

IMPROVING TEACHER COMPETENCE THROUGH THE UTILIZATION OF THE STUDYSTACK APPLICATION IN MUKTIWARI VILLAGE, CIBITUNG, BEKASI REGENCY

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Abstract: The era of digital technology integration in education presents new challenges for teachers. The objective of this study program is to improve teacher competency through the use of the StudyStack application at MI Nurul Islam, Muktiwari Village, Cibitung District, Bekasi Regency, Indonesia. The program involved 25 teachers and was implemented through six interrelated stages: needs assessment, professional training, guided practice, mentoring, classroom implementation, and reflective evaluation. Data were collected through observation, documentation, and questionnaires. The findings revealed that teachers' abilities to develop interactive learning activities and integrate digital technology into classroom learning have improved through StudyStack-based training activities. Participants responded very positively to the program. These findings suggest that professional development programs that combine practical training, mentoring, and classroom implementation can effectively strengthen teacher competency and support sustainable digital learning practices in schools.

Keywords: *Communitu, Digital Competenc, SrudyStack, Teacher.*

INTRODUCTION

The development of information and communication technology has become an indicator of change in 21st-century education, shifting the paradigm of student-centered learning to teacher-centered learning (Arsyad et al., 2024; Prajapati, 2025; Rahimi & Oh, 2024; Sosa-Díaz et al., 2022). This shift allows students to engage more deeply with complex scientific concepts, encouraging independent learning, peer-led discussions, and collaborative research (Bhardwaj et al., 2025). To meet these needs, educational institutions must be able to provide teachers who master the changing paradigms of knowledge and digital technology. This will certainly impact the provision of teaching materials and pedagogical strategies in classroom learning that can also be integrated with technology and in line with current global developments. We need all parts of the learning ecosystem to work together towards transgressive, innovative, transformative, diverse, and inclusive teaching and learning, taking into account Industry 4.0, Higher Education 4.0, and World 4.0 (Chigbu et al., 2023).

Therefore, teachers must be able to balance their competencies in pedagogy and digital technology to deliver authentic materials, learning strategies, and teaching evaluations. However, many teachers still haven't achieved this ideal in the digital era of education (Leahy et al., 2019; McDiarmid & Zhao, 2023). Furthermore, teachers struggle to select and use digital learning applications that align with student needs, learning objectives, and the demands of current changes in education delivery. As a result, technology is often underutilized despite its significant potential to improve learning quality and student engagement. Even learning activities remain conventional, with teachers preferring to lecture, explain material, and provide exercises to students.

Initial observations at MI Nurul Islam, Muktiwari Village, Cibitung District, Bekasi Regency, revealed this problem. Teachers have adequate technological devices and a reliable internet connection to support their teaching, but they are not utilizing them optimally for digital-based instruction. The variety of learning media used is also still conventional and lacks digital multimedia. Therefore, discussions with school leaders and teachers concluded that practical and easy-to-implement professional development activities are needed to improve their teaching skills and mastery of digital technology, enabling them to design simple and user-friendly digital learning media across various digital platforms. StudyStack is a digital learning application that can be used as a solution to this problem. This web-based application allows teachers to develop various interactive learning activities, including flashcards, matching games, quizzes, crosswords, and other formative assessment exercises, using a single set of learning materials.

Previous studies have shown that teacher professional development programs, conducted through comprehensive training, mentoring, and classroom implementation, can improve teachers' pedagogical and digital competencies (Marnoko, 2025; Mwesigwa & Nakato, 2025). Other studies have shown that teachers who receive mentoring can achieve more optimal self-development in managing teaching and learning (Abakah, 2023; LoCasale-Crouch et al., 2012; Oh et al., 2024; Pesina, 2026; Shvets et al., 2024). These findings suggest that ongoing professional development should emphasize practical experience, collaborative learning, and ongoing reflection rather than solely introducing technology. Increasingly, teacher involvement in collaborative curriculum design is seen as a form of professional development (Voogt et al., 2015).

