

Debriefing Program for Prospective Elementary School Teachers in Developing Learning Aids

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Abstract. This research was conducted to develop a debriefing program for prospective elementary school teachers in order to develop context-based learning aids and its assessment. Reeves Design Based Research (DBR) model was employed as a research design, and its data were processed descriptively. A field needs analysis was conducted to students who have taught at school through an analysis of common learning aids and questionnaires. Early debriefing programs were developed based on field needs analysis. The trial of the debriefing program was conducted in two phases, i.e. to final year students through conventional lectures and alumni who have taught in elementary school. Trials with different subjects aim at providing an alternative form of debriefing activities that could be used for prospective elementary school teachers. Reflection was done to evaluate the developed debriefing program. The result of this program was in the form of the stages of debriefing implementation, debriefing materials, and the procedures of debriefing program implementation.

Keywords: Debriefing Program, Learning Aid, Context Based Learning.

INTRODUCTION

In recent years, there has been an increasingly urgent need for professionals by assuring a quality and effective programs implementation (Borko, Jacobs, & Koellner, 2010). The references of professional development are linked to existing curriculum implementation, standards, and curriculum policies, knowledge, skills, and teacher beliefs. Specifically, its content focus refers to a professional development to improve teacher expertise related to the domain of teaching knowledge under different circumstances (Fischer et al., 2018). There has been a strong evidence showing that the professional development for teachers still needs improvement (Gore et al., 2017). The developed teacher professional program reveals that there is an important role between teaching practice and reflective activities in the learning process of teacher education (Ivanova & Skara-MincEne, 2016).

To be professional, teacher educator needs to be exposed to some experiences with conceptual and practical knowledge on teaching and learning how to teach well. The relationship between these two experiences and practices is framed in a coherent curriculum and program to connect with graduate outcomes from teacher education (Loughran, 2014). Teacher education is conducted by instilling sustainable education through a broad approach by linking with the growing curriculum field in the workplace, strengthening core courses, analyzing the core components of school subjects and analyzing the broadly needed elective courses (Evans, Stevenson, Lasen, Ferreira, & Davis, 2017).

The teacher professional skills can be illustrated through their resilience in carrying out the aforementioned professional duties (Day, 2014). According to Mansfield, Beltman, Broadley & Weatherby-Fell (2016), the teacher resilience can be caused by four factors, namely:

1. teacher resources (such as: motivation, belief, aims, optimism, social, and emotional competence),
2. contextual or environmental aspects (such as: school leadership, colleagues, relationships with students, and school culture),
3. strategies (such as: balance between daily and work, problem solving, professional learner, and goal determination),
4. Outcomes (such as: welfare, commitment, job satisfaction, enthusiasm, and responsibility).

Therefore, to enhance teachers' professional resilience, the teacher education implementation must be able to adapt through intercultural interaction and some learning aspects, including the acquisition of theoretical knowledge and theories according to background and experience (Mutvei & Mattsson, 2015).

The modern context of social development lies in the concept of sustainable education as the basic strategy of global and national education. Sustainable teacher education should be seen as an important principle in building an integrative new educational model. To bring forward the idea of sustainable education, the beginning of teacher training should be seen as an important stage in professional teacher education. To be professional, teachers are expected to do some innovation through continuous development of knowledge and pedagogical, adoption of new challenges in education, and efficient exploration of skills (Sabirova, 2014).

In Indonesia, the Regulation of Ministry of Education No. 41 of 2007 regulates that the workload of teachers includes: planning of learning activities, conducting learning activities, assessing learning outcomes, guiding and training students, and carrying out additional tasks. The regulation of teacher professional competence is framed in the form of process standard (Regulation of Government No. 19 of 2005), that covers planning of learning process, implementation of learning process, evaluation of learning outcomes, and supervision of learning process to achieve effective and efficient learning process. The aforementioned teachers' main activities indicate the need of programs developed to enhance teachers' professional skills.

Teacher competence has an important role in student achievement. The teacher certification program has been undertaken by the government to respond to low standard teacher quality in Indonesia. A study assessing the competence of national teachers in 1999 found that from 1,455,507 elementary school teachers,

there were only 51% of them who met national standards (Ramdhani, Ancok, Swasono, & Suryanto, 2012).

