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Designing Innovative Evaluation Instruments for Elementary Teacher Professional Education: A Learning Condition Theory Approach

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ABSTRACT

Purpose of the study: This study aims to develop a valid, reliable, and culturally relevant evaluation instrument for assessing the pedagogical competencies of teacher candidates in the Professional Teacher Education Program (PPG) at the elementary school level, based on the *Condition of Learning* theory.

Methodology: The study employed a quantitative approach with validation by six experts and field testing involving 100 teacher candidates. Data analysis included Cronbach's Alpha for reliability measurement. The instrument design adhered to *Condition of Learning* principles, integrating cultural relevance and pedagogical evaluation.

Main Findings: Validation scores ranged from 4.3 to 5.0 across aspects, with a reliability score of 0.72 (Cronbach's Alpha). Evaluation results showed mean scores of 85.05 for cognitive, 80.07 for affective, and 81.14 for psychomotor competencies, indicating strong preparedness among teacher candidates.

Novelty/Originality of this study: This study integrates *Condition of Learning* principles with cultural elements, creating a comprehensive evaluation instrument that reflects Indonesia's educational context. It provides a significant tool for improving pedagogical assessments and aligns evaluation with local values and national education standards. This research has an impact on the creation of more effective and relevant evaluation instruments, so that it can improve the quality of professional education of elementary school teachers through the application of learning conditions theory.

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1. INTRODUCTION

Teacher Professional Education is a strategic program designed to prepare prospective teachers with pedagogical competencies that are in accordance with the needs of the world of education [1]-[3]. These competencies include the ability to teach, manage classes, and integrate moral and cultural values into learning [4]-[6]. In the context of Indonesian education, Teacher Professional Education not only aims to produce quality teachers, but also those who are able to become agents of social change [2], [7], [8]. However, the effectiveness of the Teacher Professional Education program is often hampered by the lack of evaluation instruments that are relevant to Indonesia's socio-cultural conditions. Inadequate evaluation can lead to assessments that do not reflect the true abilities of prospective teachers [9]-[11].

One of the main challenges in implementing Teacher Professional Education is ensuring that evaluation instruments cover important aspects of pedagogical competency [12]-[14]. Effective evaluation instruments must be able to measure the abilities of prospective teachers in three learning domains: cognitive, affective, and psychomotor [15]-[17]. Unfortunately, many Teacher Professional Education programs only focus on the cognitive aspect without considering the development of local character and values. This is a significant weakness, especially in the context of Indonesia's culturally diverse society. Therefore, a more holistic approach is needed in developing evaluation instruments for the Teacher Professional Education program [18]-[20].

The Condition of Learning theory developed by Robert Gagne offers a relevant conceptual framework to address these challenges [21]-[23]. This theory emphasizes the importance of clear learning objectives, varied teaching strategies, and relevant learning media [24]-[26]. In addition, this theory also highlights the importance of comprehensive evaluation to cover various aspects of learning. In the Indonesian context, this theory can be adapted to integrate local values and culture into learning. Thus, the development of evaluation instruments based on this theory is a potential solution to strengthen the Teacher Professional Education program [27]-[29].

The diverse social and cultural context of Indonesia requires an inclusive and relevant evaluation approach. Prospective teachers who participate in the Teacher Professional Education program are not only required to understand educational theory, but also to be able to apply local values in teaching practice [30]-[32]. In this case, the evaluation instrument must be designed in such a way that it can measure the ability of prospective teachers to integrate Pancasila values, local culture, and diversity in the learning process [33], [34]. This is important to ensure that education in Indonesia not only produces students who are academically intelligent but also have strong characters.

In addition to cultural relevance, the validity and reliability of the evaluation instrument are also important aspects that must be considered. A valid instrument ensures that the assessment truly reflects the competency being measured, while a reliable instrument ensures the consistency of the assessment results [35], [36]. In developing an evaluation instrument based on the Condition of Learning theory, these two aspects can be achieved through a validation process by experts and empirical testing [37], [38]. This study aims to develop an instrument that is not only culturally relevant but also reliable in its measurement.

The advantage of the Condition of Learning theory is its flexibility to be applied in various educational contexts, including in Indonesia. By adapting this theory to local needs, evaluation instruments can be designed to measure pedagogical competence holistically [39], [40]. This includes the ability of prospective teachers to design adaptive learning, use relevant media, and evaluate learning outcomes comprehensively. The development of this instrument also opens up opportunities to integrate technology into the evaluation process, making it more practical and efficient.