Based on the findings of the problem and previous research, it can be concluded that community involvement with educational institutions such as Jakarta State University is one collaborative concept in teacher professional development, such as the StudyStack-based teacher training program for teachers at MI Nurul Islam. This activity has distinct advantages because it combines needs assessment, workshops, guided practice, mentoring, classroom implementation, and evaluation to strengthen teacher competency in developing interactive digital learning activities. Thus, there are practical activities from the application of StudyStack in daily teaching practice.

The purpose of this study is to improve teacher competency in utilizing the StudyStack application to support interactive, student-centered learning. Therefore, this activity is expected to contribute to the knowledge of all parties involved and stakeholders in the education sector in conducting teacher pedagogical professional development, particularly in utilizing digital technology. Practically, it can strengthen teacher competency through easily accessible digital technology. Furthermore, this study provides a practical model for universities, schools, and education stakeholders seeking sustainable approaches to supporting teacher digital

transformation, particularly in elementary education environments with limited technological resources.

RESEARCH METHODS

The approach used to develop teacher competency through the StudyStack application is a participatory training approach. Participatory Learning and Action (PLA) is a form of action research and a general term for various participatory approaches and methods rooted in community participation in the process of sharing and learning about issues of concern to them, as well as the actions needed to address them (Coghlan & Brydon-Miller, 2014). Activities involved in implementing this program include training, mentoring, classroom implementation, and evaluation. This approach provides teachers with opportunities to familiarize themselves with StudyStack features and use them in the classroom or directly adapt them to actual teaching situations. Activities range from initial needs assessment to evaluation, emphasizing ongoing support to ensure teachers can independently develop and implement interactive digital learning activities. The stages of this study are presented in the figure 1 below.

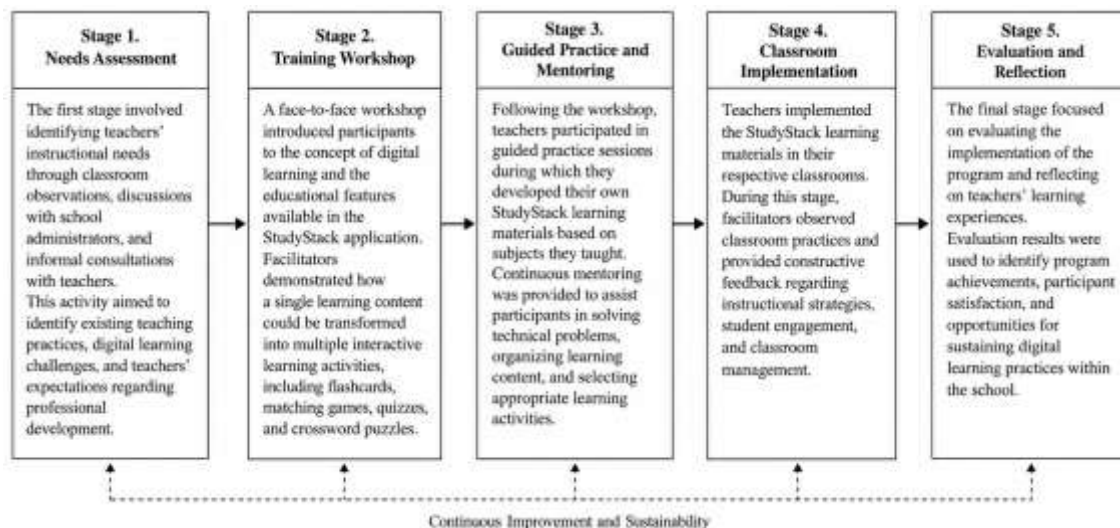


Figure 1. Implementation Process of Program

Participants and Location

This program is implemented through a collaboration between Jakarta State University and MI Nurul Islam, Muktiwari Village, Cibitung District, Bekasi Regency. Twenty-five teachers, teaching various subjects, participated. Participant selection used a total sampling approach due to the small number of participants and their participation in all professional development activities. Furthermore, participants had technological devices and knowledge of digital applications; however, few had prior experience using interactive digital learning applications.

