Improving Teachers' Ability to Integrate TPACK in Their Lessons through Hands-on Activities: A Lesson Study Based Research

Istiqlaliah Nurul Hidayati[1*], Mursidah Rahmah[1], Gusnadi[1]

[1]Universitas Pakuan
*Corresponding author, e-mail: istiqlaliah@unpak.ac.id

Abstract
Pedagogy and Content Knowledge (TPACK) which is a unification between the use of technology, knowledge in the field of pedagogy and knowledge related to lesson content is currently being intensified by the government to be practiced in schools. Teachers are required to develop one more skill in their profession, namely the skill of using technology-based learning media that is in accordance with pedagogical principles and is also relevant to the lesson content. Due to the importance of integrating TPACK into learning, material on TPACK currently has its own portion in the Teacher Professional Education Program (PPG) curriculum. But what are the techniques for teaching TPACK so that teachers' skills in integrating TPACK into learning can improve? In this study, the researcher who is also the supervisor of learning practices in the PPG program directs students to prepare for learning practices using the Lesson Study. The TPACK teaching is carried out using the hands-on at the preparation stage (plan). After planning (plan), students who are selected to become model teachers will practice teaching as is done by all students, but the model teacher learning videos will be observed by other students and other students will provide input and observations during the reflection phase (see) . After three cycles of learning practice were carried out, students showed significant improvements both in learning tools and in learning practices.

Keywords: TPACK, PPG, Lesson Study

Introduction

Minister of Education and Culture Regulation number 87 of 2013 states that the Teacher Professional Education Program (PPG) is an educational program organized to prepare graduates of undergraduate education and S1/D IV non-educational who have talents and interests become a teacher in order to fully master the competence of teachers in accordance with national education standards so that they can obtain professional educator certificates in early childhood education, basic education and secondary education. From the problems above, there are two main things that need to be analyzed further, namely how the government's strategy is to improve teacher professionalism and the role of PPG in improving the quality of education in Indonesia.

PPG has a very good impact in its implementation (Pangestika & Alfarisa, 2015) because even though teachers have had a lot of 'flying hours', in the field there are still misconceptions and they still have not updated their knowledge both about learning materials that are constantly evolving, technology, etc. Learning materials are very dynamic and develop quite rapidly so that teachers must always update their knowledge in order to carry out learning properly. In addition to materials, approaches, methods, and also learning techniques have undergone significant changes (Kuntarto, 2017). Currently, the government is intensifying student-centered learning (Naibaho, 2019). Student-centered learning will help students to explore their abilities (Saragih & Napitupulu, 2015). In addition to exploring the abilities of students, a student-centered approach will also help students to be active and creative and willing to be involved in learning.

Istiqlaliah Nurul Hidayati1, Mursidah Rahmah1, Gusnadi1 29
Improving Teachers' Ability to Integrate TPACK in Their Lessons
through Hands-on Activities: A Lesson Study Based Research

To be able to organize student-centered learning, teachers must be able to choose the right learning models and techniques. This means that teacher competence must be improved in order to carry out effective learning. Teachers must have supporting competencies, namely pedagogic, social, personality, and professional competencies (Febriana, 2021). Pedagogic competence is the ability to manage student learning which includes understanding students, designing and implementing learning, evaluating learning outcomes, and developing students to actualize their various potentials. Personal competence is the personality of educators who are steady, stable, mature, wise, and authoritative, become role models for students, and have noble character. Social competence is the ability of educators to communicate and interact effectively with students, fellow educators, education staff, parents/guardians of students, and the community. Professional competence is the ability of educators in mastering learning materials broadly and deeply which allows them to guide students in obtaining the specified competencies. These four competencies must be trained to teachers so that they can carry out their roles well. But it turns out that currently, these four competencies are not enough. There are still other demands that must be met by teachers in order to be able to carry out learning activities effectively, namely skills to integrate technology, pedagogy and knowledge related to learning content or called Technology Pedagogy and Content Knowledge (TPACK). This new demand shows the importance of strategic thinking and teacher action by integrating technology as a learning tool (Niess, 2011). Therefore, teachers as educators must redesign their programs so that technology is integrated in learning but also must be appropriate to the knowledge of the content they will teach. These teachers must constantly update their knowledge through pre-service, in-service, and professional development experiences to reshape teachers' thinking and actions more effectively. What experiences and preparations are important to develop teacher knowledge to guide learning in various subjects using digital technology? What is a teacher's knowledge of subject content? Is the material automatically transferred to knowledge to include the appropriate technology? In addition to learning about the ability to use technology, what experience do teachers need to teach and learn with technology across a variety of content?

