic factors that are related to teacher readiness in online teaching?
3) What are the teachers' needs for them to be ready with online teaching competencies?

RESEARCH DESIGN

This research used a quantitative design to answer the research questions and a questionnaire is adapted from the study conducted by Florence (2019) to collect data from the sample. The items in the questionnaire were modified from its original higher education context to the primary school context so that it is in accordance with the purpose of the study. The questionnaire consists of 3 sections which are section A, B and C. The first section of the questionnaire (section A) serves to answer the first research question which regards to demographic background of the respondents. Respondents were required to answer a total of 4 demographics background questions which includes Gender, Academic Rank, Education Level and Years of Teaching. The second section of the questionnaire (section B) serves to answer the second research question which regards to teachers' online teaching competencies. The questionnaire adapted a Likert scale which consists of a 5 points scale, 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree) and 5 (strongly agree). There are a total of 20 items in the questionnaire to assess teacher readiness in online teaching based on online teaching competencies. The items in the instrument are arranged into 4 categories of online teaching competencies: Instructional Design (5 items), Communication (5 items), Time Management (5 items) and Technology Proficiency (5 items). The third section of the questionnaire (section C) serves to answer the third research question which regards to teachers' needs. This section consists of two open-ended questions to determine the teachers' needs to be ready with online teaching competencies. A pilot test was conducted to ensure the validity and reliability of the findings. The language of the questionnaire is in 'Bahasa Melayu' as the population in this research are able to comprehend 'Bahasa Melayu' better as it is their first language. This was also taken as a pre-cautionary step to avoid threatening data validity.

3.1 Sampling

Sampling technique that used for the research was a simple random sampling procedure. This study was directed to the group of interest which are primary school teachers. The population of this research are 550 primary school teachers from the district of Kuala Selangor. The research sample is a subset of the population mentioned previously. The sample size was determined based on the size of the population,

degree of error the tolerance as well as by referring to Krejcie and Morgan's sample size determination table to control type I error. Based on the table, it is recommended that if the population is (N) 550, then the number of sample (n) should be around 226. Hence, out of 550 teachers in the population, 226 teachers were chosen randomly as the subjects and were asked to answer the questionnaire.

3.2 Demographic Data

Table 3. Respondents' Demographic Data

		Frequency	Percent (%)
1.	**Respondents' Gender**		
	Male	57	25.2
	Female	169	74.8
	Total	**226**	**100.0**
2.	**Respondents' Academic Rank**		
	Headmaster	15	6.60
	Senior Assistant	25	11.10
	Head of Panel	23	10.20
	Academic Teacher	163	72.10
	Total	**226**	**100.0**
3.	**Respondents' Education Level**		
	Diploma	29	12.80
	Bachelor	185	81.90
	Master	12	5.30
	Total	**226**	**100.00**
4.	**Respondents' Years of Teaching**		
	0-2 Years	4	1.80
	3-5 Years	7	3.10
	6-8 Years	12	5.30
	9-11 Years	25	11.10
	12-14 Years	31	13.70
	15-17 Years	24	10.60
	18-20 Years	21	9.30
	More than 20 Years	102	45.10
	Total	**226**	**100.00**

The demographic factors of respondents were entailed composition by Gender, Academic Rank, Education Level and Years of Teaching. Based on Table 3, the gender of the respondents are mostly females as there were a total of 57 (25.20 %) male respondents and 169 (74.80%) are females in the sample.

In terms of Academic Rank, 15 (6.60%) respondents hold of the position as the Headmaster, 25 respondents (11.10%) hold the post

as Senior Assistant, 23 (10.20%) and majority of the respondents are Academic Teachers 163 (72.10%).

In terms of Educational Level, 29 respondents (12.80%) are Diploma holders, 185 respondents (81.90%) are Bachelor holders while another 12 respondents (5.30%) are Master holders.

In terms of Years of Teaching, 4 respondents (1.80%) have 0-2 years of teaching experience. 7 respondents (3.10%) have 3-5 years of teaching experience, 12 respondents (5.30%) have 6-8 years of teaching experience, 25 respondents (11.10%) have 9-11 years of teaching experience, 31 respondents (13.70%) have 12-14 years of teaching experience, 24 respondents (10.60%) have 15-17 years of teaching experience and 21 respondents (9.30%) have 18-20 years of teaching experience. The highest frequency is more than 20 years of teaching with 102 respondents (45.10%).