Data Collection Techniques

Data were collected using three techniques:

1. Observations were conducted directly during the training activities, recording all developments, particularly teacher participation and practice in using StudyStack to design learning activities.
2. Questionnaire. After the training was completed, a questionnaire was distributed to participants to evaluate the results. There were 18 indicators measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Five aspects were

evaluated: the relevance of the training materials, facilitator performance, training implementation, StudyStack usability, and overall participant satisfaction.

3. Documentation included photographs, daily notes used during the observation activities, classroom implementation notes, and evaluation reports.

Data Analysis

The questionnaire data was analyzed descriptively. Furthermore, the data analysis was also directed at determining the level of satisfaction of the participants and was interpreted qualitatively. Qualitative data was obtained through observations and documentation collected during the activity. The integration of quantitative and qualitative findings provided a comprehensive evaluation of the program's implementation and outcomes.

Therefore, the activity evaluation also included four indicators:

1. Teachers' active participation during the training program.
2. Teachers' ability to develop interactive learning materials using StudyStack.
3. Participants' positive response to the training program and implementation of StudyStack.
4. Teachers' implementation of StudyStack in classroom learning activities after the mentoring session.

RESULTS AND DISCUSSION

Teacher Professional Development Needs

Needs analysis is a crucial part of identifying the main problem and its solution, namely the need for the application of digital technology in learning. The results of the initial observation analysis of this need concluded that teachers still predominantly use conventional learning activities and have not integrated them with digital technology. The findings of the initial needs analysis are as follows:

