Lesson Study Oriented Teaching Materials Improve Student Learning Outcomes

I Gede Nurjaya[1*], I Gusti Ayu Agung Manik Wulandari[2]   iD

[1] Pendidikan Bahasa Indonesia, Universitas Pendidikan Ganesha, Singaraja, Indonesia
[2] Pendidikan Anak Usia Dini, Universitas Pendidikan Ganesha, Singaraja, Indonesia

ABSTRAK

Kurang efektifnya pembelajaran dipengaruhi faktor sumber belajar seperti belum tersedianya bahan ajar. Berdasarkan hal tersebut, tujuan penelitian ini yaitu mengembangkan buku ajar berorientasi lesson study untuk mahasiswa teknologi pendidikan. Jenis penelitian ini adalah penelitian pengembangan. Penelitian ini menggunakan desain pra eksperimen one group pretest posttest design. Buku ajar dikembangkan menggunakan model Hannafin & Peck. Produk yang dikembangkan dinilai oleh ahli yaitu ahli isi, ahli media, dan ahli desain pembelajaran. Subjek uji coba produk yaitu 38 mahasiswa teknologi pendidikan. Metode pengumpulan data yang digunakan adalah metode kuesioner, metode tes dan metode observasi. Instrumen pengumpulan data menggunakan lembar kuesioner dan tes. Data yang telah dikumpulkan selanjutnya dianalisis menggunakan analisis deskriptif kualitatif, analisis deskriptif kuantitatif, dan analisis statistik inferensial (uji-t). Hasil penelitian yaitu buku ajar berorientasi lesson study mendapatkan kualifikasi sangat baik dari ahli dan mahasiswa. Hasil analisis juga terdapat perbedaan yang signifikan pada hasil belajar mahasiswa antara sebelum dan sesudah menggunakan buku ajar. Disimpulkan bahwa buku ajar berorientasi lesson study meningkatkan hasil belajar mahasiswa.

ABSTRACT

The ineffectiveness of learning is influenced by learning resource factors such as the unavailability of teaching materials. Based on this, this research aims to develop lesson study-oriented textbooks for educational technology students. This type of research is development research. This study used a one-group pretest, posttest design pre-experimental design. The textbook was developed using the Hannafin & Peck model. The products developed were assessed by content experts, media experts, and learning design experts. The product trial subjects were 38 educational technology students. The data collection method used is the questionnaire method, the test method, and the observation method. Data collection instruments used questionnaires and tests. The collected data were then analyzed using qualitative descriptive analysis, quantitative descriptive analysis, and inferential statistical analysis (t-test). The research results show that lesson study-oriented textbooks get very good qualifications from experts and students. The results of the analysis also show that there are significant differences in student learning outcomes before and after using textbooks. It was concluded that lesson study-oriented textbooks improve student learning outcomes.

1. INTRODUCTION

Competence has always been a reference by educational practitioners carrying out educational practices. Competence is a set of knowledge, skills, and behaviors teachers and lecturers must possess, internalize, and master in carrying out professional duties (Andini & Supardi, 2018; Kusumayani et al., 2019; Suardana et al., 2018). Competence is also a set of skills and abilities that a person must have in order to be able to carry out maximum performance to produce a learning process that is what is desired (Agustini et al., 2019; Peng et al., 2021; Santagata et al., 2021). It indicates that the teacher must first be competent before educating students to become competent learners. Teachers or lecturers as educators have a very important role in education, so they need to be developed into professional educators (Agustini et al., 2020; Kholis, 2019; Mpungose, 2021). With this professional attitude, it is expected to achieve quality education to create reliable human resources in the academic, socio-personal, and vocational fields.

Corresponding author
E-mail addresses: gede.nurjaya@undiksha.ac.id (I Gede Nurjaya)

One of the recent issues or topics that is interesting to be discussed in education is the effectiveness of learning. Less effective learning prioritizes how educators teach rather than how students learn (Astiti et al., 2017; Setianingsih et al., 2019; Widani et al., 2019). This paradigm triggers the implementation of conventional learning through oral communication techniques. This understanding certainly conflicts with constructivist adherents such as Gagne, Briggs, and Wager. The expert stated that learning is designing external events to support the internal student learning process (Hamdunah et al., 2016; Hayden et al., 2015). This conception has two main things, namely. First, learning is designed by educators (Nasri & Mansor, 2016; Shawa, 2020). Second, the purpose of learning is to increase or encourage the learning process in students (Amin et al., 2020; Kivunja, 2014; Sasono et al., 2017). Apart from the educator factor, the need for more learning effectiveness is also influenced by learning resource factors such as the unavailability of teaching materials (Albana & Sujarwo, 2021; Hastuti et al., 2020).

