Restructuring the pedagogical competence training involving lesson study

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Abstract. Lecturers in higher education are recruited based on scientific field qualifications. Therefore, most of them did not have sufficient pedagogical competence academically. Pedagogical competence training in the form of instructional skills training (IST) and applied approach (AA) has not run optimally because it still emphasizes mastery of pedagogical basic knowledge and lacks in strengthening the lecturer’s learning management skills in the real classroom. By literature review method, this paper aims to analyze a practical experience of lecturer pedagogical competence training then propose the new structure both of material and pattern of IST and AA to overcome their problems. Analysis of the training experience and literature review concludes that university needs to restructure both material and pedagogic training patterns which include (a) merging of training material (b) focusing IST on providing basic pedagogical knowledge, while AA on developing supporting skills and learning practice (c) conducting IST in an online platform using a learning management system, while AA conducting through the field practice (d) conducting the learning practice in a real classroom using lesson study approach. It needs to involve the university institution leaders to facilitate the program by taking an appropriate policy to keep the sustainability of the program.

1. Introduction

Competencies that must be possessed by lecturers based on Law No. 14 of 2005 concerning Teachers and Lecturers [1] as well as the Decree of the Minister of Education RI, No. 3 of 2020 concerning the national standards of higher education that lecturers are professional educators and scientists with the main task of transforming, developing, and disseminating science, technology through education, research, and community service [2]. Especially in the field of education, lecturers must have competencies of (1) Pedagogic: designing learning, managing learning, assessing learning, making use of research results to improve the quality of learning (2) Personality (3) Professional (4) Social.

Lecturers must have sufficient knowledge and skills to be able to facilitate students’ learning in order to achieve learning outcomes effectively. Learning in higher education according to the Regulation of the Minister of Education and Culture RI No. 3 of 2020 must be interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered [2]. It means that teaching is not just conveying learning material, but also must be able to equip broad and in-depth science, train students to solve real problems independently, scientifically, and transdisciplinary. The learning process
also has to create an academic environment based on a system of values, norms, and scientific principles and uphold religious and national values.

Generally, lecturers are recruited by universities based on their field of knowledge. Therefore, most of them have limited knowledge and pedagogic skills because they did not have knowledge and experience in managing to learn, except for lecturers in the faculty of teacher education. Mastery of content knowledge and pedagogic skills is equally important to produce successful learning in higher education. Thus, it is necessary to increase pedagogical skills so that they are able to carry out his main duties and functions as educators.

Professional development related to the lecturer's pedagogical competence has been carried out in the form of Instructional Skills Training (IST) and Applied Approach (AA). IST is the first stage of training for novice lecturers followed by the second stage training, AA. Both types of training are carried out annually by University. The IST and AA programs are training programs designed by the Directorate General of Higher Education RI to improve the pedagogical competence of lecturers throughout Indonesia.

Lecturer pedagogical competence plays an important role because it will affect the quality of the learning process as well as the achievement of student learning outcomes. In the industrial revolution 4.0 era, lecturers must also have additional skills to use information technology in facilitating student learning and exploring various learning sources. Improving students' learning achievement must begin with improving the quality of staff [3].

Based on field observations to the IST and AA training at university indicated that the training focused on pedagogical knowledge in which pedagogic skills was just measured based on tasks completed after the training, did not integrate information technology as part of pedagogic skills, did not have standardization of trainers and teaching practice be conducted in peer teaching form not in the real classroom. Thus, it is necessary to restructure and develop both the materials and the mode of IST and AA programs. Restructuring the programs will improve lecturers' pedagogical skills, their ability to use information and technology in learning, and their skills in managing real classrooms. Finally, it will impact to the students’ learning outcome.

This paper examines how IST and AA training have been implemented and what are restructuration proposed in training materials as well as the patterns using lesson study approach. Lesson study approach is proposed because it has been widely researched and has shown its effectiveness in the professional development of educators, especially pedagogical skills [4–6]. Teachers' professional growth, with the iterative processes of enactment and reflection being critical in mediating this professional growth [7]. Lesson studies allow teachers to collaborate with each other to improve the learning quality that is being conducted. They plan, conduct, and reflect on the learning process collaboratively in improving their future learning [5]. Finally, lesson study will habituate the teacher to carry out learning reflectively in order to improve students’ competencies continuously.

