






Preservice Teacher Self Assessment Of Based Course TPACK Model Of Competencies Development

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Abstract: This research is motivated by the low competence of TPACK and the difficulty in determining the right strategy for developing the TPACK competence of economics teachers and measuring their success. One of the TPACK competency development strategies for economics teachers is a based course development model that can be assessed by self-assessment. This study aims to analyze the level of competence of TPACK, the strength and weakness domain and determine the correlation between TPACK components as domain information that increases with the TPACK-based Course strategy. This study uses a qualitative approach with design-based research by adapting a self-assessment instrument. This research was conducted on 80 economic education pre-service teachers by determining the gain based on the gain before and after the implementation of the TPACK-based course.¹ The results of this study reveal that a based course development strategy can improve the ability of Pedagogy Content and pedagogy technology, and there is a strong correlation between several TPACK components.

Keywords: Self, Assessment, Model, TPACK

1 Introduction

Technological advances that are increasingly rapid in education challenge teachers to develop integrated learning systems in the 21st-century learning era. The challenges that must be faced in the field of education in Indonesia, namely, the expertise of a teacher in managing the design of increasing teacher competency or TPACK (Technological Pedagogical Content Knowledge)². TPACK is a new knowledge that must be mastered by teachers in order to integrate technology with learning properly³. However, we know that the thinking skills of teachers in TPACK, especially teachers in Indonesia, are still low because they have to adapt to existing changes and limited facilities in their schools.

This low competence is also due to difficulty determining the right strategy for developing teacher TPACK competencies. Even the development carried out in TPACK is still weak because schools and teachers in Indonesia still have problems with low teacher standards, mastery of the material, and media and technology/Literacy media and Technology². Another problem arises because prospective teachers are still weak in mastering the curriculum and designing learning according to the demands of the 2013 curriculum⁴.

The TPACK-based Course development strategy provides opportunities for teachers to improve their knowledge and skills through technical guidance on managing learning with digital technology media and HOTS-based assessments. Guidance for teachers in a school through the TPACK approach with HOTS assessments provided an increase in teacher competence in classroom management learning by videos on digital applications, creating worksheets through live worksheets, and HOTS-based assessment tools⁵, and development of self-assessment instruments based on self-

regulated learning ⁶. This instrument was made to make learning assessments for students independently so they can be involved in the learning process and evaluated independently. Self-assessment-based course assessment integrates the CIPP model (Context, Input, Process, Product) in producing assessments in an educational program. ⁷ has introduced four essential assessment elements: context, input, process, and product.

TPACK's research is based on constructivist learning theory, which states that TPACK is an active process carried out by the teacher that constructs knowledge for teaching in the technology-rich setting. It is a process of knowledge construction and equilibration through which the TPACK unique to the individual teacher is built ⁸. In addition, TPACK's capability development is based on the productive pedagogy framework, which states that Productive Pedagogies provide a tool for teachers to use to increase their students' learning outcomes, both academic and social ⁹. TPACK originates from the concept of pedagogical and content knowledge (PCK) ¹⁰, which states the need for a more coherent theoretical framework regarding what teachers must know and be able to do, including what content knowledge they need and how it can be implemented. So, it needs to add technology as a key component of the framework, creating technology pedagogical content knowledge (TPACK)¹¹.

In this study, the TPACK development strategy focused on an instructional design approach with assessment carried out through performance observation/assessment and design research using design-based research. This study aims to identify TPACK Preservice Teacher (PST's) competency problems, the gains obtained after applying the course to increase TPACK competence and correlations between TPACK domains. This research was conducted with design-based research on PSTs in Economic Studies.

2 Methods

This research used a qualitative approach with a research-based design model (DBR) to develop learning designs and teaching materials within the TPACK framework. The initial research design was designed from the beginning of the research process until the end of the research. ¹². The flow of predictions and the Design-Based approach to educational technology research can be seen in Figure 2 ¹³.