RESULTS AND DISCUSSION

4.1 Teachers' Readiness in Online Teaching Based on Their Online Teaching Competencies

Table 4. Descriptive for Teacher Readiness

	N	Mean	Std. Deviation
Instructional Design			
I can create instructional videos. (e.g. Video tutorials, demonstrations, teaching)	226	3.34	.97
I can run online quizzes using different platforms. (e.g. Quizizz, Google Form, Kahoot)	226	3.75	.93
I can design learning activities that increase students' chances of interacting. (eg: Discussions, forums, Questions and answers)	226	3.35	.97
I can use a variety of online teaching techniques. (e.g. Discussions, video reflections, online games)	226	3.43	.97
I can design measurable learning objectives.	226	3.55	.87
Total	**226**	**3.49**	**.79**
Communication			
I can send announcements / reminders to students.	226	4.04	.68
I can respond to student questions immediately.	226	3.75	.81
I can provide feedback on students' work.	226	3.96	.71
I can conduct discussion sessions with the students.	226	3.53	.82
I can use a synchronous web conferencing tool. (e.g. Google Meet, Webex, Skype)	226	3.45	.90
Total	**226**	**3.75**	**.62**
Time Management			
I can schedule weekly hours for online teaching.	226	4.04	.658
I can schedule weekly hours to evaluate student work.	226	3.89	.691
I can allocate time to learn about new teaching strategies.	226	3.80	.706
I can use an online platform to facilitate grading student work. (e.g. Google Classroom, Quizizz, Google Form)	226	3.87	.770
I can conduct classes according to pre-determined time table	226	3.98	.680
Total	**226**	**3.92**	**.59**
Technology Efficiency			
I can perform basic computer operations. (e.g. editing documents, managing files and folders)	226	3.73	.93
I can use video editing software. (Movie Maker, Movavi, Filmora)	226	3.23	.97
I can use online collaboration tools. (e.g. Google Drive, Dropbox)	226	3.59	.916
I can share open educational resources. (e.g. Learning websites, Web resources, games and simulations)	226	3.46	.89
I use learning management system. (e.g. Google Classroom, Edmodo, VLE Frog)	226	3.64	.83
Total	**226**	**3.53**	**.76**
Total Overall (Readiness)	**226**	**3.67**	**.58**

The descriptive analysis shown in Table 4 shows that the highest mean score (mean=3.75, SD=.93) for the item in instructional design is "I can run online quizzes using different platforms (e.g. Quizizz, Google

Form, Kahoot)". Meanwhile, the item with the lowest mean score is "I can create instructional videos. (e.g. Video tutorials, demonstrations, teaching)" (mean=3.34, SD=.97). The overall total mean score for all the items in instructional design is (mean=3.49, SD=7.9). This shows that the teachers are ready with instructional design online teaching competencies. According to Florence (2019), designing learning activities and creating online course orientation were competencies that the respondents rated as very important in online course design. From the findings, it also revealed that most of the teachers can use different platforms to run online quizzes since the mean score was the highest. The integration of quizzes with other instructional activities in a teaching strategy has been very favourable (Lorenzo, 2012). However, the data above also indicates that most teachers do not have the ability to create instructional videos. This needs to be improved as instructional video is often the main information-delivery mechanism for online courses (Brame, 2016).

Next, for items in the Communication dimension, the item with the highest mean score is "I can send announcements / reminders to students" (mean=4.04, SD=.658) while the item with the lowest mean score is "I can use synchronous web conferencing tools. (e.g. Google Meet, Webex, Skype)" (mean=3.45, SD= .90). The total mean score for all items in communication is (mean=3.75, SD=.62). As the communication dimension has a high mean value, it indicates that most teachers can communicate well with their students via online teaching. The findings also revealed that most teachers agreed that they were able to send announcements/ reminders to students as it has the highest mean value. This finding is coherent to a study conducted by Florence (2019) where the respondents rated that they were able to communicate well with their students via emails and other communication tools. However, there is a variation on agreement on teachers' usage on synchronous web conferencing tools. Results in Table 4 also shows that not many teachers claimed that they are well-versed with synchronous web conferencing tools. This finding is quite alarming because synchronous meetings with the teacher will motivate learning to take place and create a meaningful learning experience for the students (Karal, 2011).