Previous research conducted by El-Sabagh [41] focused on the use of adaptive technology tailored to individual learning styles to enhance student engagement. This study highlighted the importance of personalization in the learning process to improve learning outcomes. Meanwhile, the current research focuses on the development of evaluation instruments designed based on the theory of learning conditions to improve the effectiveness of teacher professional education. The gap that emerged lies in the object and approach of the research: previous research was more oriented towards students and the use of technology in learning, while the current research is oriented towards teachers and the development of evaluation tools based on educational theory. This shows that although both seek to improve the quality of education, their approaches and implementation targets are different, providing unique contributions to the field of education.

Previous research conducted by Mulyani et al., [42] focused on the development of video learning media that adopted Gagne's theory, especially the Nine Learning Events, to support the learning process at the junior high school level. This approach prioritizes the aspect of delivering material effectively through visual media based on educational theory. Meanwhile, the current research focuses on the development of evaluation instruments for teacher professional education based on the theory of learning conditions. The gap that is seen is the focus on the level of education and the purpose of implementation: previous research is oriented towards students through the development of learning media, while the current research is oriented towards teachers through the development of evaluation tools. Thus, this research complements efforts to improve the quality of education from two different perspectives, namely students and teachers.

This study has novelty in its approach that integrates Learning Condition Theory to design an innovative teacher professional education evaluation instrument, something that has not been widely explored in previous studies. By utilizing this theory, this study presents a more relevant and contextual instrument, in accordance with the real needs in the teacher education process. The urgency of this study lies in the importance of improving the quality of evaluation in teacher professional education, which directly affects teacher competence in managing classroom learning. In an era where teacher quality is one of the key factors for educational success, this study answers the urgent need for a more effective evaluation approach to support teacher professional development.

This study aims to develop a valid, reliable, and relevant evaluation instrument for the Elementary School Teacher Professional Education program in Indonesia. This instrument is designed based on the

Condition of Learning theory by Robert Gagne to measure the pedagogical competence of prospective teachers holistically, covering cognitive, affective, and psychomotor aspects. In addition, this study aims to integrate local values and Indonesian culture into the evaluation instrument, so that it can reflect the diverse context of education in Indonesia. Through validation by experts and reliability testing, this study is expected to produce an effective instrument in evaluating the ability of prospective teachers to design adaptive and contextual learning. The ultimate goal is to contribute to strengthening the Teacher Professional Education program in Indonesia by ensuring that prospective teachers produced have competencies that are in accordance with the needs of education and the Indonesian community.

2. RESEARCH METHOD

This research is a research and development study that aims to produce an instrument for evaluating the pedagogical competence of prospective elementary school teachers. This approach is used to develop, validate, and test the reliability of instruments based on the Condition of Learning theory [43], [44]. This study also adopts a quantitative approach in data collection and analysis to ensure the validity and reliability of the results obtained. The research subjects consisted of two main groups, namely the validator group and the prospective teacher group. The validator group involved six experts who had expertise in the fields of pedagogy, educational evaluation, culture, educational technology, and educational policy. They were tasked with validating the evaluation instrument by assessing aspects of clarity, cultural relevance, and effectiveness of the instrument [45]. Meanwhile, the prospective teacher group consisted of 100 participants of the Elementary School Teacher Professional Education program who were randomly selected from Teacher Professional Education Universitas Jambi. This group was used to test the reliability of the instrument through direct application in field situations.

The research instruments used in this study include two main types, namely evaluation instruments and validation instruments. The evaluation instrument is designed in the form of a questionnaire and assessment rubric to measure the pedagogical competence of prospective elementary school teachers, including cognitive, affective, and psychomotor aspects. Indicators in this instrument include the ability of prospective teachers to design learning objectives, implement teaching strategies, use relevant learning media, and evaluate learning outcomes holistically. The validation instrument is used to measure the validity and relevance of the evaluation instrument. This instrument is arranged on a Likert scale of 1–5 to assess various aspects such as clarity of content, conformity with the Condition of Learning theory, cultural relevance, ease of use, and alignment with national teacher competency standards.

The data collection technique is carried out through two main stages. First, validation data is collected from six experts who provide assessments of the evaluation instrument using a validation questionnaire. Input and scores from experts are used to refine the instrument before being applied in the field. Second, reliability data is collected from 100 prospective Teacher Professional Education teachers who are respondents in the field trial. Respondents are asked to fill out the evaluation instrument, and the results are analyzed to determine the consistency and effectiveness of the instrument in measuring the pedagogical competence of prospective teachers. This technique ensures that the instruments developed have high validity and reliability and are relevant to educational needs in Indonesia.