Teacher has professional position to provide expert service and this demands academic, pedagogical, social, and professional skills requirements. The result of teacher competence test in 2015 showed low teacher pedagogical competence and considered that Teacher Training Colleges (LPTK, *Lembaga Pendidikan Tenaga Kependidikan*) as the most responsible institution. Teachers are products of LPTK, so this institution should be more responsible for such condition (Maryani, 2016). Therefore, the development of teacher education to produce professional teachers should be prepared when taking formal education teacher training in LPTK.

LPTK trainers are expected to innovate the debriefing programs by considering the characteristics of each course. The article discusses the development of a debriefing program for prospective elementary school teachers to be applied in LPTK through lecturing activities in the appropriate subjects. In specific, this debriefing program was developed for prospective elementary school teachers to be able to design context-based learning aids and their assessment. They are assigned to create creative learning aids, the growing level of creativity leads to the improvement of professional competence (Judiani, 2011). The debriefing program has been widely developed through lectures, however, the program tends to study a particular part of the learning aids or their assessment. This occurs since one subject is more specific to a certain learning aid. However, when there are certain subjects related to the development of learning, then the programs provided in the course need to refer to the development of learning aids and assessment comprehensively.

The influence of this program towards the participants' comprehension is not discussed in the article. The objective orientation of this research is to identify what kind of debriefing program that can be applied for the prospective elementary school teacher in preparing them to be able to develop the learning aids and their assessment.

METHOD

The development of the program was carried out by adopting the steps of Reeves Design Research Based (DBR) model (Herrington, McKenney, Reeves, & Oliver, 2007), as follow: analyzing field needs, designing program development, testing the program, and reflecting the development program, as depicted in Figure 1.

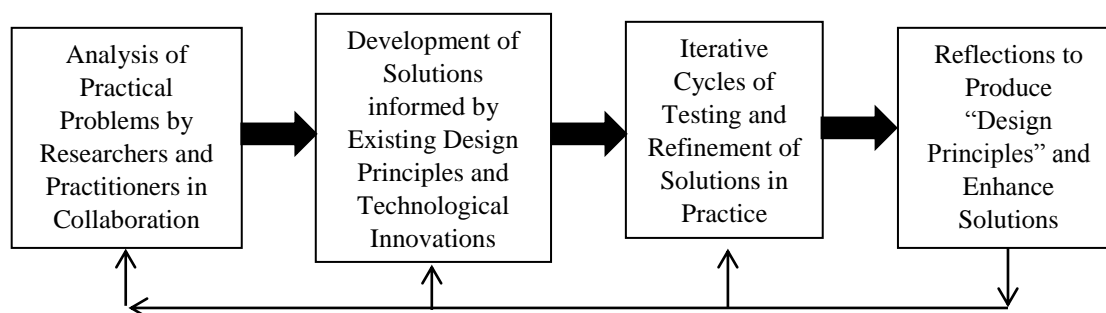


Figure 1: Diagram of Reeves' Design Based Research Model

The research was conducted in one of the state universities in Indonesia. The university has several campus areas scattered in Western Java and Banten regions and has an elementary school teacher education program. Its campus located in Tasikmalaya City, West Java, was selected as the research site.

The field needs analysis was conducted to 38 students registered as participants of dual-mode elementary teacher education program (extension students with a status as teachers in elementary school). It was done by analyzing the lesson plans (RPP, *Rencana Pelaksanaan Pembelajaran*) and questionnaires on professional training. The results of the analysis were described comprehensively as the materials for the development of debriefing program.

The design of the debriefing program was developed based on the results of the field needs analysis. It is related with the material development and the stages of the debriefing program implementation.

The program trial was done two times. The first trial was conducted to one class consisting of 35 elementary teacher education students through conventional lecturing (3 credits) about the development of learning in elementary school. The second trial was conducted to 20 alumni of elementary teacher education students. Trials with different subjects aim at providing an alternative form of training activities that can be used for prospective elementary school teachers. Its difference lies in the duration of integrated debriefing program, lectures, and the debriefing program

Reflection was done in all stages of the program development. Its results provided reinforcement to the program. The design of the debriefing program was specifically studied to provide context-based learning aids and their assessment to the prospective elementary school teachers.

The focus of the debriefing program was the development of context-based science learning in elementary school conducted by the participants. Hence, the students were able to develop context-based science learning aids, which were studied in this research.