Lesson study leads to facilitate teacher or lecturer to be an adaptive educator who addressing students’ educational need in a social and dynamic learning environment by entailing both careful plannings as well as responsive intervention in lesson [8,9]. According to lesson studies benefits, university can adopt its philosophical value as well as its practical experience in developing and strengthening the novice lecturers’ pedagogical competencies. This paper aims to analyse our experience program in developing lecturers’ pedagogical competence to give the proposed structure of the material and the pattern of the pedagogical training program.

2. Method
This article was prepared using the literature review method to analyze a practical experience of developing the lecturer's pedagogical competence at Universitas Lambung Mangkurat Indonesia. There were 26 pieces of literature used, 15 of them are reputable international journals. In addition, references are also used are lesson study activities reports that have been carried out by Universitas Lambung Mangkurat, books, and the relevant government laws and or regulations. Furthermore, based on the analysis author propose the structuration of both the material and pattern of IST and AA.
3. Practical Experience and Discussion

3.1. Lecturer pedagogical skills development

Lecturers’ instructional skills development is very important because most of the novice lecturers do not have a pedagogical education background. The instructional skills is measured in the form of the ability to apply learning paradigm in the development of learning systems; designing a learning system based on the learning paradigm, implementing learning based on the competence learning system design, and improving the quality of the learning system.

Development of the novice lecturers' pedagogical competencies has been carried out through tiered training of IST and AA. The training material including strategic issues of higher education, higher education competency-based curriculum, profession and lecturer ethics, learning: problems and alternative solutions, learning and learning models, learning paradigms, systems approach in learning design, learning principles, learning decision making, various learning resources, learning assessment models, micro-teaching practices, evaluation of learning programs, classroom action research, course reconstruction, and development of learning materials [10].

IST and AA at Universitas Lambung Mangkurat are carried out for 40 learning hours respectively which includes material as presented in Table I. IST emphasizes the minimum compulsory of basic pedagogical competencies that must be mastered by lecturers, while AA material is a supporting competency to strengthen basic pedagogical competences as a lecturer.

| No | Instructional Skill Training Materials | Applied Approach Materials |
|----|---------------------------------------|----------------------------|
| 1  | Strategy to improve the quality of higher education | Integrated quality management |
| 2  | Learning theory and motivation         | Ethics and morals in learning |
| 3  | A taxonomy of instructional goals      | Evaluation of the learning process |
| 4  | Constructivism in learning             | Cognitive strategies        |
| 5  | Assignment method                      | Course reconstruction       |
| 6  | Innovative learning model              | Classroom Action Research   |
| 7  | Basics of communication and basic teaching skills | Alternative assessment |
| 8  | The nature of the instructional method | Course contract            |
| 9  | Instructional design                   | Various e-learning based learning media |
| 10 | Implementation of Indonesian National Qualification Framework (INQF)/Higher Education National Standard (HINS) in courses | Development of higher education curriculum based on INQF, HINS and 4.0 era. |
| 11 | Team teaching                         | Writing teaching materials  |
| 12 | Assessment of learning outcomes        | Reference writing standards and plagiarism |
| 13 | Teaching practice                      | Practices (Lecture contracts, textbook writing, learning assessment) |

Based on the material presented in Table 1, the learning theory and motivation material (IST No.2) and constructivism material in learning (IST No.4) can be combined in a discussion topic. Meanwhile, evaluation of the learning process (AA No. 3) and alternative assessment (AA no 7) can be combined with learning evaluation (IST No. 12) as a learning assessment material. Likewise, the implementation of INQF/ HINS in courses (IST No.10) can be combined to the development of higher education curriculum based on INQF, HINS, and 4.0 era. (AA No.10) due to overlapping materials related to the curriculum and its development.

