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THE FUNDAMENTAL THEORIES FOR DEVELOPING AN INNOVATIVE TEACHER EDUCATION PROGRAM

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ABSTRACT

In this literature review, there are some reasons why we need an innovative education program for preparedness preservice teachers. Developing teacher quality is crucial in education and is still a challenge in Indonesia. These challenges require teacher knowledge to master concepts, technologies, pedagogics, for preservice teachers. However, the facts show that the majority of preservice teachers lack adequate pedagogical skills despite being familiar with the technology. It is important to design an educational program for the professional development of teachers, especially preservice teachers, to use an approach to the development of teacher preparation that integrates content, teaching, and learning integrated with technology. The main question is what are the fundamental theories that can be used as the basis for developing an innovative teacher education program?

INTRODUCTION

The success of the education system is fundamentally determined by the quality of the teachers who will carry out the function of the system (Widowati et al., 2020). Education can succeed if there is support in the form of teacher professionalism. Of course, it is important to innovate teacher education programs in order to produce teachers as the 21st-century demands. Teacher education programs have the responsibility to prepare future teachers to teach students who are now characterized by ongoing technological changes. The integration of technology in learning is very common in the context of global education.

Technology mastery is very important in creating unlimited access to global society and creating new ways for self-development and overcoming problems in learning (Suryawati et al., 2017). The rapid development of Information and Communication Technology (ICT) in life has an impact on all aspects of daily life, including education (Polly et al., 2010; Buabeng-Andoh, 2012; Tanak, 2018). In addition, to face generation Z, teachers are required to be able to use technology in preparing learning practices in the classroom (Srisawasdi, 2012) so students can contribute to the global community (Mupa & Chinooneka, 2015). Teachers are required to have knowledge and teach effectively using technology (Pamuk & Peker, 2009) and assess students to use technology as a new challenge (Hutchison & Reinking, 2011). Teacher education has an important role in training this ability (Tükkahraman, 2014; Aslan & Zhu, 2015).

The experience of prospective teachers during lecture programs in higher education can affect the readiness of prospective teachers in implementing the integration of technology in the classroom when becoming a teacher (Oriente & Angelito, 2020). Safaruddin et al (2020) state that integrating technology into teaching is an important focus for teacher education especially in this era. The appropriateness of the way of integrating technology in the TPACK framework requires teachers to have a conceptualization that is formed by considering interactions between components in the form of technology, content, and pedagogy (Angeli & Valanides, 2009). Lingenfelter argued that the TPACK framework allows teachers to make effective lesson plans and at the same time enables students to become successful and productive individuals (Widowati et al., 2020).

The successful implementation of a new approach to teacher education according to Joshi (2015) depends on four factors, namely: (1) clarity of vision about effective teaching that informs the entire program (2) Integrates theory and practice so that professional experience in schools is central to this program, and graduates master the development of complete tools and effective teaching strategies and the capacity to continuously review and improve approaches; (3) high skills and good support by supervisors who are both adult educators and expert teachers, who play important roles assigned to these programs; (4) Sustainable and measurable partnerships that bring resources and capabilities to all parties in their fields, and involve systems to ensure the benefits of a successful approach are widespread. The four success factors are synergized with each other. Based on the above review, it is certainly important to have an idea about how to develop a lecture program for teachers, especially the basic philosophical and theoretical basis. This is in order to formulate an appropriate strategy for

implementing innovative lecture programs. In terms of the focus developed in the lecture program is how teachers are capable of integrating technology in learning effectively. For example the design an educational program for the professional development of teachers, especially preservice science teachers. It is vital to use an approach in the development of science teacher preparation that integrates science, teaching, and learning with technology (which hereafter will be referred to as TPACK) and Nature of Science subject matter (Widowati et al, 2020). In this case, innovation is expected to be an idea for improving the quality of science teacher education in the form of efforts to prepare and create professional science teachers to face the Z generation, which is the designation for the generation of technology literate (Widowati, 2019).

DISCUSSION

The development of the use of technology in learning is essential for improving education. Smetana & Bell (2012) emphasizes the role of knowledgeable and capable teachers in demonstrating the need to consider educational technology and the specific content and pedagogical context. These challenges require teacher knowledge to master concepts, technologies, pedagogics or what is called Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006). TPACK encourages 21st-century teacher competence and becomes an essential knowledge for high-quality science teachers (Srisawasdi, 2012). In this case, the orientation of the lecture program with an innovative approach taken is to equip preservice teachers to be able to integrate technology in learning effectively with the TPACK framework.

