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# THE EFFECT OF TECHNOLOGY-BASED LEARNING ON IMPROVING EDUCATIONAL COMMUNICATION SKILLS OF ELEMENTARY SCHOOL TEACHER EDUCATION STUDENTS

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**Abstract**

This study aims to determine the influence of technology-based learning on improving the educational communication skills of students of the Elementary School Teacher Education Study Program (PGSD). Using a descriptive quantitative approach with a simple linear regression survey and analysis method, this study involves students who actively participate in technology-based lectures. The instrument used was in the form of a closed questionnaire that measured two main variables: the intensity of technology use in learning and students' communication skills. The results show that students with a high level of technology utilization tend to have better communication skills. Data analysis showed a significant influence between technology-based learning on communication skills, with a significance value of 0.003 and a coefficient of determination ($R^2$) of 0.452. These findings support Vygotsky's theory of constructivism and Garrison's theory of social presence, that technology-mediated social interactions play an important role in the development of communication competence. Technology-based learning has been proven to be able to create a learning environment that supports the development of students' communication skills effectively and is relevant to the demands of 21st century education.

**Keywords:** ***Project-Based Learning, Social Studies Learning, 21st Century Skills, Primary School, Learning Planning***

## INTRODUCTION

Education in the 21st century requires a transformation in the learning process, where technology is not only a tool, but also the main means of developing student competencies (Marsini, 2023) (Samadun et al., 2023). Technology has changed the way teachers and students interact, convey information, and build meaning together (Marsini & Dwikoranto, 2022). Elementary School Teacher Education (PGSD) students as prospective educators are required to master not only pedagogic and professional competence, but also qualified communication skills (Adhi et al., 2023). Communication is an integral part of the teaching process, both verbal and non-verbal. In this context, technology-based learning is becoming an increasingly important approach to implement. Technology provides an interactive, flexible, and collaborative space in the learning process that supports the development of students' communication skills. According to (Chaffey et al., 2009), technology-driven learning enables simultaneous integration of text, images, video, and audio, which enriches the learning experience and makes it easier to convey information. This has a direct impact on the way students communicate and convey ideas.

Technology-based learning also expands students' access to information, encourages them to explore various learning resources independently, and improves critical thinking and academic communication skills (Marsini, 2023). This is in line with the theory of constructivism (Vygotsky & Cole, 1978) which emphasizes the importance of social interaction in the learning process. PGSD students who are exposed to technology-based learning are expected to be more active in discussions, presentations, and critical reflection. They not only receive the material passively, but also engage in the process of thinking and expressing opinions in a more open and structured manner. Technology such as Learning Management System (LMS), interactive presentation applications, online discussion forums, and video conferencing are the main means of building students' communication skills (Suaka et al., 2023). The use of this media encourages students to convey ideas more effectively and efficiently. According to (Judge & Robbins,

2013), effective communication involves the process of delivering information that is understood by the recipient in accordance with the sender's intentions. In technology-based learning, the success of this communication is greatly influenced by how students master digital media to convey and interpret messages. However, the communication skills of PGSD students are still a challenge in itself. Many students experience obstacles in expressing their opinions orally and in writing, especially in academic and pedagogical contexts. This can be caused by a lack of training, lack of confidence, and lack of experience in using technological media for communication. Therefore, the integration of technology in learning is not only a matter of tools, but also a matter of pedagogical strategies and approaches. By utilizing technology-based learning approaches, lecturers can create an interactive and collaborative learning environment, which encourages students' active participation in various forms of communication, both synchronous and asynchronous. According to (Gagne et al., 1992), effective learning must pay attention to the internal and external conditions of students, including the use of media and technology to support a meaningful learning process. In practice, learning technology provides space for students to practice communication skills in various forms: making presentation videos, writing reflective blogs, discussing in online forums, to expressing opinions in virtual meetings. Communication skills developed through technological media include the skills of composing messages, adapting communication styles, and understanding diverse audiences. This is very important for prospective elementary school teachers who will later become the main communicators in the classroom.

Technology-based learning also encourages collaboration between students in group projects, which requires coordination, negotiation, and interpersonal communication. This is an excellent event to train the ability to communicate actively and effectively. Social Presence Theory of (Garrison et al., 1999) explains that social presence in online learning encourages emotional and affective involvement of students. This means that, through the medium of technology, students can build a strong presence and increase meaningful interactions. In addition, the technology-based approach provides the opportunity to provide feedback quickly and on an ongoing basis, which greatly helps students in developing their communication competencies progressively. However, the success of the use of technology in learning is highly dependent on the readiness of lecturers, appropriate instructional design, and students' openness in accepting and using technology optimally.Therefore, it is necessary to conduct research to examine in depth how technology-based learning affects the improvement of students' communication skills, especially in the Elementary School Teacher Education study program. This research is important as an empirical foundation for the development of technology-based curriculum and learning strategies, so that it can produce PGSD graduates who are not only academically competent, but also excel in communication skills as the main capital in the teaching profession.