The item that scored the highest mean score for the Time Management dimension is "I can schedule weekly hours for online teaching" (mean=4.04, SD=.65). Meanwhile, the item that scored the lowest mean score was "I can allocate time to learn about new teaching strategies" (mean=3.80, SD=.70). The total mean score is (mean=3.92, SD=.59). Time management was rated as the highest mean value among all 4 variables. It shows that most teachers can manage their time well in online teaching. The results contradict to a report by Seller (2020) which states that one of the biggest issues that impacts online teachers is poor time management as the findings above indicate that most teachers had no problem in scheduling weekly hours for online teaching which resulted a lower mean score for the item "to allocate time to learn about new teaching strategies". As teachers are able to identify the different available learning methods, it will enable them to develop the right strategies to deal with their target group (Armstrong, 2020).

For the items in Technology Proficiency dimension, the item that scored the highest mean score is "I can perform basic computer operations. (e.g. editing documents, managing files and folders)" (mean=3.73, SD=.93). In contrast, the item with lowest mean score "I can use video editing software. (Movie Maker, Movavi, Filmora)" (mean=3.23, SD=.97). The total mean score for all items in technology proficiency scale is (mean=3.53, SD=.76). The findings reveal that technology proficiency has a high mean value which indicate that most teachers have good technology proficiency. However, technology proficiency also has the lowest mean value which indicate teachers in the population have issues in technology proficiency. Similar to a research done by Abu-Obaideh Alazzam (2012), , the findings of the study shows that a vast majority of the technical and vocational teachers involved in this study possess a moderate level of knowledge about ICT. The findings also revealed that most teachers know how to do basic computer operations but do not know much to on how to use video editing software. A study by Nwangwu (2013) revealed that computer education lecturers do not possess video editing and production skills required to edit and produce instructional videos.

In conclusion, based on the total mean score of each variable, the highest total mean score was from time management scale with a mean score of (mean=3.92, SD=.59). Meanwhile the lowest total mean score was instructional design with a mean score of (mean=3.49, SD=.79). The overall for all total mean score that indicated the teachers' readiness in online teaching was (mean=3.67, SD=.58). This can be interpreted that the readiness of teachers in online teaching based on online teaching competencies was high and most teachers are ready in online teaching with their online teaching competencies.

4.2 Demographic factors that related to teacher readiness in online teaching

The second research objective is to identify the demographic factors that related to teacher readiness in online teaching. The demographic factors used in this research are Gender, rank, education level, and years of teaching.

4.2.1 Gender

Table 4.1 Gender Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Readiness	Male	57	3.59	.72	.09
	Female	169	3.69	.53	.04

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	2.24	.13	-1.15	224	.25	-.10	.08	-.28	.07
Equal variances not assumed			-.99	77.69	.32	-.10	.10	-.31	.10

Firstly, to identify whether gender which is male and female teachers related to teacher readiness in online teaching, independent samples t-test was conducted, and the results are shown in Table 4.1 It was

found that t value = -1.15, df = 224, sig. = .25. The results indicate that there is no significant difference in the readiness in online teaching between gender. In other words, male and female teachers have similar level of readiness in online teaching. Contradicting a research by Florence (2019), that stated female attitudes were significantly higher than male attitudes about the importance of course design, course communication, and time management. Although there is no significant difference between male and female groups, the mean value for the female group is slightly higher than the male group.

4.2.2 Academic Rank

Table 4.2 Academic Rank Group Statistics

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Headmaster	15	3.72	.41	.10	3.49	3.95	2.95	4.55
Senior	25	3.57	.66	.13	3.29	3.84	1.90	4.70
Assistant	23	3.68	.40	.08	3.51	3.86	2.85	4.65
Head of Panel	163	3.67	.61	.04	3.58	3.77	1.00	5.00
Academic	226	3.66	.58	.03	3.59	3.74	1.00	5.00

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.29	3	.10	.28	.83
Within Groups	77.44	222	.34		
Total	77.74	225			

To identify whether Academic Rank is related to teacher readiness in online teaching, teachers were grouped into 4 groups based on their current rank which are headmaster, senior assistant, head of panel, and academic teacher. ANOVA was conducted and the results are shown in table 4.2. It could be seen that F value = .28, df = 3, 222, sig. = .83. The results indicate that there was no significant difference in the readiness in online teaching between rank. In other words, regardless of their rank, they have the same level of readiness in online teaching. This finding contradicted with a study done by Martin (2019) which claimed that academic rank influences a teacher's readiness to teach online where lecturers rated course design and technical competency to be more important when compared to individuals whose academic rank is professor. This study however, found that individuals who

are of higher academic rank in this study e.g., the headmaster, have the highest readiness mean score when compared to teachers in other academic ranks. Due to the scarcity of research done in looking at the correlation between online readiness and academic ranks, there is not much comparison that can further be done by drawing from examples of previous studies.