Textbooks are materials systematically designed to achieve competency (Momang, 2021; Muga et al., 2017). Textbooks are different from textbooks. Textbooks are not designed based on the competence of a subject or course but rather are oriented toward general goals (Ernawati, 2018; Ulfah et al., 2019). This phenomenon is also experienced in lectures on developing teaching materials at the Department of Educational Technology, Faculty of Education, University of Education, Ganesha, which still uses textbooks as student handbooks. The results of other studies also show that learning that only uses textbooks (not textbooks) can lead to low student achievement (Dwi Lestari & Putu Parmiti, 2020; Fahmi et al., 2021; Wulansari et al., 2018). These problems indicate that the learning design and teaching materials as components of the learning system significantly impact the quality of the learning process.

One alternative to overcome the problem of learning practices that have been less effective so far is to apply lesson study. Lesson study is a model for developing the teaching profession through collaborative and sustainable learning assessment based on collegiality and mutual learning principles to build a learning community (Ario, 2018; Rozhana & Harnanik, 2019). Lesson study is carried out systematically; namely, the educator's work is carried out collaboratively to develop learning plans and tools, make observations, and reflect and revise lesson plans cyclically and continuously (Anif et al., 2020; Effendi M., 2016). The alternative proposed for the absence of textbooks is carried out through a development process.

The importance of developing textbooks stems from the function of making teaching materials. Making teaching materials saves educators time in learning and changes the educator's role from a teacher to a facilitator (Albana & Sujarwo, 2021; Hastuti et al., 2020). In addition, textbooks can improve the learning process to be more effective and interactive (Setiawan et al., 2017; Syahroni et al., 2016). Textbooks can also guide educators who will direct all their activities in the learning process (Neppala et al., 2018; Resita & Ertikanto, 2018). For students, teaching materials can facilitate independent learning, learning is more flexible, and learning can be according to the pace of each student (Dewi & Primayana, 2019; Nurhasnah et al., 2020). In addition, teaching materials also serve as guidelines for students who will direct all activities in the learning process (Handayani et al., 2021; Linda et al., 2018).

The development of developed textbooks follows the pattern of learning product development models (Darmayasa et al., 2018; Pramana et al., 2020). What distinguishes this development from other developments is that it is carried out through lesson study activities at the design, development, and implementation stages of textbooks in the classroom. Some things that are taken into consideration are; first, general competencies in textbooks and learning tools can be translated into specific competencies that are more complete, logical, and systematic because they are formulated by several teachers of the same subject so that they can complement and collaborate. Second, the learning design accommodates the development of student competencies. Third, the implementation of textbooks is more optimal because the results of the lesson study team's analysis serve as guidelines for improving the quality of the learning process at the next meeting.

These considerations refer to the main goal of lesson study, which is to understand better how students learn and educators teach (Sujana et al., 2018; Yulianto et al., 2017). Second, increasing learning systematically through collaborative inquiry and building pedagogical knowledge (Hobri et al., 2018; Permana et al., 2017). Previous research findings also state that lesson study focuses on material or subject matter that is considered important and becomes a weak point in student learning and is very difficult to learn (Guner & Akyuz, 2020; Manrulu & Sari, 2015). Textbooks developed through lesson study can help students more easily understand the material that is considered difficult. It is reinforced by research findings which state that the development of lesson study activities has improved student learning processes and outcomes (Manrulu & Sari, 2015; Sudrajat et al., 2018). Based on this, it is concluded that lesson study-oriented textbooks can overcome the problems students or teachers face. This research aims to develop lesson study-oriented textbooks for educational technology students.

2. METHOD

This type of research is development research. This study used a one-group pretest, posttest design pre-experimental design. The textbook was developed using the Hannafin & Peck model, which consists of three main processes: needs assessment, design, development, and implementation (Dewi & Sujana, 2021). Evaluation and revision are carried out in these three stages. At the needs assessment stage, an analysis of learning problems, competencies, student characteristics, materials, and analysis of learning resources is carried out. At the design stage, the focus is on three activities: material selection, learning strategy selection, and designing the forms and assessment methods used. At the development and implementation stage, namely, producing a product development prototype as a textbook. Operationalization of development activities, namely searching and collecting all sources or references, making drawings, charts, and supporting tables, typing, preparing layouts, preparing evaluation instruments, and other related matters

The results of the development in the form of textbooks need to be tested in real terms in the field to obtain an overview of the validity, effectiveness, and attractiveness level. The implementation phase includes three activities: planning, implementation, and reflection. Planning activities are carried out by inviting lecturers for the teaching material development course, starting now referred to as the lesson study team (LS). The LS team plans to prepare learning tools, including making a syllabus, learning implementation plans, student worksheets, evaluation tools, and textbooks. At the implementation stage, the model lecturer applies to learn tools and textbooks. Before the learning process begins, a pretest is carried out, and then learning is carried out using textbooks for four meetings. A project-based learning model was used to apply textbooks through lesson study. At the end of the fourth meeting, a posttest was conducted to determine the increase in learning effectiveness. The role of the lesson study team is as an observer.