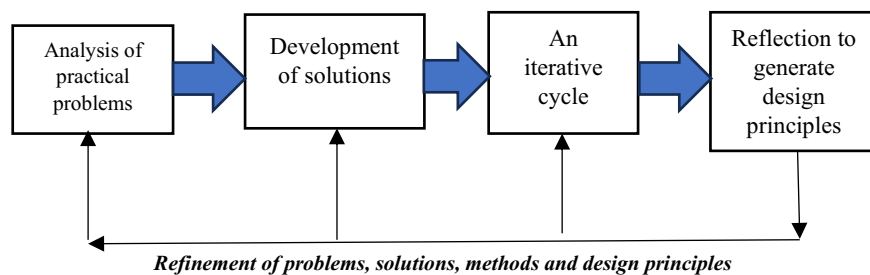


Fig. 2. Prosedur Desain Based Research

The subjects in this study were student preservice teachers of the Economics Education Study Program who had passed the ICT Literacy MK & Media Economics Learning and Digital Economy Learning and teaching practices in schools, totalling 80 students, hereafter referred to as preservice teachers (PSTs). Several research instruments are used in this study, including Observation Guidelines ² Design Guidelines ³ Teaching Materials ³ Competency Assessment Sheets. This observation was carried out in research in the classroom. This observation is divided into two parts: initial observation and core observation. Initial observation identifies research conducted to see the basic abilities of TPACK and TPACK competency problems. Core observations are used to observe when PSTs perform TPACK-oriented learning performances/practices. Design guidelines are prepared to design solutions to problems along with programs that will be carried out in the learning process and preparation of places, students, time and others. Teaching materials are needed as material that will be used in increasing competence and will be used in 4 meetings. The competency assessment sheet is a self-assessment assessment sheet for each TPACK domain competency used to measure the activity's success. The self-assessment instrument used is adjustment-adapting, valid, and reliable ¹.

3 Results And Discussion

The results of this study include analysis of PST's TPACK competency problems, implementing solutions and developing solutions based on self-assessments conducted by PSTs while participating in development activities, analyzing the gains obtained and analyzing the correlation of each TPACK component. In the discussion section, the analysis is further analyzed for the influence of domain development activities, which can be increased with TPACK-based Course competency development solutions and the linkages between TPACK domains.

3.1 Results

The problems encountered in PSTs related to TPACK competencies are mainly related to problems of knowledge competence in Economics and pedagogical content and their combined competencies. Problems encountered are based on self-assessment of current capabilities or prior to getting development activities. TPACK competency problems in detail can be seen in Figure 3.

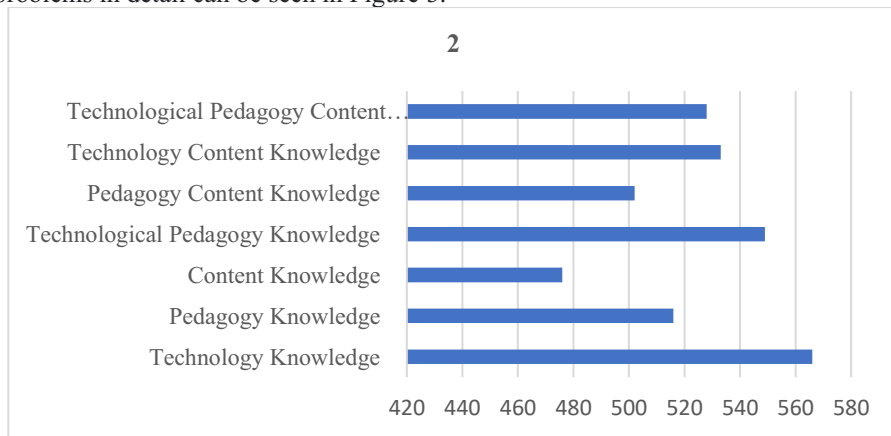


Fig. 3. Strength and Weakness Of PST's TPACK

Figure 3 shows the results of a survey on TPACK competencies. PSTs' main problems are 1) content knowledge and Pedagogy content knowledge. Weaknesses in content knowledge are shown by a lack of understanding of the macroeconomics material and criticizing the implementation of macroeconomic policies, while the weaknesses in content knowledge pedagogy are mainly due to weaknesses in determining appropriate learning strategies to teach economics material.