Teaching practice (IST No. 13) has been carried out using microteaching with limited time duration (30 minutes). Thus, they are not able to equip novice lecturers with adequate basic teaching skills. Teaching practice is the most important part of lecturers’ competencies because it determines the...
achievement of learning objectives. In this practice, a novice lecturer making learning plans, choosing the right learning strategy, and assessing the results and learning process. Due to limited practice time, the activities tend to be theoretical. So they were unable to measure the lecturers’ pedagogical skills in a real class learning process.

According to both IST and AA, it is necessary to restructure the training materials so that lectures’ pedagogical competencies can be achieved effectively and efficiently. IST needs to be focused on strengthening the basics pedagogical knowledge, while AA is focused on strengthening practical learning in the real classroom. By this pattern, pedagogical skills development training can provide a sufficient portion of pedagogic practice. If the spent time of training is the same, integrating material in the same discussion topic can be proposed as shown in Table 2.

Table 2 Proposed material of IST and AA training at Universitas Lambung Mangkurat

| No | Instructional Skill Training Materials | Learning Time | Applied Approach Materials | Learning Time |
|----|----------------------------------------|---------------|----------------------------|---------------|
| 1  | Strategy to improve the quality of higher education | 3             | Writing teaching materials | 5             |
| 2  | Integrated quality management           | 3             | Reference writing standards and plagiarism | 3             |
| 3  | Development and implementation of higher education curriculum based on IQFN, SNPT and industry 4.0 | 4             | Classroom action research | 6             |
| 4  | Course Reconstruction and Competency Analysis | 4             | Teaching practice (curriculum analysis, lesson plan, lecture contracts & teaching practice, making reports) | 20            |
| 5  | Learning theory and motivation          | 4             |                            |               |
| 6  | Basics of communication and basic teaching skills | 4             |                            |               |
| 7  | The nature of the instructional method  | 4             |                            |               |
| 8  | Innovative learning model               | 4             |                            |               |
| 9  | Assessment of learning outcomes and processes | 4             |                            |               |
| 10 | Various e-learning based learning media | 4             |                            |               |
| 11 | Instructional design                    | 4             |                            |               |
| 12 | Team teaching                          | 2             |                            |               |
| 13 | Ethics and morals in learning           | 2             |                            |               |
|    | Total                                  | 46            |                            | 34            |

Based on the above analysis, it is important to restructure the lecturer pedagogic skills training method so that they are able to equip young lecturers with reliable knowledge and skills. In addition, to restructure training materials (Table 2), it is also necessary to utilize e-learning to streamline learning time, especially for IST materials, and to use a lesson study approach for teaching practice in AA activities in order to provide adequate professional experience in a real classroom. The proposed training pattern is shown in Figure 1.

3.2. The lecturer pedagogical skills development-based lesson study

Sections Why should we use a lesson study approach to strengthen the lecturers’ pedagogical skills? In a lesson study, teachers or educators carefully explore how student learning, thinking and behavior
change as a result of the lesson. The practice of lesson study can lead to instructional improvement as teachers become more knowledgeable about how their students learn and think and how instruction affects student thinking. In lesson study teachers work in small teams to plan, teach, observe, analyze, and use information about student learning to revise the lesson [11,12]. Lesson study (jugyou kenkyuu = lesson research) is also defined as a Japanese model of teacher-led research in which a triad of teachers work together to target an identified area for development in their students' learning. Using existing evidence, participants collaboratively research, plan, teach, and observe a series of lessons, using ongoing discussion, reflection, and expert input to track and refine their interventions [13,14].

