

DEVELOPMENT OF TPACK SELF-ASSESSMENT INSTRUMENT FOR MADRASAH IBTIDAIYAH PRESERVICE TEACHERS

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Abstract

The digital era requires teachers to have TPACK abilities. Not only teachers, but pre-service teachers also need to be equipped with TPACK abilities in order to become competitive teachers in the digital age. To measure the TPACK ability of prospective teachers, it is necessary to develop an instrument that can measure TPACK. This research was conducted with the aim of developing a TPACK self-assessment instrument for PGMI students who are prospective teachers of Madrasah Ibtidaiyah (MI). The approach used in this research is research and development (R&D) type ADDIE, which is carried out through five (5) stages, namely analysis, design, development, implementation, and evaluation. The instrument was developed based on the seven components of TPACK. A total of 34 PGMI students who have carried out teaching practices act as samples in this study. After validation and reliability tests were carried out using SPSS, 39 items were valid statements out of a total of 40 items, with an alpha coefficient of 0.970. Thus, it can be said that 39 items of statements are reliable and appropriate to be used to measure the TPACK ability of PGMI students.

Keywords : Pre-Service Teacher; TPACK Instrsument; Islamic Elementary School

INTRODUCTION

Not all teachers master technology in learning. In fact, education in today's digital era is very dependent on technology. Several studies prove that technology has a very crucial role in the development of education (Bakar et al., 2020). Professional teachers in the digital era must have the ability to integrate technology in the learning process. The ability to combine knowledge of teaching materials, pedagogy in learning and skills in utilizing technological devices is known as Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006). TPACK competencies are needed by professional teachers in the digital era because teachers are required to prepare students who are ready to live in the future. teachers in the era of globalization are required to have the ability to adapt to developments so as not to be outdated and must be able to use technology in the world of education. Especially when learning online, one of the teachers' problems is the difficulty in understanding and using various technologies and platforms that support learning (M. Jannah et al., 2020).

Suryawati also stated that content knowledge is knowledge of concepts, theories, ideas, frameworks, conceptual knowledge, theories, ideas, frameworks, evidentiary knowledge, as well as practices and methods for developing this knowledge. Therefore, teachers must have a broad and deep understanding of the material and understand the material in their field (Suryawati et al., 2014). Zhang said Magnusson and his colleagues established five components of teaching content knowledge: (1) science-based learning orientation, (2) knowledge and beliefs about curriculum science, and (3) knowledge of science understanding around 12 students, (4) knowledge of science literacy assessment, and (5) knowledge of teaching strategies (Zhang & Loyola University Chicago, 2015).

Education is a necessity for every individual as a process of self-actualization and development of the potential that individuals have through a learning process. There is no education without a teacher. Law No. 14 of 2005 emphasizes that teachers are required to meet academic requirements, have competence and the ability to achieve national education goals. The mandate of this law is implemented by organizing education for prospective teachers carried out by various higher education institutions, one of which is by opening the Madrasah Ibtidaiyah Teacher Education Department (PGMI) at both private and state Islamic universities. Pekalongan State Islamic Institute (IAIN) is one of the

educational institutions that has a PGMI Department that aims to prepare prospective Madrasah Ibtidaiyah classroom teachers.

Madrasah Ibtidaiyah teachers are expected to be the gateway to the success of the madrasah world to realize the madrasah slogan “Madrasah Hebat Bermartabat” by becoming teachers who master technology in learning in the digital era. But in reality, the ability to master the technology of Madrasah Ibtidaiyah teachers is still low (Nurhayati, 2016). The same thing was also conveyed by Zuhroh in his research which states that the competence of the Al-Qur'an Hadith subject teacher in mastering technology is not satisfactory due to the factor of the teacher's individual ability to master technology even though technological facilities for learning have been provided at school.

Given the importance of teachers' technology mastery competencies in learning, the TPACK competencies of Madrasah Ibtidaiyah teacher candidates need to be measured. By knowing the TPACK of prospective teachers of Madrasah Ibtidaiyah, it can help individual prospective teachers and managers of the PGMI Department to determine the professionalism development programs that need to be carried out so that prospective teachers are truly ready to become professional madrasah ibtidaiyah teachers in the digital era towards great madrasah with dignity. Measuring TPACK of madrasah ibtidaiyah teacher candidates needs to be done by developing an appropriate TPACK self-assessment instrument. Several development studies have been conducted, including: 1) Development of technology knowledge measurement for prospective teachers (Schmidt et al., 2009). 2) Development of TPACK instruments for elementary school science teachers (Desstya, 2018). 3) Development of TPACK self-assessment for prospective mathematics teachers (Önal, 2016). 4) Development of an Assessment Instrument to Measure the TPACK Ability of Prospective Chemistry Teachers on Acid-Base Materials (R. Jannah, 2020). and 5) The development of HOTS-based TPACK instruments (Zaeni et al., 2021). All of these studies are still limited to measuring the TPACK of subject teachers, not specifically on the development of TPACK instruments for prospective classroom teachers in Madrasah Ibtidaiyah which are certainly required to have broader competencies and internalize Islamic values.