RESEARCH RESULT AND DISCUSSION

The results of this research were reviewed based on the results obtained from DBR design stages, namely: field needs analysis, program development design, program testing and reflection

1. Field Needs Results

Field requirements were obtained based on the aspects of learning objectives development (Table 1), Learning Steps (Table 2), Concept Development (Table 3), Assessment Development (Table 4) and debriefing for elementary teachers through teaching working group (KKG, *Kelompok Kerja Guru*) (Table 5).

Table 1: Analysis Result of Aspect of Learning Objective Development Aspects

No	Learning Objectives Development Aspect	Analysis Results (%)
1	Teachers create learning objectives on the development of student-oriented competencies merely on conceptual understanding	55.26

When the teacher has oriented the learning only on concept understanding, then it can be assumed that the learning implementation is done conventionally. Teachers would be the dominant source of information Student involvement in learning is reduced because it is more dominated by teachers (Corporation., 2007). There are some concepts that need to be comprehended by. These concepts should be possessed as a result of learning.

Table 2: Analysis Result of Learning Step Aspect

No	Learning Steps Aspects	Analysis Results (%)
1	Teachers do apperception only to connect between concepts.	63.16
2	Teachers provide learning activities to students that are linked to the context of the lesson learned only through practices and discussions	63.79
3	Teachers carry out learning steps using worksheet, which has clear intention, but unclear assessment	55,27
4	Teachers include methods/models only for procurement purposes of context-based learning implementation	50
5	Teachers use classroom visual aid in outdoor environment.	57.90

From the analysis results in Table 1, it can be assumed that the learning was done conventionally, as it is supported by the analysis results presented in Table 2. The general learning steps that were stated in the RPP include: apperception aiming at connecting concepts, more learning activities on practices and limited discussions, unclear use of LKS, methods or learning models mentioned in RPP was just a formality and was not reflected in the learning stages, and the lack use of media involving environment.

Learning by involving the right context could be planned by the teacher. The concepts studied in context were not only linked to be compared, but also to be integrated. To achieve integration, the context must have tasks, problems or challenges that are inherent, hence it would be meaningful for students. "Knowledge introduced in a context should be useful in accomplishing tasks, solving problems, or meeting challenges (Hutchinson, 2002).

Problem solving was guided by LKS as a part of learning process. The implementation of the learning stage was rationally designed with the appropriate method. The context used could be used by various media with significant environmental involvement. The analysis of context-based LKS development was then described through the learning steps by integrating some rational and appropriate concepts. It has already known that the teachers are required to complete their duties and their roles are no longer as informants of the knowledge but their roles should be as a motivator in the process of teaching and learning so that students can construct their own knowledge through various activities in the learning activities. Through the use of the students' worksheets in the learning process, the students are expected to learn a subject matter independently (Zulyadaini, 2017).

Table 3: Analysis Results of Concept Development Aspect

No	Concept Development Aspect	Analysis Results (%)
1	Teachers link context with textual discussed only for apperception purposes only	73.68
2	Teachers use context to only connect between contents	73.68
3	Teachers use context in explaining concepts by relating them to teaching materials	57.90

The assumption that the conventional learning was done by the teachers was supported by the analysis results of concept development aspect. Teachers preferred to link context with textual use for apperception. The context in question was only on the relationship between content in the teaching materials. The teachers had to be able to connect the context in real-life every day and the content of teaching by having an in-depth understanding of the teaching material in order to provide useful meaningful learning. In the learning implementation, it is necessary to provide a variety of contexts in conducting and interpreting the concepts through authentic learning (Schwartz, Lederman, & Crawford, 2004b)

Table 4: Analysis Result of Assessment Development Aspect

No	Assessment Development Aspect	Analysis Results (%)
1	Teachers develop assessment in accordance with the objectives that have been formulated but it was only oriented to concept understanding	47.38
2	Teachers develop assessment in terms of conceptual comprehension limited to direct memory (such as these question: specify, what is meant, why, etc.)	50
3	Teachers do not develop other assessments other than tests on conceptual comprehension	73.69
4	Teachers do not develop assessment rubrics	73.69
5	The teachers develop rubric that is not in line with the aspects assessed	73.69

Orientation of learning with the aim of understanding the concept generally led to conventional assessment. Teachers tended to prefer assessing student learning outcomes through comprehension tests because they were more practical and easy. The test was given with a problem that tested the ability of low-level thinking and rarely used other alternative assessment. The level of student competence from other abilities was neglected to be assessed. The recording of alternative appraisals using the rubric development was not done because the orientation of the learning objectives on the delivery of information should be as much as possible about teaching materials. While information on how students gradually discover and understand the concept through learning activities become neglected. The use of alternative assessments was a way of developing more authentic assessments with various forms of assessment that provide

various "real" contextual contexts and tasks for the purpose of exploring and better describe student development during learning (Gulikers et al., 2010).