Collaboration is a medium for interaction between teachers to sharpen the point of view of a learning process. Thus this collaboration will provide opportunities to improve the quality of the student learning process. Collaboration also has the impact of sharing the best learning experiences, thereby increasing the professional competence of educators involved in lesson study [15]. Lesson Study, which was first developed in Japan, has developed in various countries and has become an approach to develop educators' professionalism. Lesson study activities basically include the main steps of design a lesson to achieve the learning goals, One team member teaches the lesson while others observe and collect evidence of student learning, and reflect through discuss the results and assess student progress toward learning goals as material for the improvement of the next lesson plan [12,16] as described by Fig. 2. These stages can be summarized in three main activities, namely plan (compiling a learning plan together), do (educators implementing learning and being observed by several other educators), see (reflecting on learning together) [17]. Reflection stage is a very important stage because efforts to improve the subsequent learning process will depend on the sharpness of the participants' analysis based on the evidence collected during the learning process. Reflection activity is carried out through a discussion that is followed by all participants. The discussion starts from conveying the impressions of the teacher who has practiced learning, by conveying comments or general impressions or special impressions of the learning process he/she did, for example regarding difficulties and problems in implementing lesson plans in the classroom. Furthermore, all observers convey responses or suggestions wisely to the learning process that has been carried out (not against the teacher) based on accurate evidence. The various ideas in the discussion can be used as feedback for all participants in order to improve the next learning process. Reff [15] state that teachers' participation in shared professional teaching knowledge is affected by the degree to which the teachers embraced the public nature of lesson study, the teachers 'idiosyncratic views of teaching and learning, the teachers' individual tolerance for socially constructing curricula, and the degree to which teachers acceded to school cultural obstacles. Reflection activities can generate an amount of new knowledge or important decisions that are useful for the improvement and enhancement of the learning process. Individually, the various findings and valuable input that were conveyed during the discussion in the reflection stage can be an asset for teachers, both acting as teachers and observers, to develop the learning process in a better direction. In

Figure 1. The proposed pattern of lecturers’ pedagogic competency training
managerial terms, with the direct involvement of the leaders as participants of the Lesson Study, they will get a number of valuable inputs for the benefit of developing educational management in the institution they lead.

Figur 2. Lesson study cycles

The main focus of implementing lesson study is student activity in class with the assumption that it relates to the teacher's activities while he/she carry out the learning. It means that by improving students learning activity, automatically we improved teacher pedagogical competence. Some benefits of the lesson study as a means of developing professional competence for educators [12,18] include:

1. Provide educators an opportunity to see teaching and learning in the classroom in a real form and develop a common understanding of what good teaching practice entails.
2. Keep students at the heart of professional development activity. It provides an opportunity for educators to carefully examine the students' learning and understanding process by observing and discussing actual classroom practice.
3. Educators can be actively involved in the process of instructional change and curriculum development.
4. Provide a scholarship of teaching and learning activity the final products are suitable for professional presentations and publication. Lesson study integrates teaching and research, theory, and practice.

Research reports show that teachers often misunderstand that lesson study as a lesson plan rather than teacher research [12,19]. Teachers without lesson study experience focused more on the observing phase while teachers with lesson study experience focused more on student learning [19]. In contrast, what teachers perceive as elements of learning (variants of lesson studies) are on a continuum of increasing complexity, from improving learning by following processes to transforming student understanding through conceptual change; the more complex the teachers' understanding of lesson study, the more elements they perceive as practice [20].

Generally, the success of lesson studies is reported from learning at the primary to the secondary school level, while implementation at the higher education level is still very limited. Lambung Mangkurat University, for example, has conducted a lesson study workshop in 2009 which was attended by 90 people consisting of 65 lecturers of mathematics and science education department, 3 lecturers of IAIN Antasari Banjarmasin, 5 lectures of mathematics and science education department STKIP
Banjarmasin and 17 lectures of other departments in Faculty of Education of Universitas Lambung Mangkurat [21]. The lesson studies were carried out in the same year and the monitoring data as shown in Table 3.