Departing from the description above, the author sees the need to develop a TPACK self-assessment instrument for PGMI students who are prospective teachers at the

Madrasah Ibtidaiyah level as one of the efforts made to prepare professional Madrasah Ibtidaiyah teachers in the digital era to realize a great madrasah with dignity.

METHODS

This research is a development research (Research and Development). Sugiyono defines development research as research that is carried out with the aim of producing a product as well as to assess the products produced (Maydiantoro, 2021). The research location that the researchers took was at IAIN Pekalongan, with the research time being February–May 2022. This research uses the ADDIE model developed by Dick and Carey. The ADDIE itself includes: Analysis, Design, Development, Implementation, and Evaluation (Cahyadi, 2019).

The first stage of Analysis, this first stage begins by analyzing the characteristics of PGMI students in order to adjust to the design of the TPACK instrument development and analysis of some literature related to the development of TPACK instruments described from each indicator. TPACK has 7 components, namely technological knowledge (TK), pedagogical knowledge (PK), content or material knowledge (CK), content and technological knowledge (TCK), pedagogical and content knowledge (PCK), pedagogical and technological knowledge (TPK), and pedagogical and content technological knowledge (TPACK).

The second stage is Design, which is designing an instrument based on the literature that has been reviewed. This stage is then continued by compiling indicators as the basis for developing the instrument and from each indicator it is developed again into statement items. Next is the Development stage, which is developing indicators that have been compiled into instruments and validated by two expert judgment to validate aspects of conformity with indicators and linguistic aspects. The fourth is the Implementation stage, where the instruments that have been developed are tested empirically on students majoring in PGMI FTIK IAIN Pekalongan who have participated in Teaching Practice activities. The instruments that have been developed are tested in the form of a questionnaire using a Likert scale: Very Good (4), Good (3), Fairly Good (2) and Less Good (1). Finally, the Evaluation stage, which tests the validity with Pearson Product Moment to find the r count and the reliability of the instrument items with the Cronbach's Alpha method to find the alpha coefficient.

The population in this study were PGMI students of FTIK IAIN Pekalongan class of 2019 who had participated in Teaching Practice. Researchers used PGMI students class of 2019 as a population because they have the characteristics of having taken courses related to TPACK, namely: learning technology, concepts and learning of each madrasah ibtidaiyah map and microteaching practice. the population in this study amounted to 170 students.

The sample in this study was 20% of the total population of 34 students. The sampling technique was carried out by means of systematic sampling of the probability sampling type. This sampling technique is almost identical to random sampling, except that it systematically selects random numbers from a table. The procedure takes the form of sampling, drawing each infinite number of cases (sequential numbers) from the population list. This type of sampling is easy to use if the sampling frame is generally good (Bhardwaj, 2019).

RESULTS

Based on the results of the literature analysis, each component is derived into operational definitions and indicators as follows.

Table 1. TPACK Self-Assessment Instrument Preparation Grid

| TPACK Components | Operational Definition | Indicators |
|------------------------------|--|---|
| Technological Knowledge (TK) | TK is the ability of PGMI students to understand simple technology (such as educational aids) or technology such as laptops, computers, projectors and other technologies. | Can operate a computer well Accustomed to using technology in learning Able to use media other than technology in explaining material |
| Pedagogical Knowledge (PK) | PK is the knowledge possessed by PGMI students related to pedagogical knowledge that must be possessed by a prospective teacher. | Using models/strategies in classroom learning Evaluating students Identifying student learning difficulties |
| Content Knowledge (CK) | CK is the knowledge of PGMI students about the material or teaching materials that need to be | Mastering thematic learning materials Mastering Islamic material |

