Enganging Balinese Culture and Technology in Digital Era: A Review to Foster Primary Teachers' Competencies

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Abstract—**Qualified elementary teachers are teachers who have competencies that meet the demands of the 21st century and the industry revolution 4.0. The 21st century competencies are ICT competency, cultural competency, the competency to implement culture-based learning, and personal competence in the form of self-efficacy. One way for developing such competencies in the digital age is by developing a learning resource which integrates Balinese culture with technology. This learning resource helps the elementary teachers to produce a new teaching style in the classroom that can boost their competencies, thereby quality learning that meet the demands of the 21st century can be realized.**

Keywords—elementary teacher competency, Balinese culture, technology

I. INTRODUCTION

Competent primary school teachers are vital to basic education because they are the foundation layers for students. Competencies become things demanded from them to make their students competitive workers of the 21st century society and the industry revolution 4.0. Teachers are said to be professional if they have competencies in their field so as to create quality education .The success of students in learning reflects the quality of learning and teacher competencies [1]. This causes elementary school teacher competencies to become a current trend of study in Indonesia, including in Bali.

Several government efforts have been made and some research have been done related to the issue of the competencies of elementary school teachers in Bali. For example, the government has been providing training for teachers such as the thematic and student-centered learning development training run by the Bali Provincial Education, Youth, and Sports Officials to some teachers, principals, and supervisors in East Denpasar and an ex-post facto evaluative study in cluster I of East Denpasar, however, the implementation of the training result was ineffective [2]. Another effort was the government was the establishment of Teachers Working Group (KKG) as a forum for professional development. The results showed that KKG only became the

arena of preparing lesson plans for all members of the KKG. The lesson plans have not yet reflected the process of exploration, elaboration, and confirmation. The learning process in the classroom based on the lesson plans developed in the KKG used an assessment that was still centered on the cognitive domain [3]. Some of the obstacles faced by the KKG in Jembrana sub-district based on Rahayu's in [4] research were a lack of effective communication among KKG members, insufficient teachers' competence in performing the tasks, a lack of clarity in the KKG program, a lack of experience gained in teacher professional development and insufficient IT human resources.

With regard to cultural and technology-based learning, these two competencies can be said to be a major problem for the elementary teachers in Bali. The results of a questionnaire completed by 213 elementary school teachers in Bali in 2017 showed that 95% of them implemented science lessons by teacher explanation, assignment, and presentation of answers to questions given. The teachers also still focused on the book. If they used any instructional media, the media used were limited to picture from books and videos from the internet. In many schools that already had projectors, the teachers were reluctant to use them because they could not operate them or did not have time to prepare the media. The reasons given were too many administrative tasks to do or the fact that there was no assessment of the skill to use technology in teaching. Even in many schools that did not have adequate technologies yet, the teachers almost never used technology in the classroom. Although teachers were capable of operating smart phones and computers, they only used the technology for communicative and administrative purposes. The next fact was 90% teachers also never explored and integrated Balinese culture in learning, whereas much Balinese culture can be used for learning science, such as Satua Bali. One of the reasons given was that they did not understand the connection between Balinese culture and science. KKG activities also did not address the problems of Balinese local culture integration and the use of technology in teaching.

The phenomenon shows that the development of elementary school teacher competencies in Bali needs to be given enough attention. Professional development is a means for the teachers to develop competencies with their colleagues to achieve the highest goals [5]. In this context, the competencies of teachers of the 21st century, which generally include knowledge of content, pedagogy, and learners, teaching and IT skills, and attitudes [6]. Other competencies currently required are cultural competency and the competency in implementing culture-based learning. This competency is demonstrated by the teacher's understanding of the local cultures, as well as the involvement of the cultures in their instruction. Such learning processes can intrinsically motivate students, allow students to identify values, and connect students' learning and their life [7]; [8].

Based on the description, the competencies of elementary school teachers in Bali become the focus of attention in an effort to obtain the best solution. The question that arises then is what competencies should the teacher have? Which way to take to get to the development of these competencies? To this end, this paper aims to describe an innovation that focuses on the development of elementary school teachers' competencies in Bali.

The rest of this paper is organized as follow: Section II describes the proposed method. Section III presented the obtained finding and following by discussion. Finally, Section IV describes the conclusion and highlight future work.

II. PROPOSED METHOD

This was a library research to get some information through journals and books. The analysis of the information was based on explicit and implicit meaning of the text. Then, the information obtained is synthesized to obtain a new approach.

III. RESULTS AND DISCUSSION

There are various definitions given on the concept of competency. Competency is defined as a skill to do something, which includes a set of knowledge, behaviors, and attitudes [9]. Another definition was given by Ananiadou and Claro [10], who defined competency as a broad concept, consisting of various skills, such as knowledge, skills, etc., to become workers and the 21st century society. In relation to teachers, teacher competency can be seen from three aspects, namely their knowledge, processes, and attitudes as educators [11];[12]. Referring to the definitions of competency above, then the teacher competency is the ability of a teacher to become an effective educator.