Many questions have arisen because experts have proposed new views of teacher knowledge needed to teach in the 21st century. TPACK is a framework for thinking about the knowledge teachers need to make instructional decisions with respect to integrating digital technologies as learning tools (Pamuk et al. , 2015). Teachers are expected to provide the necessary experience to develop the knowledge and skills required of teachers. Meanwhile, scholars and researchers are also trying to construct this knowledge in order to answer the questions and concerns experienced by teachers.

This teacher concern has been captured by the government and therefore the government has updated the existing curriculum in the Teacher Professionalism Education (PPG) program (Wahyudin, 2016). In the PPG program, there are several topics that can prepare teachers to become professional teachers. The series of discussions are divided into discussions of pedagogic material and professional material. In discussing pedagogic material, participants were given explanations and practices about education, educational psychology, and education management. The discussion of professional material includes: a) deepening of material containing basic educational materials according to the field and the discussion is divided into three sub-topics, namely: analysis of teaching materials in the field of study, preparation of teaching materials and review of teaching materials; b) learning design which includes: identification of problems and action plans as well as preparation of learning planning documents; c) comprehensive test; d) learning practices carried out in three cycles. These discussions are carried out by a supervising lecturer and a tutor teacher, especially when carrying out learning practices. The learning practice lasted for three cycles. During the three cycles, the supervising lecturers and tutors were required to observe and provide comments to the participants. To make this activity more effective, the author who is also a PPG supervisor implements Lesson Study-based learning.

The implementation lesson study is carried out in three stages (Hidayat, 2016). The three stages are: the planning stage (plan), the implementation stage (do), and the reflection stage (see). The cycle is described as follows:
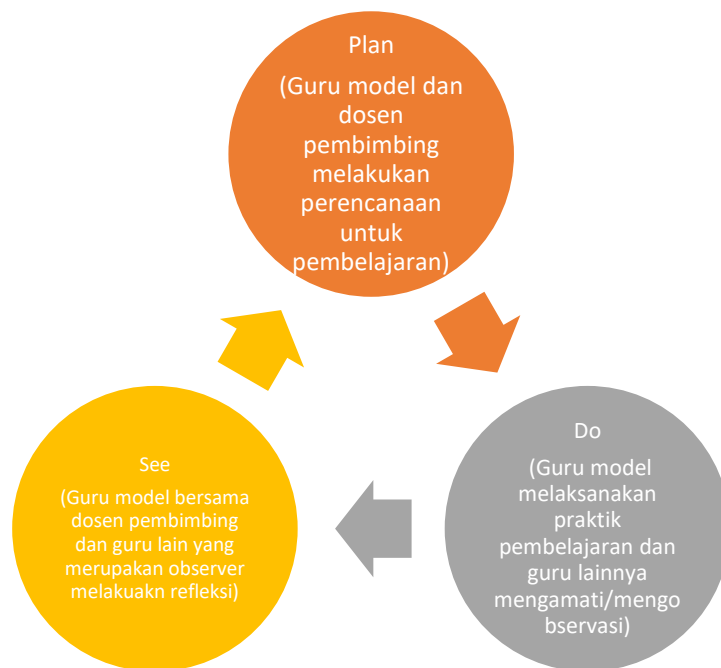
Istiqlaliah Nurul Hidayati1, Mursidah Rahmah1, Gusnadi1 30

Improving Teachers' Ability to Integrate TPACK in Their Lessons
through Hands-on Activities: A Lesson Study Based Research

Figure 1 Activities in Lesson Study

The purpose of this Lesson Study is to improve the competence of teachers participating in PPG. It is hoped that with the implementation of lesson study in practical learning activities, PPG participants will always improve the quality of their learning, in this case the teacher is able to integrate TPACK in learning.