## RESEARCH METHODS

This research method uses a descriptive quantitative approach that aims to determine the influence of technology-based learning on improving the educational communication skills of students of the Elementary School Teacher Education (PGSD) study program (Priadana & Sunarsi, 2021). This approach was chosen because it is able to describe the relationship between variables systematically through data that is measured numerically and analyzed with statistics. Quantitative research also allows researchers to test hypotheses objectively and generate generalizations based on data obtained from representative samples. This type of research is included in explanatory research, because it aims to explain the extent to which independent variables, namely technology-based learning, affect bound variables, namely students' educational communication skills. The main focus of this study is to measure the intensity of the use of technology in the learning process and its impact on the communication skills, both oral and written, possessed by PGSD students. The population in this study is all active students of the PGSD Study Program at one of the state universities in Indonesia in the even semester of the 2024/2025 academic year. The sampling technique was carried out by the purposive sampling method, which is to select respondents based on certain criteria, such as students who have participated in at least two semesters of technology-based learning or have used the Learning Management System (LMS), video conferencing applications, and other digital platforms in lecture activities.

The research instrument used is in the form of a closed questionnaire in the form of a Likert scale that has been validated by experts. This questionnaire consists of two main parts: first, to measure the extent to which students utilize technology in learning; Second, to assess students' educational communication skills, including aspects of message clarity, delivery structure, and confidence in academic communication. In addition, observation and documentation of learning activities involving technology were carried out, in order to support the results of the questionnaire and provide a contextual picture. Validity and reliability tests were first performed on the questionnaire instrument using item-total correlation analysis and Cronbach's Alpha (Nalendra, 2021). The collected data is then analyzed using simple linear regression analysis to determine the influence of independent variables on dependent

variables. The data analysis process is carried out with the help of statistical software, such as the latest version of SPSS (Imam Ghozali, 2018). The results of data processing are presented in the form of tables, diagrams, and interpretive narratives that illustrate the relationship between technology-based learning and students' communication skills. This study also pays attention to research ethical principles, such as maintaining the confidentiality of respondent data, requesting informed consent, and ensuring that participation is voluntary without coercion. Through this method, it is hoped that a deeper understanding of the contribution of technology in developing the communication skills of PGSD students will be obtained, as well as the basis for developing learning strategies that are more innovative and adaptive to the demands of education in the digital era.

## RESULTS OF RESEARCH AND DISCUSSION

### 1. The Level of Technology Utilization in PGSD Student Learning

The results of the questionnaire show that the majority of PGSD students have utilized various forms of technology in the learning process. As many as 82% of respondents stated that they use a Learning Management System (LMS) regularly, such as Google Classroom, Moodle, or Edmodo. About 76% of active college students use video conferencing apps such as Zoom and Google Meet for presentations, group discussions, and remote synchronous learning. On the other hand, 68% of college students also integrate visual media such as Canva, interactive PowerPoint, or animated videos in their presentation assignments. The results of observations on the lecture process support this data. Students are seen being active in virtual discussion activities, displaying the ability to express opinions systematically, and using digital features effectively, such as screen sharing, annotations, or poll features in group presentations. This shows that the integration of technology in the learning process has been optimally applied to PGSD students.

The results of the study show that the level of technology utilization by PGSD students is quite high, especially in the use of LMS, video conferencing applications, and digital visual media. These findings reflect that students have become accustomed to using technology as an integral part of the learning process, not just a complementary tool. This is in accordance with the view (Chaffey et al., 2009), which states that learning technology allows the integration of various forms of text, image, video, and audio information so as to enrich the student learning experience and support deeper understanding. Furthermore, the optimal use of technology can also be seen as the application of the principle of constructivism (Vygotsky & Cole, 1978), which emphasizes the importance of social interaction and the use of cultural tools (in this case digital technology) in developing students' cognitive and social abilities. In this context, PGSD students not only access materials, but also interact, discuss, and build common meaning through the digital platforms they use.

### 2. Student Communication Skills in the Context of Education

The second part of the questionnaire data that assesses communication skills shows that students have a relatively high level of educational communication skills. The assessment was carried out on three main aspects, namely: clarity of message delivery, structure and logic of thinking when delivering material, and confidence in academic communication. The average score of students' communication skills is 81.2%, which is classified as high based on the conversion of the Likert scale. Most students are able to formulate ideas with a clear structure, demonstrate the ability to convey ideas in the right academic language, and have confidence when speaking in online forums. However, some students still show weaknesses in maintaining the audience's attention when delivering presentations through digital media, especially in long durations.