| | | |
|---|--|---|
| | delivered to students in accordance with the applicable curriculum. | Mastering materials other than thematic and Islamic learning |
| Technological Content Knowledge (TCK) | TCK is the knowledge of PGMI students about how technology can shape or create new material and be able to help madrasah ibtidaiyah students in understanding the material. | Selecting suitable media to use based on the material being studied Choosing a learning strategy or model that is suitable for the material being studied Relating the material to daily life |
| Pedagogical Content Knowledge (PCK) | PCK is the knowledge of a PGMI student about pedagogy or the right way to teach according to the character of the material or content. | Selecting a learning strategy or model that is appropriate for the material being studied. Relate the material to daily life |
| Technological Pedagogical Knowledge (TPK) | TPK can be defined as the knowledge of PGMI students about the use of technology in learning and how the way teachers teach in the classroom can be influenced by these technologies. | Use technology in providing understanding to learners Use technology to find references |
| Technological Pedagogical Content Knowledge (TPACK) | TPACK is the knowledge of PGMI students in integrating technology in the learning process in madrasah ibtidaiyah in accordance with the material to be delivered so that learning objectives are achieved. | Select appropriate technology media in learning Using technology in delivering material in class Combining technology in learning materials |

The instrument that has been developed is validated by two experts (expert judgment) to assess aspects of conformity with indicators and linguistic aspects. The validation results from expert judgment can be shown in the following table.

Table 2. Expert Judgment Validation Results

| TPACK Components | Conformity with Indicators | | Kebahasaan | |
|------------------|----------------------------|----------------|------------|----------------|
| | Average | Interpretation | Average | Interpretation |
| TK | 3,58 | Very Good | 3,33 | Good |
| PK | 3,71 | Very Good | 3,79 | Very Good |
| CK | 3,80 | Very Good | 3,70 | Very Good |
| TCK | 3,75 | Very Good | 3,75 | Very Good |
| PCK | 3,90 | Very Good | 3,70 | Very Good |
| TPK | 3,64 | Very Good | 3,79 | Very Good |
| TPACK | 4,00 | Very Good | 3,67 | Very Good |

The results of the validity test using SPSS to find the Product Moment correlation coefficient (r count) obtained the following data.

Table 3. Item Validity of TK

| Item | Statement | r count | Desc |
|------|---|---------|---------|
| 1 | I can turn on and off a computer or laptop | ,445 | Valid |
| 2 | I am used to using technology to make lesson plans, PPTs, or other learning tools | ,109 | Invalid |
| 3 | I master several types of technology, such as computer/laptop, printer, projector, etc. | ,820 | Valid |
| 4 | I follow the development of technology | ,802 | Valid |
| 5 | I can use non-technological media | ,600 | Valid |
| 6 | I often work or make assignments by utilizing technology | ,498 | Valid |

Table 4. Item Validity of PK

| Item | Statement | r count | Desc |
|------|--|---------|-------|
| 7 | I master several types of models or strategies in classroom learning | ,592 | Valid |
| 8 | I can determine the appropriate learning model or strategy for MI-age children | ,872 | Valid |
| 9 | I know some assessment techniques for MI-age learners | ,750 | Valid |
| 10 | I can adjust my teaching style to facilitate different learning styles of students | ,774 | Valid |
| 11 | I am able to help solve learning difficulties of MI-age learners | ,809 | Valid |
| 12 | I know how to assess the performance of MI-age learners in the classroom | ,839 | Valid |
| 13 | I understand how to identify participants' abilities in the classroom | ,835 | Valid |

Table 5. Item Validity of CK

| Item | Statement | r count | Desc |
|------|---|---------|-------|
| 14 | I understand the concept of thematic learning in MI | ,934 | Valid |
| 15 | I have sufficient knowledge about thematic learning for MI | ,897 | Valid |
| 16 | I can integrate several subject contents in thematic learning for MI | ,916 | Valid |
| 17 | I master Islamic materials in MI (Akidah Akhlak, Al-Quran Hadith, Fiqh, SKI, and Arabic Language) | ,894 | Valid |
| 18 | I have various ways to develop my knowledge in the Islamic field in MI | ,905 | Valid |

Table 6. Item Validity of TCK

| Item | Statement | r count | Desc |
|------|--|---------|-------|
| 19 | I can determine the right media in delivering learning materials | ,785 | Valid |
| 20 | I am able to use power point in transferring knowledge to students | ,705 | Valid |
| 21 | I am used to delivering materials using educational teaching aids | ,782 | Valid |
| 22 | I understand the technology that can be used to deliver thematic learning materials or other materials | ,889 | Valid |