Method

This research is a qualitative research using a qualitative descriptive approach. This study involved 11 PPG students who were in the practical phase of learning. The LS series that is carried out is plan, do, see. These stages are carried out as follows:

1. Guidance of supervising lecturers and tutors related to the process of learning practice activities based on lesson study.

   This stage includes the preparation of learning tools that will be used including the Learning Implementation Plan, teaching materials, Student Worksheets, and Teaching Media. At the plan or planning stage, lecturers and tutors ask and re-check the learning tools, asking which mode to use: offline or online. If online, the selected application must be prepared. As well as discussing the learning media that will be used. When discussing the learning media that will be used, the supervisors carry out 'hands on' activities to train teachers to use certain technology-based learning media.

2. Determining the Model Teacher

   Although each participant must appear to teach in each cycle, to become a lesson learned, all participants agree to choose a model teacher whose learning video will be watched together. Due to the pandemic period, learning is carried out online and the observation process is carried out by observing model teacher learning videos.

3. Carry out plan, do, see

   After listening to the supervisor's explanation about the stages to be carried out and determining a model teacher, the participants then plan, planning includes what material will be taught, learning media to be used, and teaching techniques to be implemented. Also at this planning stage, the supervisor provides hands-on activities to teach participants how to use electronic learning media. Furthermore,

Istiqlaliah Nurul Hidayati1, Mursidah Rahmah1, Gusnadi1 31
Improving Teachers' Ability to Integrate TPACK in Their Lessons
through Hands-on Activities: A Lesson Study Based Research

the participants made learning tools and consulted them with the supervisor before proceeding to the implementation stage (do).

In the do stage, the teacher carries out learning practices according to what has been planned. Participants who are not model teachers will act as observers who will see and evaluate the learning carried out by the model teachers, especially regarding the integration of TPACK. After the observation and implementation stages are carried out, the next stage is for the participants together with the supervisor and tutor teachers to reflect (see). The participants, including the model teacher, were asked to share their observations. After all participants expressed their observations, then the problems were discussed and solutions were found so that they did not reappear in the next cycle.

The measurement of the increase in teacher skills is seen from the progress or improvement of the teacher's ability in making learning tools that have integrated TPACK in it. The data is obtained from the LS implementation sheet for each individual which will then be described.

Results and Discussion

The results obtained in Lesson Study indicate an improvement and improvement from the first cycle to the third cycle. This increase is seen from the manufacture of learning tools and also the presence or absence of appropriate elements of technology, pedagogy, and content knowledge in learning. From the preparation of learning tools, it was found that there was an increase in the quality made by the participants. The improvement can be seen from: 1) material selection, 2) there is a link between competency standards, basic competencies, indicators and learning objectives properly and correctly, 3) RPP writing systematics, 4) selection of learning models that are in accordance with the material being taught, 5) selection of appropriate technology-based learning media in learning. Meanwhile, in terms of the presence or absence of TPACK elements in learning, there has also been an increase. At first the teacher did not use technology-based learning media or some used it but it was not yet effective. After three cycles of learning, the teacher always shows the use of technology-based learning media and uses them appropriately or in accordance with the material being taught. The following is a description of the plan, do, see activities in each cycle:

Table 1 Data in Cycle 1

Plan	Do	See
In the first plan, the model teacher will teach about the "Greeting Card". The supervisor invites all students to learn Canva and make examples of Greeting Cards using Canva. The civil servant teacher then plans the learning activities that will be carried out by making lesson plans. Technological elements used: Canva. The pedagogical element: Gallery Walk and the content knowledge element is the making of Greeting Cards.	The model teacher carries out learning according to the plan and other students become observers.	The use of Canva for teaching Greeting Cards is quite successful and attracts the attention of students but unfortunately not all students can use this application because not all bring laptops or cellphones. But this can be overcome by turning individual tasks into group assignments. The implementation of the Gallery Walk learning technique runs smoothly without any obstacles.

