ICT training curriculum for primary school teachers

A A Syahid*, I Isrokatun and D Nugraha
Program Studi Pendidikan Guru Sekolah Dasar, Universitas Pendidikan Indonesia, Bandung, Indonesia

*syahid@upi.edu

Abstract. The advancement of this modern day has required primary school teachers to utilize Information and Communication Technology (ICT) devices in the classroom. Therefore, it is imperative that teachers possess the skills to use ICT. Several studies have shown that teaching process (instruction) using ICT provides more optimal result for the students. This paper will discuss the result of a study aiming to develop an ICT training curriculum for professional teachers. The data for this study has been collected since 2017 to 2018 through surveys to explain need analysis of ICT skill for teaching. The product of this study is a curriculum structure in the form of training materials that primary school teachers need to improve their skills in utilizing ICT in teaching activities. This training curriculum is expected to lead to an effective training because it is developed based on teachers’ needs in implementing ICT in primary school.

1. Introduction
Teachers are considered as the primary drive in teaching and learning activities in primary school level. Hence, it is stipulated in Indonesia’s constitution that all teachers should possess good competencies and skills, particularly in classroom management. Good classroom management will improve learning effectiveness and students’ learning results. Good classroom management today involves the use of Information and Communication Technology (ICT) devices in teaching activities [1]. Possessing good competence in implementing ICT-based learning is an imperative for primary school teachers. Moreover, UNESCO has developed a comprehensive framework of ICT competence standard for all teachers internationally [2].

Researchers in several countries reported their finding that good classroom management would improve good learning results for primary school students [3,4]. A previous study conducted 2016 in Indonesia revealed that teachers had not possessed good ICT competence, i.e. only 21%. In fact, every elementary school teacher should get used to using ICT as it has happened in many developed countries compared to developing countries in Asian countries [5,6]. This condition calls for an effort to improve teachers’ competence of using ICT in teaching activities.

The present study aims to analyze training needs to improve teachers’ competence in using ICT for teaching. Need analysis is an important step in developing an effective training, one that is not miss-targeted [7]. The output of this study is the development of a teachers training curriculum design which will improve teachers’ competence in using digital technology for teaching or other educational activities. The developed efficient ICT training curriculum can be implemented for improving teachers’ skills because it has been adjusted through gap analysis between teachers’ current competence and teachers’ expected competence. The difference with other training curriculum, this curriculum was created based on the needs of ICT training for teachers in Indonesia.
2. Methods
The present study employs a descriptive methodology. Surveys are administered using questionnaires to gather the necessary data from 30 primary school teachers in 12 areas in Indonesia. The questionnaire is adapted from a questionnaire on need analysis of educational institutions [8]. It consists of teachers’ performance questionnaire, teachers’ task questionnaire, and gap identification form. In addition to questionnaire, data gathering is also performed through interview and observation to crosscheck and analyze the data from the questionnaire responses.

3. Results and discussion
3.1. Training materials that teachers need
Improving ICT competence for primary school teachers can be conducted through appropriate and effective training. A training is effective if the participants are those who need it. Therefore, the training material should be selected and decided based on training participants’ needs. This is in line with training education expert’s opinion that need analysis is the first step of successful training as well as the guide to determine the direction of training design [9]. Furthermore, an ICT competence training for teachers has to consider the diversity of the teachers, including their age [10].

Appropriate selection of topics and material in a training curriculum will allow for an effective training. In this study, the selection of training material is based on the general skills and competencies that teachers have to possess to use ICT in learning as stipulated in UNESCO’s ICT Competency Framework for Teachers [2]. In the present study, training materials are decided based on the analysis of questionnaire data as follow table 1.