TPACK is a unique knowledge, which is better understood in terms of the competencies teachers need to be able to teach using ICT adequately (Angeli & Valanides, 2005). TPACK competency based on Angeli et al (2016) relates to knowing how to:

1) Identifying topics that can be taught with computer-aided learning technology and those that cannot.

2) Identifying representations to transform content taught in a pedagogically strong form and difficult to support traditional means.

3) Identifying teaching tactics that are difficult or possible to implement other means, such as the application of ideas in contexts that are not experienced in the real world. For example, exploration and discovery in the real world, virtual visits, testing hypotheses, simulations, complex problem solving, modeling, long distance communication, and collaboration with experts, remote communication and collaboration with peers, personal learning, adaptive learning, and context-sensitive feedback.

4) Determine suitable tools to support the identification of representation and identification of teaching tactics.

5) Embed activities using computers by implementing learning strategies that are centered on students in the classroom.

Teachers are required to focus on learning practices that provide students with knowledge and skills so students can contribute to the global community (Mupa &

Chinooneka, 2015). Therefore, learning by using technology becomes a necessity for teachers to teach Generation Z who are already familiar with the technology so teachers must have the ability to integrate technology in learning. This is because education, teacher training, and the teacher training process, the most important component of education, cannot be considered without considering social developments and changes (Türkkahraman, 2014).

Preservice teachers must also have the ability to raise issues that exist around daily life as learning problems and guide students to construct concepts based on learning experiences carried out or in other words, preservice teachers must have the ability to be able to design and teach content in a constructivist and contextual context. Constructivist and contextual learning will answer and are the antithesis of Freire's scathing criticism so that learning really runs effectively and efficiently. Such learning is in accordance with the philosophy of education, namely critical pedagogy, which opposes dehumanization or oppression. Humanist education rejects the dominant and authoritarian role of teachers, rejects textbook oriented teaching methods, teacher-centered and banking or mere knowledge memorization. The relationship of subjects in the process of humanization according to Kesuma & Ibrahim (2016: 163) is as follows: (1) Teachers and students have an equal position in the learning process. The teacher learns and teaches or 'give and take'; (2) Material in the form of problems relating to social contexts that demand critical analysis by the reason of being; (3) Dialogic communication, not like giving instructions one by one or prescribing, formulas, fast methods; (4) Knowledge is explorative (open).

Determination of theories that underlie the development of lecture programs and program targets for teacher candidates to be able to adapt to the demands of the 21st century can be used as a reference for the development of innovative lecture programs in the form of:

The theory of constructivism emphasizes that knowledge is actively constructed by students' subjects (Schunk, 2012). The constructivist learning environment emphasizes deep understanding, is centered on the subject of students, and the responsibilities and initiatives of the students' subject (Rahmini & Ebrahimi, 2011). The essence of constructivism is that knowledge is not passively accepted, but actively by students. As Haylock & Thangata (2007: 35) suggested that the central idea of constructivism is that learning is an active process in which students build new ideas or concepts based on students' current and previous knowledge. Koh (2013) states that the active role of students in constructing meaning is important in constructivism theory, which distinguishes between rote learning and meaningful learning. Students process by active learning, both individually and in groups to construct knowledge and the ability to integrate technology in learning by following innovative lecture programs.

(2) Vygotsky's theory emphasizes that learning activities are the result of social interaction between students (Salkind, 2004). The innovative approach lectures program emphasizes collaborative learning. Collaborative learning is a learning system that gives an opportunity for two or more people to work together in gaining learning experiences to share and contribute to each member's understanding of a topic and to complete a given task (Joshi, 2015). Students

collaborate with each other through social media to learn more about certain topics, to test ideas and theories, learn facts, and measure each other's opinions. The activity provides the possibility of differences in understanding that students have depending on the experience and perspective of students in interpreting (Nurhidayati, 2017). Knowledge is always an impact of a cognitive construction through real activities. Vygotsky's concept of the Zone of Proximal Development (ZPD), where the zone is intended to focus attention on the relationship between instruction and development (Mary et al., 2017).

(3) Andragogy theory which emphasizes that the subject of students already has a readiness to learn (Tolstoy & Miloslavskaya, 2019). Andragogy theory is a philosophy of learning centered on learners, which assumes learners are independent and have initiative, able to control, and are responsible for the achievement of learning goals (Goodarzi et al., 2011). Andragogy is one of three types of human education after birth, in addition to pedagogy and state pedagogy. Andragogy is education for adults or true education for adults (Loeng, 2017). The role of educators in the andragogy approach is as a tutor, who supports students in developing the capacity to be self-learning (Patel & Khanushiya, 2018). Innovative approach lecture programs are intended for students. Students include adults, who are assumed to have an active ability to plan learning directions, possess material, think of the best way to learn, analyze and conclude and are able to benefit from learning or from an educational process.