The competency of teachers as workers in the field of education can be reviewed from several aspects. The first aspect is the skills to implement the instructional and innovation [12]. Innovation in teaching by teachers can shape student creativity, which is part of 21st century competencies [13]. Inquiry-based learning and the use of technology in learning also characterize teachers' competency in implementing teaching and innovation [11]. Inquiry-based learning is conducted for the acquisition of scientific knowledge, scientific reasoning, critical thinking

and scientific methods [14]; [15]. Technological skills are also important for the teachers to create better learning environments Altınay-Gazi and Altınay-Aksal, in [16] and deliver materials in different ways in the classroom [17].

The skill in using technology becomes part of 21st century teachers' competencies [18]. It is undeniable that ICT in the digital age becomes one of the primary needs of modern society. ICT provides support to people in all aspects of their lives, and this is also true in educational world. The use of ICT in the classroom is an effort to improve students' learning experience [19]. In addition, another function of ICT in education is to develop student competencies, so that they can meet the demands of employment [10]. To meet such demands, teachers should have certain ICT skills and become good at the skills to make it easy for them to guide the students in learning and in applying what they have learned outside the classroom [20].

The ICT competencies that teachers must have to achieve these goals fall into 6 domains, and each deal with the cognitive skills of ICT and the technical skills of ICT [20]. The six domains are defining, accessing, evaluating, managing, integrating, creating, and communicating. On the other hand, the DeSeCo program in the OECD approach has three key ICT competencies: using interactive ICT tools, interacting in heterogeneous groups, and acting autonomously [10].

Furthermore, research on teachers' ICT skills has been conducted widely. The research was in the form of quantitative, qualitative, and action research. For example, the Galanouli, *et al.* in [19] survey was conducted in the UK with 208 elementary teachers and 256 junior / senior high school teachers on NOF training and teacher competency in ICT. Their research results showed that 46% of teachers showed negative attitudes toward NOF training with various reasons, male teachers were more confident using ICT, and the teachers who had followed NOF training felt more confident using ICT than those who had not attended NOF training. Another example of research was the research conducted by Altınay-Gazi and Altınay-Aksal in [16] through action research. This study was conducted on prospective teacher students in micro teaching class. The treatment was learning through role playing with video tapped recording. The results of the research showed that there was an increase in the college students' communication skill, self-control, and reflection ability.

The next aspect of teacher competencies is the mastery of knowledge in one's field, attitude toward teaching and motivation to teach [21]. First, cognitive competency is related to the mastery of knowledge in the field that the teacher oversees. Cognitive competency is the teacher's behavior or performance related to the content of the task at hand [21]. Cognitive competency includes understanding the knowledge in the form of explanations, procedures, and metacognitive skill [9]. Related to science, the aspects of pedagogical and scientific knowledge that teachers should master include the components of scientific knowledge, the scientific curriculum, the transformation of scientific knowledge, students' learning difficulties in specific science knowledge, science learning strategies, general pedagogy,

and educational contexts [22]. Second, attitude toward teaching and teaching motivation can be viewed from teacher efficacy, self-confidence, beliefs, and self-regulatory. There has been a lot of research on the effect of attitude toward teaching and teaching motivation on students' learning outcomes conducted by researchers. Their results showed that attitude and motivation are important factors for teachers for building their professional competencies [23];[20];[24];[25];[16]. These factors influence the outcomes obtained by students, either alone or together.

An aspect that is not less important which also forms a teacher's competency is implementing teaching through culture. Culture consists of beliefs, behavior, values, language, and material culture [26]. Teaching is as a bridge that connects culture's home and school life, thus forming the students' knowledge, attitude, and skills [27]. Through this step, teachers can help students achieve higher learning outcomes. In addition, teachers can also provide a means for students to maintain cultural integrity and develop cultural competency. Thus, teaching by involving culture is very important and becomes a separate competency that must be acquired by the teacher.

One culture that can be integrated in learning is Satua Bali. Satua Bali is a folktale that originated from Bali [28]. The story is told from generation to generation verbally [29]. Based on the type of story, Satua Bali can be divided into fables (animal figures), legends (the incidence of an area with a certain figure), and myth. When viewed from the character of the story, Satua Bali can be divided into satua with animal characters and those with human characters. Some examples of Satua Bali are I Siap Badeng, I Belog, I Pengangon Bebek, and many others.

Currently Satua Bali is not widely known in the Balinese community, especially the children and adolescents. The probable cause is the breaking of the story chain in a certain period and generation as it is told verbally, so it is no longer known in the next period and generation. Based on Riastini and I Gede Margunayasa in [30], research results, the children never listen to Satua Bali, both at home and at school. At school, teachers also never integrate it in the classroom learning, including in elementary science lessons. They consider that this local culture is only suitable for Balinese language lessons. Some libraries also do not provide any reading relating to Satua Bali. Not many bookstores sell books on Satua Bali because people rarely buy them. On the other hand, there are many benefits that can gained by reading Satua Bali for the community, especially children.