| ICT Competency Framework for Teachers | N.T* | N.N.T** |
|--------------------------------------|------|---------|
| **Understanding ICT in Education**   |      |         |
| a. Understanding the theories/definitions of ICT competence in education |       |         |
| b. Understanding latest policies concerning ICT utilization for educational purposes | ✓ |         |
| c. Understanding the principles of ICT use in education | ✓ |         |
| **Pedagogy, curriculum, and assessment** |      |         |
| a. Understanding ICT in lesson plan development | ✓ |         |
| b. Understanding ICT in teaching material development | ✓ |         |
| c. Understanding ICT in teaching media development | ✓ |         |
| d. Understanding ICT in teaching method selection | ✓ |         |
| e. Understanding ICT in evaluation instrument development | ✓ |         |
| f. Understanding ICT in evaluation implementation | ✓ |         |
| g. Understanding ICT in classroom management during lessons | ✓ |         |
| h. Utilizing ICT in handling students with special needs | ✓ |         |
| i. Utilizing ICT in communication with students | ✓ |         |
| j. Utilizing ICT in effective communication with parents | ✓ |         |
| **ICT**                             |      |         |
| a. Utilizing the Internet for learning activities | ✓ |         |
| b. Understanding the Internet as learning resources | ✓ |         |
| c. Utilizing multimedia in learning activities | ✓ |         |
| d. Utilizing audio-visual devices as teaching media | ✓ |         |
| e. Utilizing the Internet to develop lesson plan | ✓ |         |
| **Organization, administration, and professional learning** |      |         |
| a. Understanding the ethics of ICT utilization in education | ✓ |         |
| b. Utilizing ICT for self-improvement | ✓ |         |
| c. Utilizing ICT to participate and contribute to discussion forums | ✓ |         |
| d. Utilizing ICT for research | ✓ |         |

Note:
* N.T = Need Training
** N.N.T = Need No Training
Based on the needs analysis table 1, a competency standard that teachers have to possess in ICT training is developed. Competency standard for training curriculum is modified from, based on the type of needs and the competency gap of the respondents [11,12]. Consequently, the standard of competency undoubtedly contains competencies that the curriculum users will obtain.

Table 2. Competency standards for ICT training.

| No. | Standard of Competency |
|-----|------------------------|
| 1.  | Participants will be able to thoroughly understand the latest policies concerning ICT use in education |
| 2.  | Participants will be able to use ICT in developing teaching apparatus |
| 3.  | Participants will be able to practice latest technology utilization for teaching in primary school |
| 4.  | Participants will be able to utilize ICT for teachers’ professional development |

The standard of competency is further detailed into several subjects, arranged in a training curriculum. The title of each subject in training curriculum describes the content that will be delivered in the training activities, comprised of a series of interrelated materials and practices [13].

3.2. ICT training curriculum

The next step is developing a training curriculum structure. The training curriculum in this study is grouped into three subject groups: basic subjects, core subjects, and supporting subjects. A success-oriented curriculum should contain basic, core, and supporting materials [14,15]. Basic subjects (materials) covers the general topic of latest government policies on ICT utilization in Indonesia’s education system. Core materials are the core of the training content, consisted of theories and practices. Meanwhile, supporting materials contains informative and applicative contents concerning ICT utilization for teachers.

The following table 3 displays the training curriculum structure that can improve primary school teachers’ ICT competency.

Table 3. Training curriculum structure.

| MATERIALS | TIME |
|-----------|------|
|           | T    | P | Total |
| Group A: Basic Materials | | |
| a. ICT utilization for teaching and education | 2 | - | 2 TH |
| Group B: Core Materials | | |
| a. Information literacy in primary school | 2 | - | 2 TH |
| b. Media literacy in primary school | 2 | - | 2 TH |
| c. Digital literacy in primary school | 2 | - | 2 TH |
| d. ICT for Lesson Plan development | 1 | 2 | 3 TH |
| e. ICT for teaching material development | 1 | 2 | 3 TH |
| f. ICT for teaching media development | 1 | 5 | 6 TH |
| g. ICT utilization for teaching in primary school | 1 | 2 | 3 TH |
| h. Teaching using audio-visual media | 1 | 3 | 3 TH |
| i. Teaching using multimedia | 1 | 3 | 3 TH |
| Group C: Supporting Materials | | |
| a. Internet as a source of learning | 2 | - | 2 TH |
| b. Social media for educational communication | 2 | - | 2 TH |
| Total Training Hours | 18 | 17 | 35 TH |

Note: T = Theory P = Practice TH = Training Hours

The appropriate strategy to implement a teachers training curriculum is to combine theories and practices. Since the participants are teachers, the training will use andragogy principle in its activities [16]. Other strategies that will be developed in general are several training activities; an adult learning activity should at least consist of lecture, Q&A, discussion, group task, and practices [17]. In developing other components in a training curriculum is to make materials, strategies and evaluation instruments that are in accordance with the characteristics of the participants, in which case they must be
distinguished which are included in andragogy material that is suitable for the training participants [18,19].

4. Conclusion

Based on the needs analysis result and the curriculum structure development in this study, it can be concluded that ICT competencies for primary school teachers still need to be improved. The most effective way to do so is through training based on teachers’ needs. The curriculum structure developed in this study is able to improve primary school teachers’ ICT competencies because it is developed based on teachers’ needs obtained through in-depth data analysis and processing and discussions with experts in curriculum development.

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