The lecture program targets which have an orientation to the ability to integrate technology in learning (TPACK ability) and provide the self-confidence that preservice teachers can be ideal teachers and teach content well (self-efficacy) include:

(1)   Erikson's psychosocial theory states that individuals who are pubescent will be able to have an interest in something. Erikson's theory emphasizes that psychological development is the result of interactions between the process of maturity or biological needs with social demands and social pressures encountered in everyday life. Erikson also explained in general epigenesis that everything that grows has a foundation and through that foundation other parts will emerge, each of these parts has its own special time until all parts have emerged to form a comprehensive function. In adolescence, children are expected to be able to determine their interest in things such as work, marriage, and family building (Salkind, 2004).The subjects of this study are students who are individuals who are in puberty and adolescence. Puberty is a time when every individual experience a drastic change in the inside. At that time, children no longer experience changes in physical and psychological aspects.

(2) Bandura's theory or also known as a social learning theory. Bandura's theory considers that learning is a process of change in human personality, which is shown in the form of an increase in the quantity and quantity of behavior such as increased thinking, understanding, skills, skills, knowledge, habits, attitudes, and other abilities (Chaer, 2016). Bandura has put forward a theory in the form of social learning theory (social learning theory). According to Bandura, children will shape their behavior from imitating or imitating what they see everyday.

According to social learning theory, the most important thing is one's ability to abstract information from other people's behavior, make decisions about which behaviors will be imitated and then conduct selected behaviors (Yanto & Syaripah, 2017). Self-efficacy is a concept taken from social learning theory. Self-efficacy skills are felt; rather, those that are believed can be done with self skills in certain conditions (Bandura, 1977; Maddux, 2002). Students learn from other students or other groups when presenting and simulating learning practices as a learning scenario design, with or without the media. This gives self-confidence (self-efficacy) to students that they are able to become teachers and teach well.

(3) Maslow's motivational theory emphasizes that individuals have the highest needs in the form of self-actualization. The actualization of students as teacher candidates in the implementation of innovative approach lectures to develop the ability to integrate technology in learning and self-efficacy. The actualization of teacher candidates is trained as an activity carried out by the teacher, which is in the form of providing opportunities to work to produce products in the form of concept maps, learning scenarios, maps of computer-assisted learning technology needs, and Learning Implementation Plans, which are arranged collaboratively. In addition, individual students are given the opportunity to present and simulate and practice learning based on the products prepared. For example students simulate the use of computer-aided technology and practice learning scenarios. With this, students can be motivated to become teachers because as if experiencing an experience as a teacher as Saeednia & Nor (2010) suggest that if someone explores and finds themselves it will encourage them to actualize themselves.

Based on the six theories above, it can be synthesized that the development of an innovative approach to lecturing program that integrates technology integration in learning can be held for preservice teachers using the following strategies:

a. Instructional design is made with learning methods that provide opportunities for students to be actively involved in lecturing activities.

b. Alignment between theory and practice so that students can connect conceptual information and theory with practice or vice versa.

c. Lecturers as a model so that students are motivated in integrating technology in learning and are confident that they can become professional teachers. Modeling activities especially when giving examples of learning science with active and contextual approaches containing the Nature of Science by integrating technology.

d. Collaboration with peers through product manufacturing workshops and discussions.

e. Authentic experience so that students gain experience integrating technology, content, and pedagogy as a whole through presentations and peer teaching activities.

f. Continuous feedback while students are taking lectures. Every product produced by students at each stage of the program is assessed and given feedback.

CONCLUSION

The theories that can be used as a reference for the development of innovative lecture programs and targets (the ability to integrate technology and self-efficacy) in the form of constructivism theory, Vygotsky's cognitive development theory, andragogy theory, Erikson's psychosocial theory, Bandura's theory, Maslow's motivation theory. These six theories form a unity that forms the basis of the theory which forms the basis for the development of innovative teacher education programs. Based on the six theories, the development of innovative approach lecture programs that orient the integration of technology in learning for preservice teachers can be carried out using strategies: (1) active involvement; (2) aligning theory and practice; (3) lecturers as models; (4) collaboration; (5) authentic experience; (6) giving feedback.

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