Table 5: Analysis Results of Analysis Training for Elementary Teachers through KKG Aspects

No	Training for Elementary Teachers through KKG Aspects	Analysis Results (%)
1	Sometimes teachers attend educational and training activities	52.64
2	The trainings give impact to teachers' skill in preparing learning aids and setting up their assessment instruments	52.64
3	Teachers need training on learning development and assessment instruments to improve their skills in teaching and learning process	78.95
4	Teachers are sometimes active in participating in KKG.	68.42

The questionnaires' results show that the teacher participations in educational and professional training activities were frequent (23.68%), sometimes (52.64%), never (5.26%) and no answer (18.42%). This figure is supported by 68.42% of respondents stated that they were sometimes active in KKG activities. Teachers stated that there was no skill improvement after they attended debriefing program. Most teachers expected more comprehensive training activities on learning development and assessment. Training activities to develop professional skills needed to be attended by teachers. These activities could be formally followed by teachers through KKG located in the teacher work area. Participation of teachers following this professional activity can be a provision of knowledge and skills that are developing today. KKG can be utilized by teachers to improve their professionals. The professional skill refers to planning, implementing, and assessing the learning process (Muslim, 2009).

2. Program Development Design

The result of the field needs analysis resulted in a debriefing design. They were related to the need to develop a debriefing program for prospective primary school teachers, aids and materials that need to be present, and debriefing forms and stages

The debriefing program that would be developed based on the results of the study focused on the development of learning aids and comprehensive assessment for prospective elementary school teachers. This debriefing program referred to the 2013 Curriculum. Specifically, the curriculum for elementary school regulates that the learning implementation for grade 1 to 6 should use thematic approach (Permendikbud No. 67 of 2013). The integration of science subjects with other subjects became the focus in developing the learning aids and their assessment of this debriefing program.

The debriefing kit consisted of guidance, materials, assessment of debriefing results (comprehension, products, and participant activities). In general, the debriefing implementation is depicted in Figure 2.