The data analysis technique in this study was carried out quantitatively to evaluate the validity and reliability of the developed instrument. The validation data from experts were analyzed descriptively to obtain an average score for each aspect assessed, such as clarity, cultural relevance, ease of use, and suitability with the Condition of Learning theory [46]. This average score was used to identify the strengths and weaknesses of the instrument and provide direction for improvement. Furthermore, the reliability data obtained from prospective teacher respondents were analyzed using the Cronbach's Alpha method to measure the internal consistency of the instrument. A Cronbach's Alpha value ≥ 0.7 is considered to indicate good reliability, indicating that the instrument has an adequate level of trust to be used in evaluating pedagogical competence. The results of the data analysis were used to conclude the validity and reliability of the instrument and ensure that the instrument is in accordance with the context of Indonesian education and can measure pedagogical competence holistically.

The research procedure was carried out through several systematic stages to ensure the validity and reliability of the instruments developed. The first stage was preparation, in which the need for instrument development was identified based on the Condition of Learning theory and analysis of the Indonesian education context. Based on the results of the analysis, an initial evaluation instrument was prepared that included indicators of the pedagogical competence of prospective teachers. The second stage was validation by six experts consisting of various fields, such as pedagogy, educational evaluation, culture, educational technology, and educational policy. The experts were asked to assess the instrument based on aspects of clarity, cultural relevance, ease of use, and its suitability to national teacher competency standards. The validation results were used to refine the instrument. The third stage was a field trial, in which the validated instrument was applied to 100 randomly selected prospective Teacher Professional Education elementary school teachers. Respondents filled out the evaluation instrument, and the data collected was analyzed to test reliability using the Cronbach's

Alpha method. The final stage was refinement, in which the results of the data analysis were used to improve the instrument, resulting in a valid, reliable, and relevant evaluation tool for measuring the pedagogical competence of prospective teachers in the context of Indonesian education. The procedures in this study can be seen in the following figure 1.