Based on the problems faced, alternative solutions are designed to solve these problems. There are four steps in determining the solution to this problem, namely 1) root cause analysis, 2) literature study on alternative solutions, 3) determining the chosen solution, and 4) designing development activities. This activity found the right solution: implementing a training program (course) with material for each TPACK domain, which was carried out four times @ 3x50 minutes. The course material provided is in the form of material 1) pedagogic material on economics learning 2) From the course that has been carried out, PSTs conduct a self-assessment of what abilities have increased and not increased after being carried out. The results of the TPACK competency self-assessment before and after competency development activities can be seen from the gain score between each TPACK.

The TPACK-based Course development strategy can enhance the entire TPACK domain. Overall, the gains in TPACK, technology knowledge, technology content knowledge and pedagogical content knowledge gains are relatively high compared to other competency domains. The domains with the slightest increase are pedagogical knowledge and content knowledge.

Based on data processing, the t value is greater than the t table value, with a significance (2 tails) ≤ 0.05 . The results of the different tests (t-test pair) found a significance of 0.000. This means that there was a significant increase in all TPACK domains.

The relationship between individual domains (TK, PK, CK) and group domains (TPK, TCK, PCK) has been discussed in the basic concept of TPACK¹¹. The intensity of connection between these domains strongly correlates with PST's TPACK. Of all domains, Pedagogical Content Knowledge has the strongest relationship compared to other domains, followed by Technological Content Knowledge (TCK). Thus, based on this research, the TPACK development strategy focuses on PCK and TCK.

3.2 Discussion

The results of this study consist of 1) identification of problems related to TPACK competence, 2) gain reflecting the impact of development-based course activities assessed by self-assessment, 3) correlation between TPACK domains as a basis for determining the focus of TPACK competency development strategies in economic learning. The problem of TPACK competence in PSTs is a content problem. This is caused by a lack of understanding of PST's economic material, which can be caused by the complexity of the study, the lack of concrete presentation of the material, and the lack of simplification of concepts. This requires the role of media and technology that help simplify and concretize abstract concepts in economics learning. The problem of relatively low pedagogical knowledge in PSTs that should be owned by students

majoring in education can be caused by the relatively low experience of applying pedagogical knowledge in school practice. With good learning practice experience, PSTs have broad capabilities and many alternative strategies to be applied to various conditions (sources). This aligns with Kolb's experiential theory¹⁴, where TPACK's abilities can continue to increase if PSTs intensively practice their knowledge.

Based on the gain obtained from the TPACK-based course, the TPACK, TK and TCK domains have relatively better gains than the other domains. This shows that according to PSTs, the development of TPACK-based courses that have been carried out improves TPACK capabilities, technological knowledge and content technology. Based on the research results, each TPACK domain has a strong correlation with each other, in accordance with the opinion of^{11 15 16}.

4 Conclusion

The results of this study reveal student problems in the TPACK domain. A course-based development strategy can improve the ability of Pedagogy Content and pedagogy technology, and there is a strong correlation between several TPACK components. The TPACK problem of PST's students is the problem of mastery of economic material and pedagogy content knowledge. or the ability to integrate economic and pedagogical content. The course development strategy carried out with design-based research steps resulted in a significant increase in the ability of each domain. The domains with the highest increases were TPACK and TK, while those with the lowest were knowledge content. In terms of the level of correlation between TPACK domains, TCK and PCK have a strong correlation with TPACK; from obtaining TPACK competency problems, strengths and weaknesses, as well as correlations between domains, information on TPACK development can be used.

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