**DEBRIEFING STAGE: FACE TO FACE
(SECTION 1 AND 2)**

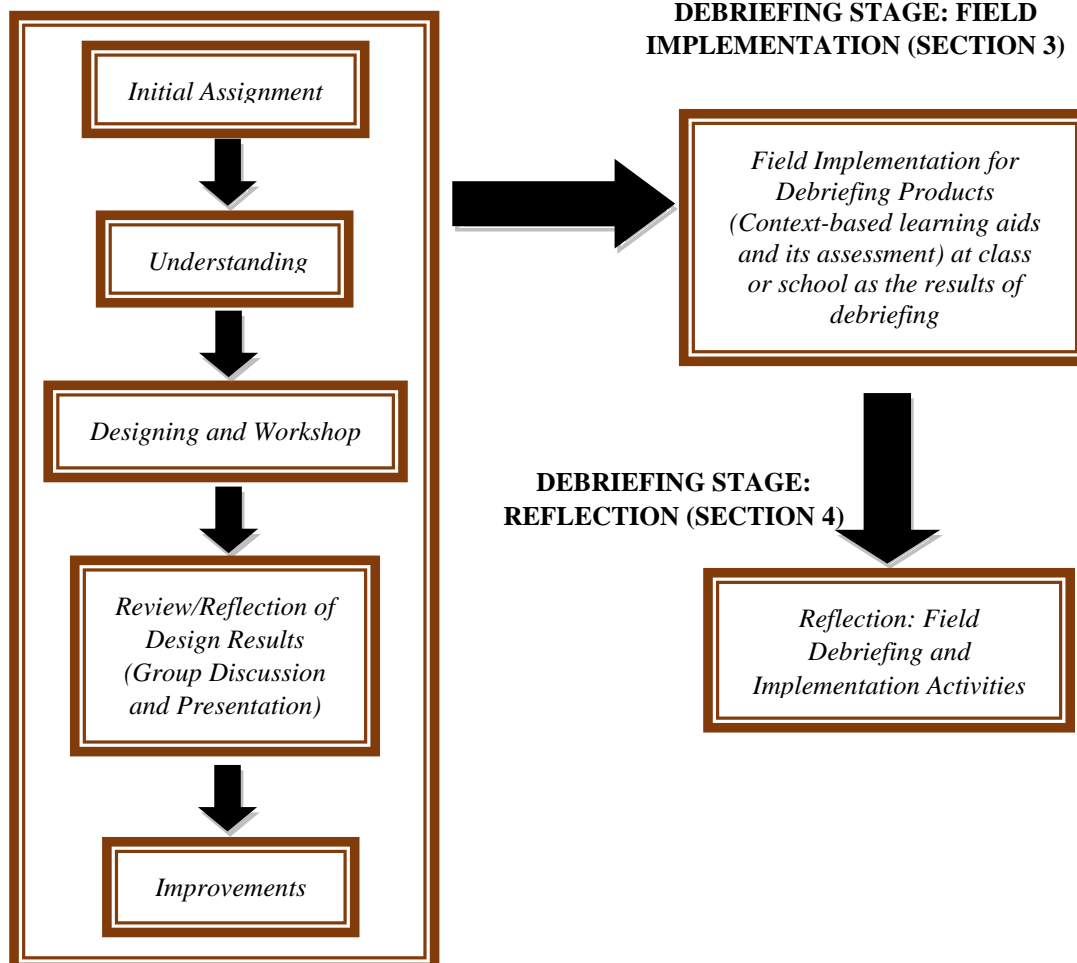


Figure 2: Implementation Stage of Debriefing Program

Before beginning the debriefing program, the tutor gave an explanation on the mechanism of the debriefing program that would be implemented, and made several agreements related to the completion of the task. This debriefing program was conducted in four sections and divided into several discussions, namely:

- a. Part 1, by studying several concepts and products related to the development of integrated context-based science learning aids in elementary school. The first part consisted of four times of debriefing. Each consisted of: Initial Assignment, Understanding, Designing and Workshop, Review/Design Results Reflection (Group Discussion and Presentation) and Improvement, divided into:
 - Debriefing 1: The nature of science learning in elementary school, educational position of science education in elementary school curriculum, the concept of thematic learning, the orientation of context-based learning and the characteristics and dimensions of authentic assessment development/

- Debriefing 2: Concept maps and their thematic connection with other non-science learning materials
 - Debriefing 3: Good LKS that focuses on authentic task, use of appropriate media or aids to support the implementation of context-based science lessons.
 - Briefing 4: How to develop strategies from context-based science lessons.
- b. Part Two, by studying some concepts and products related to the development of authentic assessments underlying on context-based science learning aids integrated into primary schools. It consisted of three times of debriefing. In each briefing, the following stages were carried out: Initial Assignment, Understanding, Designing and Workshop, Review/Design Results Reflection (Group Discussion and Presentation) and Improvement.
- Debriefing 5: Developing test questions based on HOTS (high-order thinking skills) and use of Bloom's revised taxonomy to develop HOTS
 - Debriefing 6: How to develop some authentic alternative assessments in science lessons
 - Debriefing 7: Procedure to develop a rubric score.

The first and second parts were done as follows:

Initial Assignment,

Students were assigned tasks related to the next materials. This assignment was intended to identify the students' initial understanding and require students to re-examine the concepts in particular subjects that have been obtained from previous semester. This initial assignment focused on the product to be developed when conducting face-to-face activities directly with the tutor. The results of the initial tasks were collected in soft file form. In the meantime, before being held directly face-to-face with the tutor, students were asked to work on pretest questions related to the materials that will be carried out. Time provided for working on pretest questions was between 30-40 minutes.

Understanding

This stage was done by the tutor to explain the debriefing material. Generally, the students had been obtained this from the subjects in the previous semester. However, this stage was more about the concept implementation. It was intended to ensure that the students had the same perceptions about the concepts that have been learned and the task that would be completed at the end of the program. Time provided for giving understanding was between 45-60 minutes.

Designing and workshop

The design was done by each student based on science material that had been distributed to each group. Although each student in the group had the same science material, the results of product development were different.