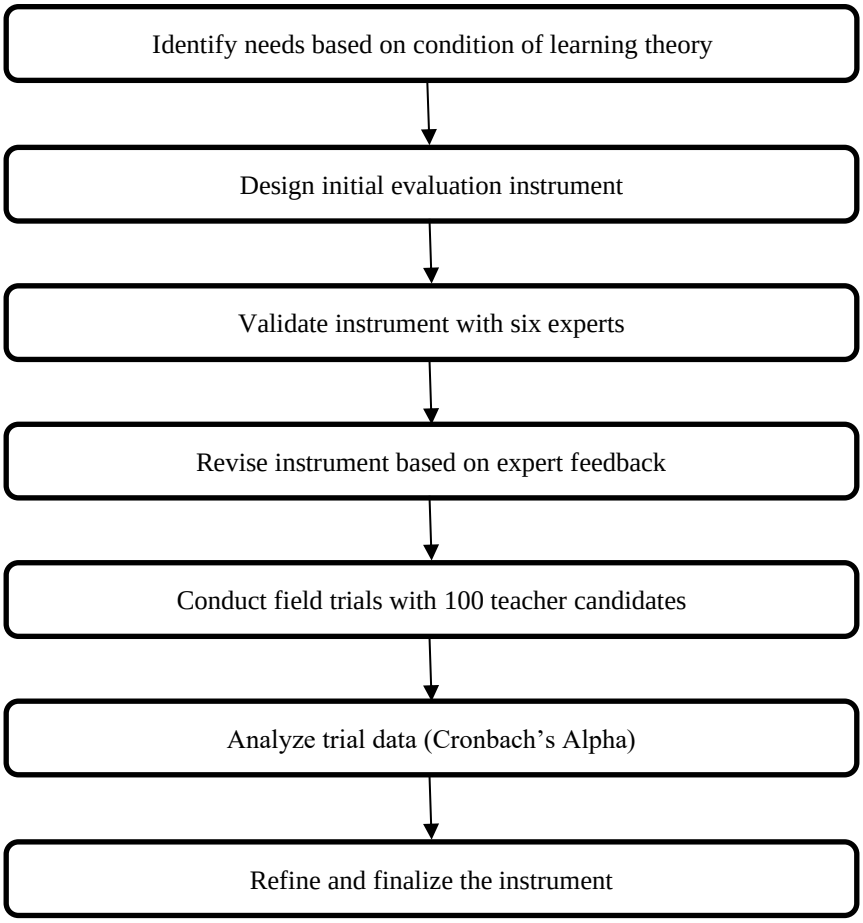

Figure 1. Research Procedure

3. RESULTS AND DICUSSION

3.1 Validity Test Results

Table 1. Results of Instrument Validity Test

Aspect	Score Expert 1	Score Expert 2	Score Expert 3	Score Expert 4	Score Expert 5	Score Expert 6	Average Score
Clarity of Content and Structure	4.5	4.6	4.4	4.5	4.5	4.6	4.5
Cultural Relevance	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Alignment with Condition of Learning Theory	4.7	4.8	4.6	4.7	4.7	4.8	4.7
Ease of Use for Teacher Candidates	4.3	4.2	4.3	4.4	4.3	4.2	4.3
Alignment with National Competency Standards	4.5	4.5	4.6	4.5	4.4	4.6	4.5

The results of the instrument validation based on the assessment of six experts showed that each aspect assessed had a high average score, with scores ranging from 4.3 to 5.0 on a scale of 1-5. The Cultural Relevance aspect obtained the highest average score of 5.0, indicating that the instrument is very relevant to local Indonesian cultural values. Clarity of Content and Structure and Alignment with National Competency Standards each obtained an average score of 4.5, reflecting good clarity and alignment of the instrument with national standards, although there is room for minor improvements. Alignment with Condition of Learning Theory

obtained an average score of 4.7, indicating that the principles of the theory have been implemented effectively in the instrument. Ease of Use for Teacher Candidates had the lowest average score of 4.3, indicating some obstacles in ease of use, such as the need to simplify technical terms. Overall, these results indicate that the instrument is valid and can be used with minor improvements in several aspects.

3.2 Reliability Test Results

Table 2. Results of Instrument Reliability Test

Aspect	Cronbach's Alpha	Description
Overall Instrument Reliability	0.72	Good reliability indicating consistent results across items.

The results of the reliability test show that the evaluation instrument has a good level of internal consistency, with a Cronbach's Alpha value of 0.72. This value is above the threshold of 0.7, which indicates that the instrument can produce consistent results when used to measure the pedagogical competence of prospective teachers. This reliability reflects that each item in the instrument supports each other to evaluate important aspects such as cognitive, affective, and psychomotor abilities holistically. These results ensure that the instrument is suitable for use in various evaluation contexts, especially to measure the competence of prospective PPG teachers at the Elementary School level in Indonesia. With guaranteed consistency, this instrument can be relied on to support the data-based decision-making process in teacher education programs.

3.3 Instrument Evaluation Results

Table 3. Instrument Evaluation Results

Aspect	Mean Score	Description
Cognitive Aspect Evaluation	85.05	Strong cognitive competency demonstrated by candidates.
Affective Aspect Evaluation	80.07	Good affective competency, with room for improvement.
Psychomotor Aspect Evaluation	81.14	Solid psychomotor skills indicating practical readiness.

The results of the evaluation of the pedagogical competence of prospective teachers showed good achievements in the three aspects tested, namely cognitive, affective, and psychomotor. The cognitive aspect recorded the highest average score of 85.05, indicating that prospective teachers have a strong academic understanding of teaching theories and strategies. The affective aspect obtained an average score of 80.07, indicating good ability in building empathy, national values, and emotional involvement in learning, although there is still room for improvement. Meanwhile, the psychomotor aspect recorded an average score of 81.14, indicating that prospective teachers have adequate practical skills in applying learning methods in the classroom. Overall, the results of this evaluation indicate the readiness of prospective teachers in facing the needs of teaching in Elementary Schools, with a balanced focus on mastery of theory, values, and practice. However, further improvements can be focused on the affective aspect to support the formation of student character more optimally.

The application of the Condition of Learning theory in the development of this instrument has proven effective in creating a structured and relevant evaluation tool. The main principles of this theory, such as emphasizing clear and measurable learning objectives, varied teaching strategies, and comprehensive evaluation, have been well integrated into the instrument design. This can be seen from the validation carried out by experts, where the Alignment with Condition of Learning Theory aspect received an average score of 4.7. This finding shows that the instrument is not only able to measure the pedagogical competence of prospective teachers but also ensures its relevance to proven theoretical approaches. The application of this theory allows prospective teachers to not only understand the conceptual framework of learning but also apply it in the classroom context more effectively.

The evaluation results show that the affective aspect scored lower than the cognitive and psychomotor aspects. This indicates that prospective teachers still need strengthening in building emotional relationships with students, motivating them, and creating an inclusive learning environment. In the context of Indonesian education, the affective aspect is very important to support the formation of student character in accordance with the values of Pancasila. Therefore, the Teacher Professional Education program needs to emphasize more intensive training in developing interpersonal and affective skills of prospective teachers. This can be done through learning simulations, case studies, and reflections on field practice that focus on interactions with students.