In the first plan, the model teacher will teach about the "Greeting Card". The supervisor invites all students to learn Canva and make examples of Greeting Cards using Canva. The civil servant teacher then plans the learning activities that will be carried out by making lesson plans. Technological elements used: Canva. The pedagogical element: Gallery Walk and the content knowledge element is the making of Greeting Cards.

The model teacher carries out learning according to the plan and other students become observers. The use of Canva for teaching Greeting Cards is quite successful and attracts the attention of students but unfortunately not all students can use this application because not all bring laptops or cellphones. But this can be overcome by turning individual tasks into group assignments. The implementation of the Gallery Walk learning technique runs smoothly without any obstacles.
In the first cycle, the model teacher taught the material about Greeting Cards. From the results of the discussion, the model teacher finally decided to use the Canva application for learning. Supervising lecturers

Istiqlaliah Nurul Hidayati1, Mursidah Rahmah1, Gusnadi1 32
Improving Teachers' Ability to Integrate TPACK in Their Lessons
through Hands-on Activities: A Lesson Study Based Research

conduct hands on activities with students to learn how to use Canva in learning. Canva was chosen because it is considered effective for language teaching that involves making certain creations or projects (Resmini et al., 2021).technique Gallery Walk which is part of the Cooperative Learning (Anwar, 2015). Thus, all elements of TPACK have begun to be seen in cycle 1, although the implementation is still experiencing obstacles such as not all students can use the necessary gadgets.

Table 2 Data in cycle 2

Plan	Do	See
The model teacher together with the supervisor and other students do the planning. The content that will be taught is about *Descriptive Text*. The element of technology used is the use of *Powtoon* which will be used as a medium to show objects or people accompanied by adjectives.	The model teacher carries out learning according to the plan and other students act as observers.	The model teacher, students and supervisors reflect in the form of reporting the results of their respective observations. Based on the observations, it can be seen that almost all students look enthusiastic in making powtoons.

The model teacher together with the supervisor and other students do the planning. The content that will be taught is about Descriptive Text. The element of technology used is the use of Powtoon which will be used as a medium to show objects or people accompanied by adjectives. The model teacher carries out learning according to the plan and other students act as observers. The model teacher, students and supervisors reflect in the form of reporting the results of their respective observations. Based on the observations, it can be seen that almost all students look enthusiastic in making powtoons. The problem in cycle 1 is that there are students who cannot participate in making Canva not occur in cycle 2 because the model teacher has anticipated it. In making Powtoons, students are grouped and each has a turn to use the computer in each group to make Powtoons. In cycle 2 it also appears that students use their creativity in learning (Rioseco et al., 2017). Then the researcher and the students did the third cycle.

Table 3 Data in Cycle 3

Plan	Do	See
The model teacher together with the supervisor does the planning. The material that will be taught is making 'Formal Letter'. After discussing, the tutor and supervisor agreed to use the 'Google Docs' application so that students could comment on and correct each other's 'formal letters' made by their friends. At this stage, the supervisor conducts hand-on activities to train PPG students in using Google Docs in learning.	The model teacher carries out the lesson according to the plan and the other students make observations.	From the observations of the observers, it can be concluded that learning to make 'formal letters' using learning media in the form of 'Google Docs' is effective. This can be seen at the presentation stage. Students can make a proper and correct 'formal letter'.