At the reflection stage (see), the LS team gathers. The model lecturer reveals the obstacles encountered during the learning process, and then the observer is invited to present the results of observations along with their analysis for learning improvement. The products developed were assessed by content experts, media experts, and learning design experts. The product trial subjects were 38 educational technology students. The data collection methods used are the questionnaire, test, and observation methods. Data collection instruments used questionnaires and tests. The collected data were then analyzed using qualitative descriptive analysis, quantitative descriptive analysis, and inferential statistical analysis (t-test). Inferential statistics in the form of a t-test are used to analyze differences in pretest and post-test scores when implementing textbooks.

3. RESULTS AND DISCUSSION

Results

The research results are in the form of textbooks, developed using the Hannafin & Peck model, which consists of three main processes: needs assessment, design, and implementation. Evaluation and revision are carried out at each stage. The development of textbooks has gone through a series of validations by experts. Based on the validation results, the content experts obtained a good assessment. These results indicate that textbooks containing knowledge in the form of facts, concepts, principles, and procedures are appropriate for students. Based on the validation of media experts, textbooks are in a good category. Media images in textbooks are declared appropriate to explain the concepts, principles, and procedures contained in textbooks. The validation results from learning design experts show that textbooks are in a good category. This result means that the textbook has met the eligibility aspects of learning design, learning message design, and the accuracy of using this type of assessment. The results of textbook development are presented in Figure 1.
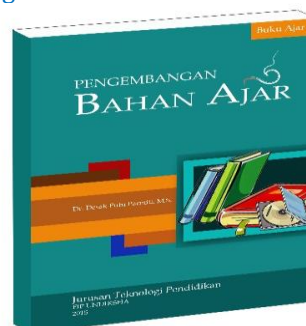

Figure 1. Lesson Study Oriented Teaching Material Development Results

The expert validation process has been passed, and students assess the textbooks. The results of individual tests (3 students), small group tests (12 students), and field tests (38) showed that the level of validity of textbooks was good. These results indicate that the clarity of the material, the ability to motivate, the attractiveness, and the ease of understanding the content of textbooks are considered appropriate when used by students. Students also stated that the textbook was good and easy to understand. Textbooks that have passed a series of expert and student assessments and have been improved are then applied in class to determine their effectiveness in improving student learning outcomes. Implementation of textbooks using the lesson study approach. The results of the two sample t-test calculations in pairs (paired samples t-test) show that the significance obtained is 0.001, which is less than the specified significance of 0.05. It was concluded that there were significant differences in student learning outcomes before learning to use textbooks and after learning to use textbooks. The average pretest score was 71.42, and the posttest average score was 85.15. Based on the results of the t-test, it was concluded that textbooks effectively increased student learning outcomes. The results of the t-test using SPSS are presented in Table 1.

Table 1. Paired Samples Test

	Model	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest - Posttest	-13.728	10.765	1.746	-17.267	-10.189	-7.861	37	0.001

Discussion

Based on the results of data analysis, it was concluded that textbooks Effectively improve student learning outcomes. Several factors cause differences in the average score of learning outcomes before and after using textbooks. First, textbooks are developed based on learning theory, learning theory, and learning message design theory. Textbooks developed based on learning theory refer to learning processes that occur due to the synergy of short-term and long-term memory, which are activated by creating external factors, namely the learning environment (Gunada et al., 2021; Indrawini et al., 2017; Susilowati, 2017). Textbooks, as a learning environment component, contain text, pictures, illustrations, cases, and many authentic assignments (Ross et al., 2019; Saputri et al., 2016; Setiawan et al., 2017). It causes students to be motivated in reading to improve student learning outcomes. Textbooks are developed based on the learning theory

The presentation of material in textbooks is based on learning events or activities. The purpose of using these learning events is so that the presentation of the contents of the textbook is not direct instruction. Presentation of material in text and images is not merely a process of transferring knowledge and positions students as passive recipients of messages (Ilmi et al., 2021; Lee & Osman, 2012; Syahroni et al., 2016). Textbooks support constructive learning and help students explore topics and generalize their knowledge (Resita & Ertikanto, 2018; Sari & Manuaba, 2021). As for the learning activities that are the principles in compiling textbooks, namely attracting students' attention, conveying learning objectives, activating students' prior knowledge, presenting learning content, providing study instructions, providing performance opportunities, providing feedback, assessments, and providing assignments to encourage knowledge transfer and retention occurs (Dewi & Primayana, 2019; Erna et al., 2021; Nurhasnah et al., 2020).