Students' relatively high communication skills show that technology-based learning not only supports information transfer, but also develops critical thinking skills and better articulation of ideas. Students who are trained in using digital media tend to be more confident in expressing opinions, able to design logical message structures, and more effective in choosing appropriate academic language. This result strengthens the view (Judge & Robbins, 2013) which states that effective communication involves the ability to convey a message that is understood by the recipient according to the sender's intentions. Through technology, students gain a wider and more flexible space to practice these aspects—both in asynchronous contexts such as discussion forums and in synchronous meetings such as online presentations. In addition, these results also support the theory (Gagne et al., 1992), which states that the effectiveness of learning is largely determined by a combination of the internal conditions of students and the preparation of appropriate external learning strategies. Technology in this case is one of the external factors that strengthens students' internal ability to convey messages effectively.

### 3. Analysis of the Relationship of Technology-Based Learning to Communication Skills

A simple linear regression analysis was carried out to test the relationship between the use of technology in learning (variable X) and students' educational communication skills (variable Y). The results of the statistical analysis showed that the significance value (p-value) was 0.003 < 0.05, which means that there is a significant relationship between the two variables. The determination coefficient ($R^2$) of 0.452 shows that 45.2% of the variation in students' communication skills can be explained by the use of technology in the learning process.

**Table 1. Summary of Analysis Results**

| Variable | $R^2$ | p-value | Interpretation |
|---|---|---|---|
| Utilization of Technology → Communication Skills | 0,452 | 0,003 | There is a significant influence; The contribution of technology is quite strong |

These findings show that the higher the intensity and quality of the use of technology in learning, the greater the improvement of students' educational communication skills. Technology provides space for expression, exploration, and collaboration that has an impact on the development of students' communication competencies as a whole. From simple linear regression analysis, it was found that there is a significant influence between technology-based learning and the improvement of students' educational communication skills. An $R^2$ value of 0.452 indicates that almost half of students' communication skills can be explained by the use of technology in the learning process. This reinforces the claim that technology is not only an administrative tool, but also a major medium in developing student competencies. This discovery is also in line with the Social Presence theory of (Garrison et al., 1999), which explains that technology-based learning can build a student's "social presence" in an online learning environment. This presence, both emotionally and cognitively, encourages more meaningful interactions and allows students to build stronger interpersonal communication, albeit in a digital format. With this significant influence, it can be said that technology-based learning directly contributes to the educational communication skills of PGSD students. They are not only users of technology, but also develop ways of thinking, conveying, and interacting that are in harmony with the demands of today's world of education.

### 4. Field Observation and Documentation Support

The results of observations during the learning process support the quantitative data obtained. Students who actively use technology tend to be more able to convey ideas systematically, use attractive presentation media, and be able to adjust their communication style to the audience. In addition, documentation in the form of recordings of student presentations shows an improvement in the quality of communication from the beginning to the end of the semester, characterized by strengthening arguments, using more appropriate language, and increasing the effective use of communication technology features. Overall, the results of this study show that technology-based learning contributes significantly to improving the educational communication skills of PGSD students. These findings also confirm the importance of designing technology-centered learning strategies, not only as a tool, but as the main means in the professional development process of prospective elementary school teachers.

In general, the results of this study show that the integration of technology in learning has a positive impact on the development of communication competencies of PGSD students. Technology has shifted the role of lecturers as the only source of information to facilitators and directers of interactive discussions. In this context, students are required to be more independent, creative, and communicative in utilizing technology to convey ideas and collaborate (Sujianto et al., 2023). By implication, higher education institutions need to ensure that technology-based learning is strategically designed and not only relies on digital platforms, but also creates challenging learning scenarios and facilitates meaningful communication. In addition, lecturers as learning managers need to equip students with qualified digital literacy skills so that technology is really used as a medium to strengthen communication, not as a distraction or mere formality. By referring to the theoretical framework and research results, it can be concluded that the technology-based learning approach is one of the important keys in forming prospective elementary school teachers who are communicative, adaptive, and ready to face the challenges of the 21st century education world.

## CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that technology-based learning has a significant influence on improving the educational communication skills of students of the Elementary School Teacher Education Study Program (PGSD). Students who actively use various media and digital platforms in

lecture activities show a higher level of communication skills compared to those with low technology utilization. Technology not only functions as a tool for delivering material, but also as an interactive means that encourages students to think critically, organize ideas in a structured manner, and convey ideas effectively, both verbally and in writing. The high level of technology utilization, such as Learning Management System (LMS), video conferencing applications, and interactive visual media, shows that PGSD students have been quite adaptive in facing changes in learning paradigms. This has a positive impact on the communication aspect of their education, especially in terms of clarity of message delivery, courage to speak an opinion, and mastery of academic language. Statistical analysis shows that technology-based learning contributes significantly to improving students' communication skills, with a determination coefficient of 45.2%. These findings corroborate Vygotsky's theory of the importance of cultural interaction and tools in learning, and support Garrison's theory of social presence that emphasizes the role of technology in building interpersonal communication in online learning spaces. Overall, this study emphasizes that learning strategies that are integrated with technology have great potential in shaping PGSD students who are communicative, innovative, and ready to become professional educators in the digital era. Therefore, institutional and educator support is needed to continue to develop technology-based learning models that not only rely on the media, but also strengthen the design of interaction and communication between students in a meaningful way.

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