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Teaching and Learning of Technology Design (Literation of Technology) for Adults Learners in Urban Communities

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ABSTRACT
This study aims to produce an appropriate learning method to teach technology to adults in urban urban areas. Teaching technology in adults is very important because it involves a person's behavior in using of technology. The method used is survey. Surveys are conducted on adults who live in densely populated areas in cities. The number of respondents is 100 people. The research instruments used were questionnaires and observations. The results of the study found that teaching materials must be quality and integrated with life, involving various aspects systematically and flexibly, must be given impressive learning experiences, and continuous motivation and stimulus. The conclusion of this study is the design of technology learning for adults in urban communities, there are seven stages, namely: recognizing and orientation of the subject of learning, raw input analysis and other input, selecting learning methods, making integration design, implementation strategies, monitoring and adaptation, and evaluation and feedback.

Keywords: *Learning for adults, Literation technology, Technology learning design.*

1. INTRODUCTION

Teaching and learning for adults has different characteristics compare to others. There are a number of factors and aspects that affect the difference. Adults mostly prefer to learn something practically or apply things directly, especially in everyday life. The benefits of the learning must be experienced in their life or raised from life itself. They have a lot of experiences, especially practical experiences [10]. Therefore, learning material for adult learners should be developed and packaged in a practical manner, easy to digest and applicable in life. However, their experiences concerning the use of technology are not easily changed. The use of appropriate learning methods and approaches provides new understanding of the creation and use of technology [6].

Teaching and learning for adults related to using technology should not be interpreted narrowly. This is very important because it is related to and influences their attitude in using technology. Technology is existed in our live, but we frequently do not care about the use of technology. Whereas, learning about technology is very broad and covers various aspects [14]. As such, teaching and learning of technology is very important, because we cannot avoid applying technology in our daily activities. It does not mean that we have to learn sophisticated technology. Learning technology should be intended to help us doing anything easily. In addition, learning technology can also be interpreted as using technology correctly in accordance with the required procedures [22].

Technology and learning of technology is related to learning process applying certain rules in producing products used to easily do something [1]. For example, designing and making water pump by applying Archimedes principle so that the water is easily move from a place to another place. Another example is the use of various principles of chemical reaction in processing organic waste into high-quality compost. Teaching and learning technology is not only applying technology in our life, but also concerning how to use technology wisely [20]. Nowadays, technology is already present in each of our homes, but it is true that technology has helped us and there are any negative effects due to the

technology we use. Regarding this, the situation and environment are very influential in the process of learning technology [12].

Teaching and learning of technology should be intended to teach technology and how to use the technology in life. So, if it is done, the quality of life is better. The users of technology mostly are urban communities, that urban communities are one of the big technology users [21]. As the subjects in teaching and learning of technology process, adults need to be treated as adults because they have had learning experiences so that they should learn something based on their experiences. Their experiences and insights can be used as learning materials or sources such as for discussion topics in learning process. Sharing experiences or brainstorming opinions related to any relevant topics for adult learning is one of the ways that can be used. Using their experiences and insights in learning process frequently is more meaningful than using general textbooks, such as summarize experiences, exercises and studies [7].

Adults will be more interested in their learning process when what they learn is based on the material they need. The materials they learn must be able to solve problems or to complete their daily tasks properly, because adults tend to comfort in the atmosphere of learning that evokes confidence [4]. This is related to the desire to be appreciated. As such, complex and hierarchical learning process should be avoided to maintain their self-confidence. In addition, adults mostly need a longer study time in a shorter period of time. Even the learning time need to be communicated in advance to get their approval. Because learning for adult does not merely provides material, they are also given the opportunity to process, validate and compare with the experiences they have. This is the function of the teacher as learning facilitator that must be able to create conditions and prepare tools or procedures to help them find what they need to know. Thus, the learning programs should be arranged according to their actual life needs and the order of the subjects needs to be adapted to the readiness of the learners [11].