One of the important contributions of this study is the integration of local cultural values in the evaluation instrument. This success can be seen from the highest score in the Cultural Relevance aspect (5.0), which shows that the instrument is able to reflect the diversity and richness of Indonesian culture. This

integration is important in the context of national education, where teachers are expected to be able to understand and appreciate the cultural background of students. This instrument also encourages prospective teachers to develop learning materials that are relevant to students' daily lives, such as the use of folklore, local history, and contextual issues. This approach not only strengthens national identity but also increases student engagement in the learning process.

In the digital era, evaluation instruments such as those developed in this study have great potential to be adapted into digital platforms. The use of technology can increase the efficiency of the evaluation process, such as faster data collection, automated analysis, and real-time feedback [47], [48]. This is also relevant in distance education situations, where technology plays a vital role in supporting learning [49]. This valid and reliable instrument can be integrated into web-based applications or learning software to expand its reach. Further research is recommended to explore how technology can support the use of this instrument, especially in the context of hard-to-reach areas.

This study provides a significant contribution to education policy in Indonesia, especially in developing evaluation standards for Teacher Professional Education programs. With valid and reliable instruments, Teacher Professional Education organizers can ensure that the competencies of prospective teachers are evaluated more objectively and comprehensively. In addition, the results of this study can be the basis for developing policies that are more oriented towards local culture-based education. This instrument can also be used as a tool to measure the success of implementing a curriculum that emphasizes the values of nationalism and diversity.

As a further step, this research opens up opportunities for the development of more comprehensive and flexible evaluation instruments. For example, the development of instruments for higher education levels or for teacher training programs in specific areas, such as inclusive education or technology-based learning. Future research can also evaluate the effectiveness of these instruments in the long term, by measuring their impact on the quality of teachers' teaching after they graduate from the Teacher Professional Education program. In addition, collaboration with the government and higher education institutions can be carried out to ensure that these instruments are applied widely and consistently throughout Indonesia.

The findings of this study are supported by research conducted by Alam, Connectivism Learning Theory supports the development of teacher professional education evaluation instruments by emphasizing the importance of connections in learning networks between individuals, information, and technology [49]. This theory is relevant to research findings that show the need for evaluation instruments based on connectivity and collaboration. In this case, Connectivism provides a theoretical basis for integrating technology into the evaluation process, which is in line with recommendations to adapt instruments to digital platforms to expand the reach of implementation, especially in remote areas. In addition, Connectivism highlights the importance of collaboration and connectedness, which are relevant to assessing the affective competencies of prospective teachers, such as the ability to build emotional relationships with students and create an inclusive learning environment. This theory also emphasizes lifelong learning, which can be integrated into instruments to assess teacher readiness in facing dynamic educational challenges. The cultural relevance prioritized in Connectivism supports the finding that the instruments developed are very suitable for the local context, by integrating Indonesian cultural values into the evaluation. Thus, the principles of Connectivism strengthen the development of innovative, relevant evaluation instruments that are able to improve the quality of teacher education in the digital era.

This study confirms the effectiveness of Gagne’s theory in structuring evaluation instruments, emphasizing the integration of cultural and pedagogical relevance. The findings suggest that the Teacher Professional Education program must prioritize affective competency development. This can be achieved through reflective practices, case studies, and simulated classroom interactions. This study is limited to Elementary Teacher Professional Education and a purposive sample. Future research should expand to other educational levels and diverse contexts. Additionally, longitudinal studies are recommended to evaluate the instrument’s impact on long-term teaching quality. Collaboration with policymakers and educational institutions is essential to ensure wide-scale adoption and refinement of the instrument.

4. CONCLUSION

This study concluded that validation by six experts showed a high average score in all aspects, especially Cultural Relevance with a score of 5.0, which confirmed the success of integrating local values into the instrument. The reliability test produced a Cronbach's Alpha value of 0.72, indicating good internal consistency. The evaluation results showed strong achievements in the cognitive, affective, and psychomotor aspects, with average scores of 85.05, 80.07, and 81.14, respectively, reflecting the readiness of prospective teachers in facing teaching needs in the field. This study makes a significant contribution to the Teacher Professional Education program by providing a comprehensive evaluation tool, while encouraging the strengthening of teaching based on local values and national culture. With further refinement, this instrument can be widely used to support the development of quality teachers in Indonesia.

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