4.2.3 Education Level

Table 4.3 Education Level Group Statistics

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Diploma	29	3.57	.45	.08	3.39	3.74	2.25	4.70
Bachelor	185	3.68	.59	.04	3.60	3.77	1.00	5.00
Master	12	3.61	.79	.22	3.11	4.11	1.40	4.50
Total	226	3.66	.58	.03	3.59	3.74	1.00	5.00

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.38	2	.19	.55	.57
Within Groups	77.36	223	.34		
Total	77.74	225			

To identify whether Education Level is related to teacher readiness in online teaching, teachers were grouped into 3 groups based on their education level which are Diploma, Bachelor, and Master. ANOVA was conducted and the result is shown in table 4.3. It could be seen that F value = .55, df = 2, 223, sig. = .57. This result indicates that there was no significant difference in the readiness in online teaching between education levels. In other words, regardless of education level they have the same level of readiness in online teaching. This contradicts with the research results of Lau & Sim (2008) as the researchers reported that the level of teachers' academic qualification does affect the level of ICT adoption. Education level determines the professional training received by teachers. Higher education level indicates the teachers received more professional training.

4.2.4 Years of teaching

Table 4.4 Years of teaching Group Statistics

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
0-2 Years	4	4.17	.45	.22	3.45	4.89	3.85	4.85
3-5 Years	7	3.96	.56	.21	3.44	4.48	3.15	4.65
6-8 Years	12	3.77	.65	.18	3.35	4.18	2.15	4.70
9-11 Years	25	3.70	.74	.14	3.39	4.01	1.00	4.90
12-14 Years	31	3.67	.73	.13	3.40	3.94	1.00	5.00
15-17 Years	24	3.69	.63	.12	3.42	3.96	1.40	4.70
18-20 Years	21	3.80	.47	.10	3.58	4.01	2.85	4.60
More than 20 Years	102	3.57	.49	.048	3.47	3.67	1.90	4.55
Total	226	3.66	.58	.03	3.59	3.74	1.00	5.00

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.07	7	.44	1.28	.25
Within Groups	74.66	218	.34		
Total	77.74	225			

To identify whether years of teaching is related to teacher readiness in online teaching, the teachers were grouped into 7 groups based on their years of teaching. ANOVA was conducted and the result are tabulated into a table (table 4.4). It could be seen that F value = 1.28, df = 7, 218, sig. = .25. This result indicates that there is no significant difference in the readiness in online teaching between years of teaching. In other words, regardless of the years of teaching, the teachers have the same level of readiness in online teaching. According to Florence (2019) found that the respondents who have more teaching experience online also have greater perceived ability to perform pedagogical competencies online. In this research, teachers who have 0-2 years and 3-5 years of teaching experience groups are among the highest mean value for readiness in online teaching. It means that younger teachers have a better readiness in online teaching and are more equipped with online teaching competencies. A report by Irish Computer Society (2019) also reported that there is a big disparity in how much newly qualified and younger teachers are using ICT, compared to those over 35 years old.

4.3 Teachers' need for them to be ready with online teaching competencies

4.3.1 Types of reinforcement training that teachers need to be better prepared with the implementation of online teaching

Table 4.5 Thematic Analysis for Types of reinforcement training that teachers need to be better prepared with the implementation of online teaching

Theme	Online teaching Competencies	Frequency
Learning materials and ways of conducting online teaching.	Instructional design	31
Module and worksheet for online teaching	Instructional design	13
Synchronous video communication training	Communication	7
Online communication skills	Communication	3
ICT and IT skills training	Technology Proficiency	49
Video making and editing	Technology Proficiency	20
Website management	Technology Proficiency	3
Online learning Application training	Technology Proficiency	20
Google Classroom management	Technology Proficiency	4
Online quizzes application skills	Technology Proficiency	37

Table 4.5 shows the thematic analysis of the first open-ended question of the questionnaire which is "What are the types of reinforcement trainings do teachers need to be better prepared with the implementation of online teaching?" Out of 226 respondents, 197 respondents gave valid responses while 29 respondents gave invalid responses. The responses of the respondents were then grouped according to the theme and the online teaching competencies such as Instructional Design, Communication, Time Management, Technology Proficiency. However, none of the responses were related to Time Management.