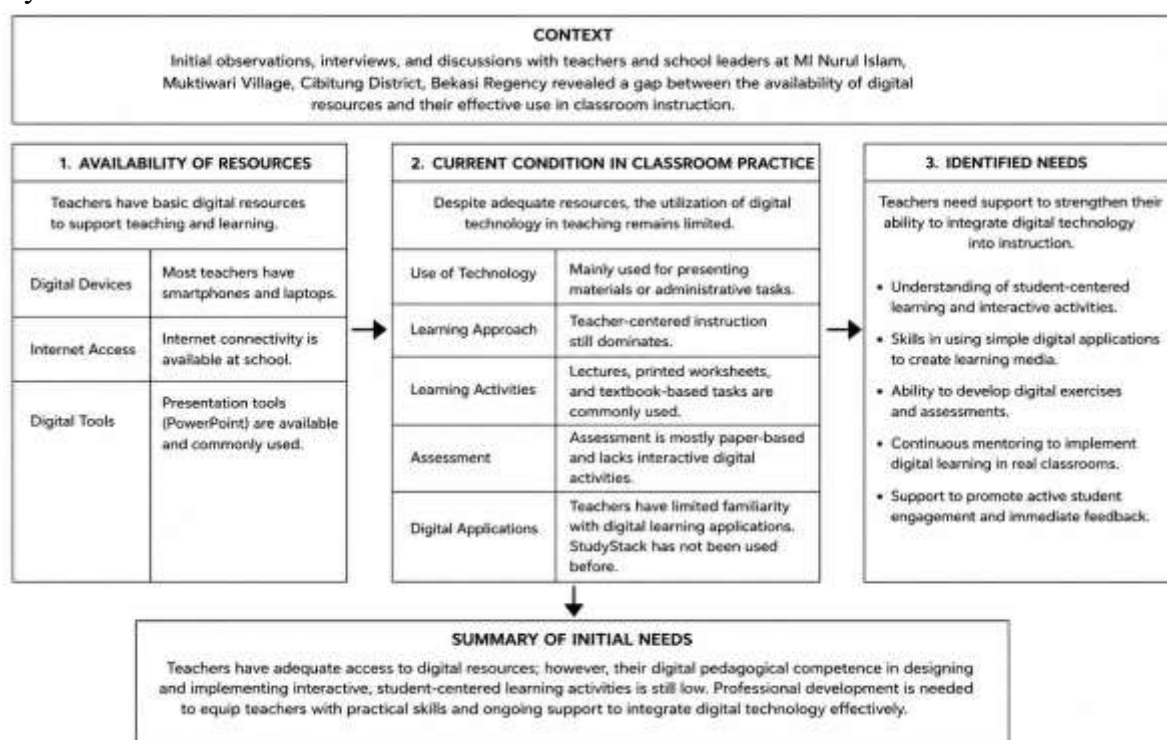


Figure 2. Implementation Process of Program

Figure 1 shows that teachers had digital technology teaching facilities but were underutilizing them. Learning activities were largely teacher-centered and relied heavily on lectures, worksheets, and PowerPoint slides, while interactive digital learning tools and formative

assessment applications were rarely used. This situation highlights that the primary challenge is not the availability of technology, but the need to strengthen teachers' competency and confidence in integrating digital technology into more engaging, interactive, and student-centered learning practices.

Implementation of the StudyStack Training and Mentoring Program

The program was implemented through six interconnected stages, as described in Figure 3. The approach used not only actively engaged participants during the training but also enabled them to develop their digital skills in StudyStack-based learning designs.