Table 7. Item Validity of PCK

| Item | Statement | r count | Desc |
|------|---|---------|-------|
| 23 | I understand that learning strategies must be tailored to the material to be delivered | ,774 | Valid |
| 24 | I can determine an effective learning model to encourage students to think and learn about thematic topics. | ,838 | Valid |
| 25 | I can choose the right strategy to use in learning mathematics in MI. | ,664 | Valid |
| 26 | In explaining the material, I am able to relate the material to examples in daily life that are relevant to students of MI age. | ,900 | Valid |
| 27 | I am able to determine the right strategy to use in learning religion in MI. | ,810 | Valid |

Table 8. Item Validity of TPK

| Item | Statement | r count | Desc |
|------|---|---------|-------|
| 28 | I can choose the right technology that can be used in improving my teaching competence | ,666 | Valid |
| 29 | I can determine the right technology that can be used to improve student learning activities | ,776 | Valid |
| 30 | Lecturers in PGMI made me realize that technology is very influential in the approach I take in the classroom when teaching | ,696 | Valid |
| 31 | I am used to using technology to find reference materials and others | ,437 | Valid |
| 32 | I studied about how to use technology in learning in MI | ,734 | Valid |
| 33 | I can adjust the use of technology to different lessons | ,838 | Valid |
| 34 | I understand that technology can help teachers in teaching in the classroom | ,807 | Valid |

Table 9 . Validity of TPACK

| Item | Statement | r count | Desc |
|------|---|---------|-------|
| 35 | When teaching, I can combine the right materials, technology and approaches for effective learning. | ,875 | Valid |
| 36 | I can utilize the knowledge about the basic concepts of materials in MI, teaching and learning strategies and learning technology that have been taught by PGMI lecturers when I teach. | ,861 | Valid |
| 37 | I am able to choose technology media that can be used in learning to help students understand the learning material. | ,843 | Valid |
| 38 | I can select technology that I can use to improve what material I teach, how I teach and what learners learn. | ,861 | Valid |
| 39 | I can assist others in integrating materials, technologies and learning approaches or strategies | ,831 | Valid |
| 40 | I can teach lessons that combine MI materials with technology and learning strategies. | ,941 | Valid |

The results of the reliability test using the Cronbach's Alpha method obtained an alpha coefficient of 0.970 with a very strong interpretation.

Table 10. Reliability Test Results

| Reliability Statistics | |
|------------------------|------------|
| Cronbach's Alpha | N of Items |
| ,970 | 40 |

DISCUSSION

TPACK is the knowledge of how various technologies can be used in teaching and the use of these technologies can change the way teachers teach. In other words, technology is influential in the learning process (Rahayu et al., 2023). TPACK skills of teachers and prospective teachers need to be ensured so that learning in the digital era can be achieved, whether learning is done online or offline (Fajero et al., 2021). The development of the TPACK self-assessment instrument in this study resulted in an instrument that can be used to measure the TPACK competencies of prospective teachers of Madrasah Ibtidaiyah.

This instrument has gone through 2 validity tests, namely construct validity test and empirical validity test. Construct validity test was conducted through validation by expert judgment, while empirical validity test was conducted through Pearson's Product Moment correlation test. The TPACK self-assessment instrument that had been filled in by the sample was analyzed using the SPSS 25 application to test validity and reliability. The validity test with Pearson's Product Moment correlation was conducted to obtain r count. After being analyzed, r count will be compared with r table. If r count is greater than r table, then the instrument item is considered valid. In this study, the validity test was carried out with $N = 34$, a two-way significance level of 0.01, obtained a value of $r = 0.4357$.

Of the 40 statement items in the instrument developed, 1 item was found to be invalid, namely in the Technological Knowledge (TK) dimension. The invalidity is due to the resulting r count being smaller than r table. This validity test resulted in 38 statement items that were constructively and content valid, so they could be used to measure TPACK ability. The reliability test shows that the seven dimensions of TPACK in this study have an overall Alpha coefficient of 0.970 with a very strong category.

CONCLUSION

The TPACK self-assessment instrument for PGMI students was carried out through 5 stages, namely: a) analyzing the initial conditions of TPACK of PGMI students and literature review; b) designing TPACK self-assessment instruments based on dimensions and indicators; c) developing TPACK self-assessment instruments based on expert validator input or expert judgment; d) implementing TPACK self-assessment instruments through empirical trials to PGMI students; and e) evaluating the trial results by analyzing the validity and reliability of the instrument. Based on the results of the analysis using the SPSS version 25 application, from a total of 40 statement items of the TPACK self-assessment instrument, 39 statement items were valid with an alpha coefficient of 0.970. Thus, the TPACK self-assessment instrument for PGMI students is declared reliable and can be used to measure the TPACK competence of PGMI students.

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