The process of adult learning is unique, special and individual. Each adult individually has his own strategies and tips to learn and find solutions to problems encountered in the learning. The opportunity to observe others' strategies and tips in learning potentially improve and refine its own way of learning, as corrections to make his learning more effective. In adult education, the creation of a learning process is a process of experience that every individual wants to manifest [19]. The learning process for adults can motivate themselves to seek higher knowledge or skills. Adults individually can learn effectively if he is able to find personal meaning for himself and see good meaning that is related to his personal needs. For adult learners, past experience factors are very influential on every action that will be taken. Therefore, good experiences need to be explored and developed for a more beneficial direction [15]. The intellectual development of adults through a process of experience can be gradually expanded. Optimizing learning outcomes can be achieved when adults individually can expand the range of his thinking patterns.

Adult learners in terms of learning technology need to implement and train authentic situations in order to achieve a higher level of technological literacy. The use of learning design, models and strategies must be well structured so that technological literacy is easily implemented and measured at the highest level that can be achieved [5]. The conceptual framework for understanding technology can use three aspects, namely awareness, praxis (for example, training) and phronesis (for examples, practical competencies and practical abilities).

2. METHOD

The research method used in this research was the survey method. The survey was conducted in densely populated areas in Bandung district, most of which have used technology in their daily life. The sample in this study was 100 adults, men and women, who were taken randomly. The sample age is 35-55 years with various educational backgrounds. The research instruments used were questionnaires, interviews and observations. Questionnaires were used to obtain data about the design and learning methods they need in learning technology. Interviews were conducted randomly that explored the use of technology in their lives, while observations were made to see their daily activities using technology. The data that has been generated from the three instruments was processed according to the facts and objectives of the study and as materials in designing technology learning for adults.

3. RESULTS

The results of the study obtained from interviews and observations shown that 80% of adults in densely populated areas of Bandung district had not received education or training in technology (technology literacy) which was about 90% of this number is women. About 75% of adults in densely populated areas of the district do not understand the literacy of technology. Then about 80% of adults do not understand the benefits of technology education for life. The results of the questionnaire concerning the teaching and learning of technology for adults are shown in Table 1.

4. DISCUSSIONS

The results of the study show directions and models of teaching and learning of technology for adults. The

Table 1. Teaching and learning of technology desired by adults

Learning Aspects	Answers
The Purpose and Benefits of Learning	Can help their life and current needs
Learning Material	Practical, specific, uncomplicated, easy, and can be applied in life
Teaching Method	Easy to understand, flexible and a lot of practices
Learning Process	Participatory, collaborative, interactive and providing awards
Learning Result	Strengthening existing learning outcomes with economic values
Time and place for study	Flexible and does not interfere with routine activities
Desired Facilitators/Teachers	Young, enthusiastic, mastering material and guiding
Learning evaluation	Conducted together, on-going and without tests

data and information that has been obtained formulate a teaching and learning technology model that is needed by adults for the community in urban population [13]. This model is an alternative developed based on the results of research and theoretical studies. Teaching and learning of technology models for adults have seven stages that must be done. The seven stages are recognizing and orienting the subject of learning; analyzing raw inputs and other inputs; choosing teaching methods; creating integrated designs; implementing strategies; monitoring and adaptation, and evaluating the feedback. These seven stages are called as integrated teaching and learning of technology design for adults (Figure 1). All stages are interrelated and always involve learning communities. Each stage of reflections is always done so that it can be controlled properly with good quality learning needs.

Recognition and orientation of the subject of learning is the initial stage that must be done. This stage is very important because it becomes the basis for determining the next stages. This stage will determine the form of learning design that must be done, the basis for choosing the methods and other stages that are closely related [9]. Those stages are carried out by observation, discussion, exchange of opinions and other ways that can produce profiles of learning communities. This is done because the learning communities are people who already have knowledge and experiences. Participation of learning communities must be involved to obtain accurate information. The initial stage is the provision of insight, motivation, strengthening of determination, appreciated initial abilities, connecting material, developing initiatives and exchanging opinions about technology [16].