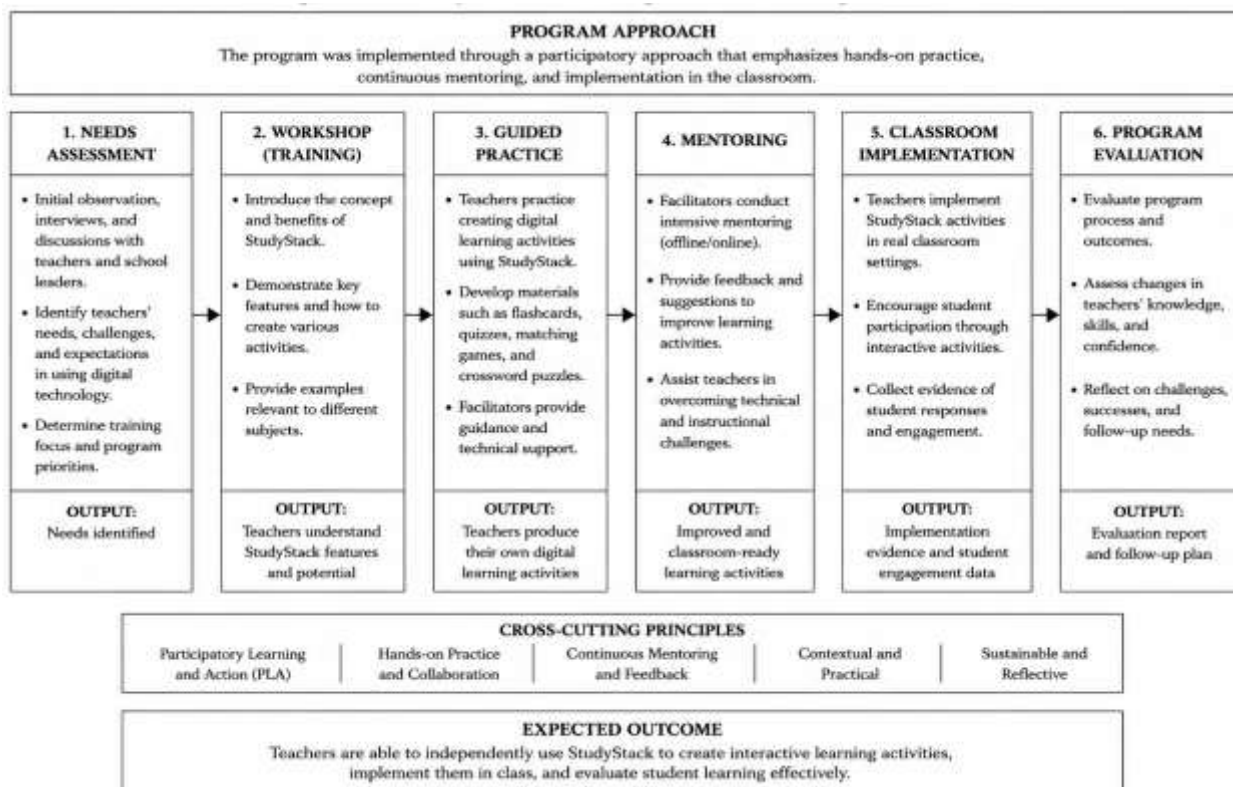


Figure 3. StudyStack Training and Mentoring Program Approach

Figure 3 illustrates that the StudyStack professional development program is implemented through a structured and ongoing process consisting of needs assessments, training workshops, guided practice, mentoring, classroom implementation, and evaluation. This phased, practice-based approach helps teachers build confidence and improve their ability to integrate digital learning activities into their daily teaching practices.

Program Outcome and Teacher Competency Improvement

The results of the program implementation show significant changes before and after the program in pedagogical and digital competencies, as illustrated in Table 1. Teachers were able to develop themselves through practical teaching skills and create interactive learning designs that were meaningful to students. Teachers began utilizing StudyStack for apperception activities, independent practice, formative quizzes, and reinforcement of learning materials.

Table 1. Changes Before and After Program Implementation

Aspect	Before Program	After Program
Learning Media	Printed worksheets and PowerPoint	Interactive StudyStack activities

Aspect	Before Program	After Program
Learning Model	Teacher-centered	Student-centered
Assessment	Paper-based exercises	Digital formative assessment
Teacher Confidence	Limited	Increased
Student Engagement	Passive	Active participation

Participants' Responses to the Professional Development Program

The program was evaluated using a questionnaire consisting of eighteen indicators covering the quality of the training materials, facilitator performance, training implementation, ease of use of StudyStack, and overall participant satisfaction. The analysis showed that the majority of participants responded very positively to the activities.

Table 2. The Participant Satisfaction Index

The Participant Satisfaction Index (IKM) was calculated based on the average score of all responses.

Satisfaction Index Scale (IKM)		Calculation of IKM		IKM Result
Index Range	Quality Category	Average total score (X)	= 4.93	IKM Score
88.31 – 100.00	Excellent	Maximum score	= 5	98.65
76.61 – 88.30	Good	IKM Formula	= (X / 5) × 100	Quality Category
65.00 – 76.60	Fair	Calculation	= (4.93 / 5) × 100	Excellent
25.00 – 64.99	Poor	Participant Satisfaction Index (IKM) = 98.65		Interpretation
0 – 24.99	Very Poor			The program achieved an excellent level of participant satisfaction.

Note: The IKM was calculated based on 25 participants' responses to 18 evaluation indicators using a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

The Participant Satisfaction Index (PSI) reached 98.65, which falls into the Excellent or Very Good category, indicating that the community service activities were deemed relevant to teachers' needs and provided direct benefits to their teaching practices.

Table 3. Summary Finding from Evaluation of the StudyStack Program

Evaluation Aspect	Main Findings	Evidence
Quality of Training Materials	Participants considered the training materials relevant, practical, and directly applicable to classroom instruction.	High positive responses across all indicators
Facilitator Performance	Facilitators were perceived as knowledgeable, responsive, and supportive throughout the training and mentoring activities.	Positive evaluations from participants
Training Implementation	The workshop, guided practice, and mentoring sessions were considered effective and well-organized.	High levels of participant engagement during activities
Usability of StudyStack	Teachers found StudyStack easy to use and suitable for developing interactive learning activities and formative assessment.	Participants reported increased confidence in using the platform
Overall Participant Satisfaction	Participants expressed a high level of satisfaction with the program and its relevance to instructional needs.	Participant Satisfaction Index (PSI) = 98.65 (<i>Excellent</i>)
Distribution of Responses	The majority of responses reflected highly positive perceptions of the program.	54.67% Strongly Agree; 44.89% Agree; 0.44%