Workshop activities were conducted to help students able to do the tasks that had been given. The tasks were completed individually and in groups. Individually, each student had different design, while in groups they discussed their design. Discussion across groups allowed product improvements that had been made. The time provided for the design and workshop was between 60-90 minutes

Review/Design Results Reflection (Group Discussion and Presentation)

The review/reflection of the design results was presented within group, to discuss which group will be presented in front of the class. The tutor managed the presentation based on the time allotted. This stage was done to open communication and discussion in general about the product perceived and made by each group. Therefore, there were some suggestions to revise the products. The time provided for the planning and workshop was between 60-90 minutes

□ Improvement

The final improvement was done to refine the product had been developed. It was submitted in soft file form. The time provided for this stage was between 15-30 minutes.

After the improvement and collection of products, students were asked to do post test questions using the questions test with pretest.

- c. The third part was the implementation of the product briefing. It was conducted at the school by using the product that was made during the debriefing program.
- d. The fourth part was a reflection of the process of debriefing and implementation of products that had been done.

3. Trial Program

The program design had been developed and tested two times with different subjects. The first trial was conducted to the prospective elementary school teachers in science material development subject, while the second test was done to alumni. The results of the trial are presented in Table 6.

Table 6: The Analysis Result of Trial of Debriefing Program

No	Description of Findings	Recommendations for Development of Debriefing Program
1	Assessment of several subjects related to the implementation of the program in the course of science learning development in elementary schools, among others: Basic Concept of Science in Elementary School, Science Education in Elementary School, Learning Media and ICT in the Field of Study, Deepening of Science Subject of Elementary School, Science Development Learning Models in Elementary School, and Curriculum Study and Learning Planning.	<ul style="list-style-type: none"> - Provide materials for the program of briefing, such as: 2013 curriculum review at elementary school, thematic and integrated learning, nature of science lesson in elementary school, Context Based Learning, characteristics and dimension of authentic assessment development, analysis of science materials with concept maps, development of learning media and LKS, Design of context-based learning stages with REACT strategy, development of HOTS-based test questions, alternative assessment analysis, and development of Anecdotal rubrics and notes. - The programming stage was designed not to refer to conventional lecture schedules
2	Lack of commitment from the participants of the debriefing from	<ul style="list-style-type: none"> - Participants involved should be in the 4th year (7th semester) and take

	the alumni/teacher if not in accordance with the task of time or task of the institution/school.	science learning development courses in elementary school
3	Implementation of the training program was done incompletely and only face-to-face so it was not clear whether the product that had been made by the student could be feasible to be used in school or not	- The implementation of the debriefing program should be done in full. In general, there should be face-to-face activities, product implementation produced by students to school and final reflection
4	Discussion of the science materials given to the lecture allowed for incompatibility with curriculum references in elementary schools. The division of groups and the number of students in the group was still limited. The division of this group caused the group discussion activities not to go well. Students tended to complete individual assignments as a whole without any input from other students.	- Division of the science materials for each group should be adapted to the primary school curriculum. Science materials should be based on grades 4, 5, and 6 - Implementation of the debriefing should be done by dividing the group according to the science material contained in the curriculum. Each participant should develop a different learning aid though still in one group. - The implementation of group discussion needed to be done with the guidance and supervision of the tutor/lecturer
5	Implementation of face-to-face training that was always done in the classroom could cause boredom for the participants because the duration of the debriefing time was long enough to produce the product on the day of the debriefing.	- Stages of debriefing at face-to-face should not only be done in the classroom, but could also be done outside the classroom. However, it should be in the campus environment and not be made into homework. The stages in the face-to-face section were: Initial Assignment, Understanding, Design and Workshop, Review/Design Results Reflection (Group Discussion and Presentation), and Improvement. Stages that allow being done in the classroom were the stages of design and workshop.
6	The product of the trial and the collection time of the alumni were hampered because sometimes they were held at the same time with other activities. For example: there were some alumni who had to teach. Timing becomes difficult so they were conducted on Saturday and Sunday.	- Implementation of the debriefing program should be carried out to students who contract the course of science learning development in elementary school with the commitment and initial explanation of how to carry out this debriefing program. Time should be adjusted with agreement between student and teacher by taking one day to carry out the debriefing program.