Technology Proficiency has the highest frequency of (n=133). The themes identified under technology proficiency are "ICT and IT Skills Training", "Video Making and Editing", "Website Management", "Online Learning Application Training", "Google Classroom Management", and "Online Quizzes Application Skills". The theme with the highest frequency is "ICT and IT Skills Training" which is (n=49). The theme with the lowest frequency is "Website Management", (n=3). The findings reveal that the respondents need training for technology proficiency, especially in ICT and IT skills. This data corresponds to the findings in "4.1 Teachers' Readiness in Online Teaching Based on Their Online Teaching Competencies." that reveals teachers have the lowest level of technology proficiency in online teaching competencies. According to Erin (2017), teachers

need have the ability to effectively use the course delivery system so that they could assist students with technology issues.

Next, Instructional Design has the second highest frequency of (n=45). The themes identified under instructional design are "Learning Materials and Ways of Conducting Online Teaching", and "Module and Worksheet for Online Teaching". The frequency for "Learning materials and ways on conducting online teaching" is (n=31) while the frequency for "Module and Worksheet for Online Teaching" is (n=13). The findings revealed that the teachers need training for instructional design especially for learning materials and ways on conducting online teaching as teachers need to be able to transform course content using effective online teaching pedagogy (Erin, 2017).

The frequency for Communication is (n=10). Two themes were identified under the Communication dimension which are "Synchronous Video Communication Training" and "Online Communication Skills". The frequency for "Synchronous Video Communication Training" is (n=7) and the frequency for "Online Communication Skills" is (n=3). This indicates that teachers also need training for communication focusing on synchronous video conference training which is parallel to the findings in "4.1 Teachers' Readiness in Online Teaching Based on Their Online Teaching Competencies." where not many teachers claimed that they are well-versed with synchronous web conferencing tools. According to Karal (2011), synchronous meeting with the teacher will motivate learning to take place and create a meaningful learning experience for the students

4.3.2 Other types of preparation that teachers need to be better prepared for online teaching implementation

Table 4.6 Thematic Analysis for Other types of preparation that teachers need to be better prepared for online teaching implementation

Theme	Frequency
Internet connection	81
Psychological preparation	14
Device/ tools for online teaching and learning	19
Technology proficiency skills	22
Time for preparation	4
Learning material	14
Video editing and making skills.	6
Student cooperation	3
Synchronous video meeting skills	4
Teaching module	7
Lesson plan	2
Parents support	3
Instructional design	9
Knowledge to conduct online teaching	8

Table 4.6 shows the thematic analysis of the second open-ended question of the questionnaire which is "What are the other types of preparation do teachers need to be better prepared for online teaching implementation?". For this section, there are total of 196 valid responses, 30 invalid responses. Hence, only 196 valid responses were analysed and grouped into themes based on the same interpretation. The themes that have been identified includes "Internet connection", "Psychological preparation", "Device/ tools for online teaching and learning", "Technology proficiency", "Time for preparation", "Learning materials", "Video editing and making skills", "Students' cooperation", "Synchronous video meeting skills", "Teaching module", "Lesson plans", "Parent's support", "Instructional design training", and "Knowledge to conduct online teaching".

The item with the highest frequency is for internet connection (n=81) which indicates that the respondents need internet connection for them to be ready with online teaching competencies. Next, the item with the second highest frequency is "Technology proficiency skills" (n=22). Next, the item with the third highest frequency is "Device/ tools for online teaching and learning" (n=19). The frequency of "Psychological preparation" and "Learning materials" are the same which is (n=14). Followed by "Instructional design", "Knowledge to conduct online

teaching", "Teaching module", "Video editing and making skills.", "Time for preparation, "Synchronous video meeting skills", "Parent's support" and "Lesson plans" with a frequency of (n=9), (n=8), (n=7), (n=6), (n=4), (n=4), (n=3), (n=2) respectively.

The findings reveal that most of the teachers need strong internet connection for themselves as well as their students. According to Nawawi (2020), many students are unable to attend online learning due to limited access to communication technology. It also reveals that the teachers need devices/ tools to implement online teaching. Other than that, the finding also highlighted that the teachers need psychological preparation in implementing online teaching.

CONCLUSION

The findings revealed that teachers have a high level of readiness in online teaching based on their online teaching with a mean value of (mean=3.67). Upon investigating the relationship between respondents' demographic factors and teacher readiness in online teaching, it was found that none of them are correlated. Further investigation revealed that the two most significant needs to prepare teachers for online teaching are professional development courses related to techno pedagogy, and sound internet connection. In conclusion, while the teachers felt that they are online-teaching ready, they are adamant that they can achieve better outcomes in teaching online when they are supplemented with good internet infrastructure and professional support system.

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