**Table 3.** Results of the lesson study monitoring and evaluation at the FKIP ULM

| No | Question                                                          | Dept -1 | Dept -2 | Dept -3 | Dept -4 | Average |
|----|------------------------------------------------------------------|---------|---------|---------|---------|---------|
| 1  | Lecturers convey learning objectives                             | 96.7    | 88.1    | 100     | 69.9    | 88.7    |
| 2  | Lecturers encourage students to study hard                       | 96.7    | 100     | 100     | 82.9    | 94.9    |
| 3  | Student like to learn with the lecturers’ way in teaching.      | 85.6    | 91.7    | 88.4    | 100     | 91.4    |
| 4  | The course topic encourages curious about the following topics   | 85.2    | 94.8    | 88.4    | 87.5    | 89.0    |
| 5  | Lecturers use media/experimental tools                           | 86.7    | 75.1    | 93.1    | 15.3    | 67.6    |
| 6  | Lecturers provide worksheet for teaching                         | 81.1    | 75.2    | 54.7    | 71.8    | 70.7    |
| 7  | Student likes to learn Mathematics and Natural Science Lessons   | 96.7    | 93.4    | 89      | 42.6    | 92.9    |
| 8  | Learning group was formed                                        | 45.9    | 88.6    | 90.6    | 88.9    | 78.5    |
| 9  | Lecturers using a boring way in teaching                         | 23.2    | 22.4    | 25.4    | 15.3    | 21.6    |
| 10 | Student likes learning in groups                                 | 69.0    | 100     | 87.6    | 100     | 89.2    |
| 11 | The lecturer gave students the opportunity to ask questions      | 100     | 100     | 95.9    | 100     | 99.0    |
| 12 | The lecturer guides the discussion                               | 63.0    | 95.5    | 88.7    | 100     | 86.8    |
| 13 | The lecturer motivated students to continue learning             | 88.9    | 100     | 88.5    | 87.0    | 91.1    |
| 14 | Lecturers provide challenges in learning                        | 93.0    | 95.6    | 89      | 87.0    | 91.2    |
| 15 | Student easier to learn with the implemented way                | 85.2    | 94.8    | 77.7    | 88.9    | 86.7    |

Source: Tim Lesson Study (2009).

There was an increase in understanding and positive responses from lecturers and students regarding the implementation of lesson study [21]. However, several obstacles were encountered, namely bringing together lecturers at the same time because it coincided with other course schedules. This fact due to the lesson study do not yet have a policy base to be implemented at Universitas Lambung Mangkurat. Based on the positive impact, institutional policies are needed so that lesson study activities can be empowered in the framework of professional development of lecturers, especially to strengthen pedagogical competence.

As a professional development approach, novice lecturers need to be introduced lesson study institutionally and maintained for sustainability. Therefore it requires the involvement of university policymakers, collaboration with faculty leaders so that professional development is integrated with the interests of developing the quality of learning in all the departments. Lee [18] argues that institutional leadership is an important factor in maintaining the sustainability of professional development through the lesson study approach. In addition, the self-disclosure of educators requires a good interaction between them in developing professional competence.

The sustainability of professional development will also be maintained if this activity is able to produce best practices that can inspire other teachers or lecturers. Lesson study as part of an innovation effort is a complex process because it involves changing the beliefs and habits of the lecturers as well as implementing new ways of learning. Principal leadership takes an important role in focusing on the development of teachers’ knowledge and skills, professional community, coherence programs, and technical resources. Principals who lead professional learning communities (PLCs) in a strictly hierarchical manner may inhibit the sustainability of PLCs as compared to principals who come alongside and support their teachers. In addition, principals whose leadership style nurtures the empowerment of teachers are more likely to create sustainable PLCs [22,23]. Adaptation of lesson study is also needed to maintain program sustainability [24,25] in accordance with the culture of local professional development.
4. Conclusion
The lecturer’s pedagogical competence training needs to be restructured in order to improve the pedagogical competence of the novice lecturers optimally. Analysis to the training experience and literature review concludes that the university needs to restructure both material and pedagogic training patterns which include:

a. Merging of training material.
b. Focusing IST on providing basic pedagogical knowledge, while AA focusing on developing supporting skills and learning practice in a real classroom.
c. Conducting IST in online platform using a learning management system, while AA conducting through the field practice.
d. Conducting the learning practice in a real classroom using lesson study approach. Because lesson study is the potential to improve the learning management competence, find best practices of student mastery to the learning materials, build teaching communities and conduct scholarly inquiry and keep students at the heart of professional development activity.

A combination of the e-learning platform and teaching practice in a real classroom using lesson study approach was believed to be able to improve novice lecturers on pedagogical skills effectively and efficiently. Given that the academic culture in higher education is relatively free, it is necessary to involve the role of leaders in encouraging and facilitating lesson study. To maintain sustainability institution leader has to make a policy of lesson study implementation for strengthening lecturers’ pedagogical competencies.

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