4. Reflection

The recommendations for the implementation of the debriefing program were based on the results of trials conducted on different subjects. It is better done to prospective teachers and teachers by paying attention to the following:

- a. All stages of debriefing program must be followed as a whole by the students until the learning aid can be implemented in the class. Each stage of the debriefing should connect the concepts and products to be produced.
- b. Each participant in the group should be given responsibility to develop different learning aid in accordance with the science materials. Implementation of group discussions should proceed with the guidance and supervision of the tutor or lecturer.
- c. Implementation of the debriefing program can be done in unconventional room situation to minimize the boredom. However, it should ensure that each stage of the program can be done well.
- d. All tasks that developed in each stage should be completed during the program. The students should not be allowed to do it at home. It should be assigned at the beginning of the program to assess the initial skill of the participants.

Furthermore, if it is done to prospective elementary school teachers, the following conditions must be addressed:

- a. It is recommended to be done to final year students (7th semester) who will do teaching practices at school.
- b. The students should have taken prerequisite courses on: Basic and Advance Concepts of Science in Elementary School, Science Education in Elementary School, Learning Media and ICT, Learning Evaluation, Learning Development Model in Elementary School, Curriculum Study and Lesson Planning.
- c. The implementation of the debriefing instilled in certain courses needs to pay attention to the duration of time. For instance, if it is one credit hour course, it will be done in 50 minutes face-to-face course, or 2.5 hours if done in 3 credit hour course. This time allocation for debriefing program will not be sufficient if done under this conventional system. Therefore, the implementation will be done well if more time allocation has been managed. This training program can be done specifically for elementary school teachers if they have commitment to attend the program and willing to allocate time to improve their teaching skills. In addition, the quality and intensity of supervision, and the evaluation tools used to guide the supervision of the debriefing program become an important element of teacher learning (Darling-Hammond, Wei, & Johnson, 2002).

Indicators that can be used to measure the professional quality of teachers are skillful in planning learning activities, implementing learning and assessing learning outcomes (Muslim, 2009). This developed debriefing program refers to these three indicators.

This comprehensive debriefing program has provided the participants with experience to be able to develop the learning tool and its assessment. Through the implementation of this debriefing program, prospective teachers are expected to have a positive attitude to the profession as a teacher. To develop a positive attitude towards the profession, Aktop & Beyazgül (2014) argue that the

curriculum, theory, and practical learning knowledge taught by academics in the debriefing program to prospective teachers should have a significant role. Further, Trif & Popescu (2013) concluded that in teacher education programs, the teacher should emphasize more on understanding professional development for teachers, and students should be made aware of all components of professional development (initial training, induction program, in-service training program, and continuous professional development in schools). Development of competencies that can be taught to prospective teachers is related to aspects: Design and implementation of the curriculum; Facilitation of several innovative teaching and learning processes; Evaluation and monitoring of teaching and learning performance; and Involvement in professional and personal development processes. Furthermore, implementation of applied learning requires the ability of teachers to understand the potential in themselves professionally related to emotional intelligence while implementing learning (Dolev & Leshem, 2017). Based on this, it is hoped that the result of this research can give an alternative of the implementation of prospective elementary school teacher debriefing by integrating with lecture program at LPTK and it is also hoped that the product can be implemented well in school. However, this program can be implemented for teachers through training activities. However, this program can be implemented for teachers through training activities.

CONCLUSION

A program to improve the professional competence of teachers is vital to be conducted. Teacher professional competence refers to designing, implementing, and assessing the outcomes of learning. This research has developed a debriefing program for prospective elementary school teachers in developing learning aids and assessment. This program produced products that have been implemented in the classroom. Its implementation consisted of four sections. Section 1 and 2 were related to understanding the concepts and products of learning aids and their assessment. Section 3 dealt with the implementation of learning aids that had been created and Section 4 dealt with reflection and discussion on the results of the product made during the program. The stages of debriefing in Section 1 and Section 2 consisted of: Initial Assignment, Understanding, Design and Workshop, Review/Design Results Reflection (Group Discussion and Presentation), and Improvement.

This training program was developed as an alternative to help prospective elementary school teachers become professionals. This skill can be given earlier through several courses. LPTK is directed to develop innovative development programs for these prospective teachers so that they are ready to become professional teachers. However, this debriefing program can also be used to enhance teachers' professionalism.

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