The model teacher together with the supervisor does the planning. The material that will be taught is making 'Formal Letter'. After discussing, the tutor and supervisor agreed to use the 'Google Docs' application so that students could comment on and correct each other's 'formal letters' made by their friends. At this stage, the supervisor conducts hand-on activities to train PPG students in using Google Docs in learning. The model teacher carries out the lesson according to the plan and the other students make observations. From the observations of the observers, it can be concluded that learning to make 'formal letters' using learning media in the form of 'Google Docs' is effective. This can be seen at the presentation stage. Students can make a proper and correct 'formal letter'.

From the learning outcomes in the third cycle, it can be seen that the model teacher has become more skilled in using technological devices, is more skilled in choosing teaching methods which are pedagogical skills and increasingly masters material content. From learning for three cycles, not only the model teacher, but all PPG students have been able to implement TPACK in their learning.

Istiqlaliah Nurul Hidayati1, Mursidah Rahmah1, Gusnadi1 33
Improving Teachers' Ability to Integrate TPACK in Their Lessons
through Hands-on Activities: A Lesson Study Based Research

Conclusion

Habituation in the use of technology-based learning media through hands-on activities carried out in the planning phase (plan) helps model teachers to improve their skills in using technology in the classroom and combines them with suitable learning methods (pedogogic) to help students understand the lesson content. It can be concluded that hands-on activities combined with a lesson study approach can help PPG students to improve their skills in integrating TPACK into learning.

Acknowledgment

References

Anwar, F. Z. (2015). Enhancing students' speaking skill through gallery walk technique. Register Journal, 8(2), 226–237.

Febriana, R. (2021). Kompetensi guru. Bumi Aksara.

Hidayat, B. (2016). Analisis Keterlaksanaan Program Perkuliahan Micro teaching berbasis lesson study di Program Studi Pendidikan Sejarah FKIP UM Metro. HISTORIA: Jurnal Program Studi Pendidikan Sejarah, 4(2), 75–80.

Kuntarto, E. (2017). Keefektifan model pembelajaran daring dalam perkuliahan bahasa Indonesia di perguruan tinggi. Journal Indonesian Language Education and Literature, 3(1).

Naibaho, L. (2019). TEACHERS'ROLES ON ENGLISH LANGUAGE TEACHING: A STUDENTS CENTERED LEARNING APPROACH. International Journal of Research-Granthaalayah, 7(4), 206–212.

Niess, M. L. (2011). Investigating TPACK: Knowledge growth in teaching with technology. Journal of Educational Computing Research, 44(3), 299–317.

Pamuk, S., Ergun, M., Cakir, R., Yilmaz, H. B., & Ayas, C. (2015). Exploring relationships among TPACK components and development of the TPACK instrument. Education and Information Technologies, 20(2), 241–263.

Pangestika, R. R., & Alfarisa, F. (2015). Pendidikan profesi guru (PPG): Strategi pengembangan profesionalitas guru dan peningkatan mutu pendidikan Indonesia. Makalah Prosiding Seminar Nasional, 9.

Resmini, S., Satriani, I., & Rafi, M. (2021). Pelatihan Penggunaan Aplikasi Canva sebagai Media Pembuatan Bahan Ajar dalam Pembelajaran Bahasa Inggris. Abdimas Siliwangi, 4(2), 335–343.

Rioseco, M., Paukner-Nogués, F., & Ramírez-Muñoz, B. (2017). Incorporating powtoon as a learning activity into a course on technological innovations as didactic resources for pedagogy programs.

Saragih, S., & Napitupulu, E. E. (2015). Developing student-centered learning model to improve high order mathematical thinking ability. International Education Studies, 8(06), 104–112.

Wahyudin, D. (2016). Manajemen kurikulum dalam pendidikan profesi guru (Studi kasus di Universitas Pendidikan Indonesia). Jurnal Kependidikan: Penelitian Inovasi Pembelajaran, 46(2), 259–270.