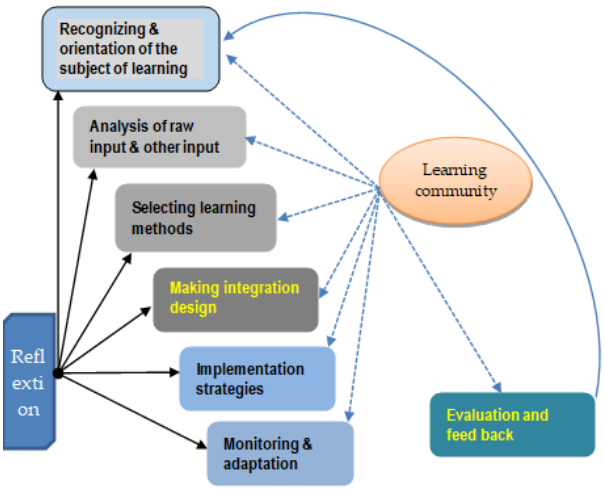

Figure 1. Integrated technology learning design for adults learners

All the inputs in teaching and learning of technology should be inventoried and analyzed carefully. The input must be chosen according to the needs and materials to be delivered. Not all inputs can be used as materials in the teaching and learning of technology process. All appropriate inputs must be processed and verified in order to be in line with the teaching and learning contexts. The process of processing and using inputs must be done together with the learning community. This is the part of teaching and learning technology process in an integrated, adaptive and participatory manner [23].

Choosing teaching methods. Teaching methods for adults differ from the teaching methods in schooling. The use of teaching methods must be done carefully, thoroughly and precisely. Teaching methods are more using movements (psychomotor) than thoughts (cognitive) and attitudes (affective). However, these three components must be exist simultaneously or cannot be done separately. Therefore, integrated teaching and learning of technology for adults must use various methods which are mixed comprehensively [8]. The use of these methods is adapted to conditions and situations by actively involving the learning community.

Creating integration design. Integration is the spirit of teaching and learning model. Integration must be interpreted broadly in all aspects of teaching and learning. All processes in detail must be well integrated and elegant, so that they become one entity. All components and resources are mixed and integrated according to the objectives that have been set together. The capacity of the facilitators, learning communities, the environment and other resources is the basis of the learning process and the delivery of learning materials [17]. The point is all resources to be a unity in supporting the success of the teaching and learning process.

Implementation strategy. Integration of all resources will not succeed if it is not accompanied by delivery strategies. Therefore, the implementation strategy is the spearhead in the success of teaching and learning of technology for adults. Place, time, method of delivery, combination of methods, complex conditions of learning communities and material are the determining factors in the implementation strategies [18]. The difference is that all these things must be communicated or discussed with the learning communities, so that all are actively involved.

Monitoring and adaptation. Each step must be monitored in order not to be out of all the steps and processes that takes place. Monitoring is carried out in various ways involving teachers, outsiders and learning communities. Monitoring is the part of adaptation in the learning process. Adaptation is a process that must be done because it includes learning environment. The learning environment for adults is a component that can make the participant resistant [2]. Therefore, monitoring and adaptation is an important step to improve each process for learning technology in adults.

Evaluation and feedback. This stage is the end of the teaching and learning process but not the end of learning itself. Evaluation is not only testing the achievement of the learning communities, but also assessing all components of learning. Regarding this, evaluation should be carried out by all components in teaching and learning activities, such as teachers and other evaluators. The evaluation did not stop at the material presented, but was carried out on the seven components in this learning model. Furthermore, evaluations are also carried out after they have finished the learning process and practiced directly in life [24].

The seven stages of integrated teaching and learning of technology are one of the ways teaching and learning adults in terms of technology. This is important because technology has become one of the ways of life. Knowledge, attitudes and skills of adults in term of technology have impact on lives [3]. There are some positive impacts of teaching and learning of technology (technology literacy) that can be obtained, among others are energy conservation, energy user safety, balance of technology use, economical use of technology tools and lifelong learning.

5. CONCLUSION

Teaching and learning of technology (technology literacy) for adults requires specific methods which are tailored to the needs of the user communities. The teaching and learning design that can be applied is the design of integrated teaching and learning of technology for adults which has seven stages: recognizing and orienting the subject of learning; analyzing raw inputs and other inputs; choosing teaching methods; creating integration designs; implementing strategies; monitoring and adaptation; and evaluating and giving feedback.

AUTHORS' CONTRIBUTIONS

Sumardi: conceptualization, analysis, and writing the paper. Wiyono: writing and reviewing the paper. Dewi: editing and reviewing the paper.

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