Satua Bali brings various benefits, especially for children, such as being a means of entertainment, means of passing values of life (moral values, religious values, etc.), and cultural heritage to the next generation [29]. Moreover, the content of the story can also be associated with science content [31]. For example, Satua I Buta teken I Rumpuh can be attributed to the five senses (eyes) and skeleton of our body. If this story is integrated in science learning, then it can strengthen the understanding of student concepts. Similarly, the effect is on the students' values, such as friendship, responsibility, and tolerance [32]; [30]. Other

benefits include strengthening interest in learning, learning motivation, improving learning outcomes, and helping teachers innovate in teaching [33].

Based on the description above, Satua Bali holds various potentials for its users so it is suitable to be integrated in instruction. To accommodate the development of technology, the development of the times, and to overcome the weaknesses of verbal delivery, new a packaging is required in the presentation so that it can be used in teaching. Thus, the integration of technology with Satua Bali causes it to survive and follow the development of time and makes the teachers able to use it to manage learning through culture, improve learning outcomes and students' cultural competencies.

In order to create the situation above, one of the technologies that can be adopted for Satua Bali is augmented reality (AR). AR is a form of technology that combines real and virtual information in a meaningful way [34]. AR provides additional and contextual information that enables the learners' experience of reality based on actual reality [35]. Furthermore, AR makes it possible to combine virtual content with the real world seamlessly [36]. The AR is a technology that integrates digital information with the real environment [37]. Everything is processed and manufactured in real time. This is one of the major differences from virtual reality, which uses an artificial environment. Furthermore, AR can be applied with a variety of technologies, such as computers, handheld devices, and so on [38]. Based on the above definition, it can be said that AR is a technology capable of combining two- or three-dimensional virtual objects into a real three-dimensional environment. These virtual objects can be projected in real time with various technological devices.

The above description shows that AR technology is a sophisticated technology, but it is not the sophistication of the technology that becomes the focus of attention. According to Bronack in [39], more important than this technology is how the concept of technology can support and makes learners learn meaningfully. To do so, this technology has certain features and capabilities that can be utilized in education. According to Wu et.al [40], based on the results of research, one of the benefits of AR is to enable learning content to be presented in a 3D perspective so that students can interact in it, learning can take place anywhere and collaboratively, involving all the senses of learners, visualizing the abstract objects, and bridging formal and informal learning. Another advantage is that the existence of learning content in a 3D perspective allows students to examine objects from different perspectives to improve their understanding [41].

As a combined technology between cyberspace and the real world, AR brings many benefits in education. Clark, *et* al. in [42], found that children gained experience to visualize the contents of pop-up books. This book is a paper-based coloring book with 3D content. This creates a new visualization for children, hence it has the potential to improve students' understanding of abstract concepts and phenomena. Furthermore, AR also demonstrates its benefits for improving student motivation in the learning process [43]. Several other studies have also been conducted from

elementary school to undergraduate program. However, no investigation has explored the use of AR in the field of teacher training at all levels of education [44]. This suggests that AR research is needed to find out the benefits for the teacher's components, such as elementary school teacher competencies.

In relation to the competencies of elementary school teachers, AR is very precisely combined with Satua Bali being a simulator for teaching at elementary level in Bali. For example, the presentation of Satua I Buta teken I Rumpuh with AR consists of regular book of the story and AR program on the smartphone used. The book section of the Satua tells about two brothers who are both disabled. The older brother named I Buta suffers blindness from birth, while the younger brother named I Rumpuh suffers from paralysis so he couldn't walk. The story presented in the book is integrated with the learning material of the sense organs and defects, and the skeletal body and defects. By the applications already installed on smart phones, the objects on the book related to the story of both characters, eye defects, and skeletal health disorders can be displayed as if they were real.

Based on the description, this tool can develop the teachers' skills in using technology, the skills of classroom technology management, and skill for engaging students in using technology. Teachers' culture awareness and motivation to design and implement creative and innovative instruction are also stimulated better. For example, teachers can ask students to analyze the story and to tell them about its connection with the learning material after they watch the story. Teachers can also cultivate values from the story to the students. Then, the students will be asked to solve some problems that are related to their daily life. Such learning will certainly help students to get a meaningful learning by experiencing something which is familiar to them from their culture. Thus, the Satua Bali simulator has positive impacts on the development of elementary school teachers' competencies in Bali and student's achievement as well.

A similar study using the idea in this paper has been done by Darmawiguna, *et al*. in [45], but the research was related to myths and legends originating from Bali. Darmawiguna, *et al*. in [45] developed a story book about Barong Landung, Jayaprana and Layon Sari, Ki Barak Panji Sakti, and Kebo Iwa and an augmented reality application which can be installed on android smartphone. This application can display the animation in the form of 3 dimensions along with narration of stories and music. The test results on 30 users of all ages, especially young users and children, their responded that they felt more familiar with Balinese myths and legends, had a good and gave valuable inputs for the product that has been developed

IV. CONCLUSION AND RECOMMENDATION

This paper has presented a review to foster primary teachers' competencies in enganging Balinese culture and technology in digital era. Bit is concluded that learning simulator of Satua Bali based on AR is very potential to be developed, so that it can be used to teach children at elementary schools in Bali.

The product needs to be tested to determine its impact on the teacher competencies, especially the competency to implement the teaching through culture and technological competency. Thus, a related research is necessary.

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