Evaluation Aspect	Main Findings	Evidence
Overall Program Outcome	The program successfully improved teachers' readiness and confidence in integrating digital technology into classroom instruction.	Moderately Agree; 0% negative responses 99.56% positive responses

One important finding from this program was the emergence of schools' commitment to continue using StudyStack after the community service activities concluded. Teachers began sharing the developed materials with colleagues, while the school administration supported the integration of digital learning into daily teaching activities.

These findings indicate that the program's success is measured not only by the improvement of individual competencies, but also by the formation of a culture of collaborative learning and the sustainable use of technology within the school environment. Thus, teacher competence in technology mastery is crucial. This situation means that the use of digital technology is imperative in the classroom. It has been proven that the use of digital technology can increase learning motivation, student participation, and learning effectiveness (Efremova & Huseynova, 2021; Haleem et al., 2022).

Furthermore, these findings also provide significant contributions to teachers and schools, as they help them understand that teacher professional development activities must be needs-driven and understand how existing digital resources can be transformed into digital teaching media in the classroom. This allows teachers to experience meaningful and relevant learning experiences for their daily lives (Heine et al., 2023; Maimun & Hakim, 2021). Similar findings have been reported in many developing educational contexts, where the availability of technology does not automatically lead to pedagogical transformation unless teachers receive adequate professional support and opportunities to develop their digital competencies (Alptekin & Taneri, 2025; Salehi et al., 2025; Tondeur et al., 2025). Thus, the findings of this study illustrate the role of teachers in the classroom and how they must adapt their current skills to changes in society, knowledge, and technological advances. This allows technology integration in schools to achieve learning objectives.

The StudyStack-based professional development program demonstrates that practical and contextualized training can effectively bridge the gap between technology access and instructional implementation. Unlike conventional workshops, which often emphasize technical demonstrations, this program combines training, guided practice, mentoring, classroom implementation, and reflective evaluation. Such an approach allows teachers to apply newly acquired knowledge directly in their own teaching contexts. Previous research consistently shows that professional development programs are more effective when they are sustained, embedded in authentic teaching practices, and supported by ongoing mentoring rather than relying solely on one-off training sessions (Asterhan & Lefstein, 2024; Boylan et al., 2018; Kennedy, 2016; Sims et al., 2025).

The observed improvements in teachers' instructional practices also reflect the importance of experiential learning in teacher professional development. After the intervention, teachers shifted from using digital technology solely as a presentation tool and began integrating StudyStack into classroom interactions, formative assessments, and student engagement activities. Another important finding relates to teachers' positive perceptions of StudyStack's usability. Participants reported that the application was easy to learn, practical to implement, and adaptable to a variety of subject areas.

CONCLUSION

A teacher competency development program utilizing StudyStack concluded that collaborative development activities had a significant impact on improving pedagogical competency and mastery of digital technology. The program's results can build teachers' abilities in designing interactive digital learning, addressing existing challenges, and integrating digital technology into classroom learning. The activity approach, which combines needs assessment, workshops, guided practice, mentoring, classroom implementation, and evaluation, can create engaging and student-centered teaching and learning experiences.

The successful implementation of this program demonstrated the importance of professional development through hands-on classroom activities. Participants not only learned about digital applications but also gained authentic experience through direct feedback and guidance from mentors until they understood and were able to use them. These findings suggest that community engagement initiatives designed around practical application and ongoing support can lead to more meaningful teacher competency improvements. Future community engagement programs to improve teaching competency and mastery of digital technology can be recommended and implemented in various communities, even involving broader communities. Expanding collaboration between universities, schools, and local education authorities could further strengthen the effectiveness and scalability of digital professional development programs for teachers.

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