Learning message design theory has a major impact on the implementation of the principles of motivation, memory principles, perception principles, and concept learning principles. The principle of motivation is implemented through an attractive book cover design (Asrial et al., 2020; Pramana et al., 2020). The book cover design reflects the book's contents and gives a positive impression to students about the contents. Not only cover design, but the principle of motivation is also applied to providing examples related to abstract material, clarity and relevance of images, and presenting interesting, challenging, and questionable topics. The principle of memory is implemented through presenting concrete messages, repeating difficult material, and practicing implementing material on concepts, principles, and procedures (Dewi & Primayana, 2019; Erna et al., 2021; Handayani et al., 2021; Nurhasnah et al., 2020). The principle of perception is implemented by providing variations on a word or phrase, such as bolding, underlining, using a different typeface, changing the color of the letters, and providing information in perceiving an image. Implementing the principle of learning concepts is carried out by presenting easy concepts first to more difficult concepts, using examples and non-examples, using various

examples, and using the characteristics of examples and non-examples that are opposite. It makes it easier for students to understand the learning material (Asrial et al., 2020; Komikesari et al., 2020; Pramana et al., 2020; Rahmatika et al., 2020).

Second, the implementation of textbooks in class uses a lesson study approach which also influences the effectiveness of textbooks in improving student learning outcomes. The model lecturer and the lesson study team make lecture program units (SAP), handouts, and student worksheets (LKM) in the do stage. In SAP, a project-based learning model is defined as a learning model in implementing textbooks, using test assessments, and project assessments (Dewi et al., 2016; Winatha et al., 2018). The textbook is applied in learning using a project-based learning model and is designed in four meetings at the do stage. Using project-based learning models positively impacts learning processes and outcomes (Nathalia et al., 2015; Wulandari, 2016). Through this learning model, students must produce authentic products (Hujjatusnaini et al., 2022; Wahyudi & Winanto, 2018). This demand makes students feel challenged to do it because the product that will be produced is useful not only for students but also for other parties, especially schools. The selection of a project-based learning model is supported by the results of previous studies, which show that project-based learning can help students access information, increase understanding, and improve practical skills when compared to traditional learning (Faizah, 2015; Saad & Zainudin, 2022; Sumardiana et al., 2019). Thus, selecting project-based learning models to implement textbooks is relevant and can improve student learning outcomes.

During the textbook implementation stage, learning interactions take place in a multi-way. Interaction occurs between students and students, students and lecturers, students with textbooks, and even students with experts. This interaction is triggered because, at the end of each lesson study team, the team gathers to reflect (see) to improve learning (Ario, 2018; Rozhana & Harnanik, 2019). Authentic tasks also encourage students to interact because tasks must be done cooperatively and collaboratively (Anif et al., 2020; Rozhana & Harnanik, 2019). Within four meetings, there was an increase in student activity. Students begin to dare to ask questions, answer questions, have dialogues, share roles, and carry out tasks that are their responsibility. Psychologically activeness can be influenced by students' interest in learning (Pour & Sukroyanti, 2018; Sihaloho et al., 2020).

Students like inspiring, interactive, fun, challenging, and motivating learning (Rahayu et al., 2019; Setyowati & Masrukan, 2016). Creating such learning is done through planning, observing implementation, and reflection by the lesson study team to correct deficiencies so that learning at the next meeting is better. The lesson study process at the textbook implementation stage has created interesting learning for students, and students do not feel disturbed by the presence of observers. These lesson study activities become an approach to encourage lecturers to become more professional, which impacts the quality of education in general. This research implies that implementing textbooks using lesson study positively impacts students and lecturers because reflection activities are a reference for model lecturers in improving learning so that students are well facilitated in building attitudes, knowledge, and skills.

4. CONCLUSION

Lesson study-oriented textbooks get very high validity from experts and students. The results of the data analysis also showed that there were significant differences in student learning outcomes before learning to use textbooks and after learning to use textbooks. It was concluded that lesson study-oriented textbooks effectively improved student learning outcomes.

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