

Development of An Android-Based Physical Education Teacher Performance Monitoring System in Tegal Regency

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Abstract

This study was motivated by the results of a questionnaire distributed to the Physical Education Teachers' Working Group in Tegal Regency regarding the organizational management of the KKG PENJAS. The findings revealed that there is currently no comprehensive, integrated digital-based monitoring system; instead, conventional methods such as physical record-keeping and informal communication are still used during every KKG PENJAS meeting in Tegal Regency. Based on this phenomenon, an Android-based monitoring system could serve as an innovation and solution to address this issue, thereby simplifying and supporting the management process of the KKG PENJAS organization. This study aims to develop an Android-based monitoring system for the integrated, real-time management of the KKG PENJAS organization. The research method employed is Research and Development (R&D) using the Borg & Gall development model, which has been modified or simplified to account for various factors, ensuring effective and efficient implementation. The stages include: Research and Information Collection, Product Development, and Product Testing and Evaluation. The subjects of the study were media experts, subject matter experts, and the KKG PENJAS of Tegal Regency. The data collection instruments used were feasibility and effectiveness questionnaires. The research sample was determined using the Purposive Sampling technique within the KKG PENJAS of Tegal Regency. The research results are as follows: The validation results from Media Expert 1 and Media Expert 2, based on the application's visual design and programming aspects—which received scores of 94% and 88%, respectively—were categorized as “highly feasible or highly valid.” Subsequently, a small-scale pilot test involving 15 teachers yielded a 90% rating in the “highly feasible or highly valid” category, and a large-scale pilot test involving 50 teachers yielded a 95% rating in the “highly feasible or highly valid” category. Based on these results, it has been demonstrated that this Android-based monitoring system is highly feasible for use by the Physical Education Teachers' Working Group in Tegal Regency

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INTRODUCTION

Physical education differs from other subjects in terms of its focus on activities and teaching methods (Mustafa & Dwiyo, 2020). In this context, physical education encompasses the psychomotor, cognitive, and affective domains, whereas other subjects aim to develop knowledge, conceptual understanding, and intellectual skills.

The implementation of education is defined as the initial process guided toward students to prepare them for mature physical and mental development through the learning process (Desmila & Suryana, 2023). In the field of education, this is grounded in sustainable goals and development that can address global issues and prepare individuals to live in society (Kopnina, 2020)

Challenges in implementing the physical education process are linked to the application of the “Merdeka Belajar” curriculum. In this context, criticism and protests have emerged from various academic circles, particularly from educators who are directly aware of on-the-ground conditions (Juditya et al., 2022). Many teachers face difficulties adapting directly to the new paradigm, which demands more innovative approaches, while students have not yet become accustomed to critical thinking (Firza et al., 2025). Several studies have shown that some physical education teachers are still stuck using conventional methods, which fail to support the development of student character in accordance with the Pancasila learner profile (Aziz & Wicaksana, 2024; Nurcholis et al., 2025).

According to (Haris et al., 2021; Mustafa, 2022), physical education is an educational process conducted through physical activities. The education system in Indonesia is governed by policies stipulating that physical education must be included in the elementary and secondary school curricula, as specified in (Law No. 20 of

2003 on the National Education System, Article 37, which designates Physical Education, Sports, and Health as mandatory subjects).

The primary objective of education in Indonesia is to enlighten the nation’s future generations and to foster the development of students’ potential so that they may become individuals who are faithful, devout to the One and Only God, possess noble character, are physically and spiritually healthy, knowledgeable, creative and innovative, independent, and responsible, democratic citizens who love the homeland of Indonesia. In accordance with Ki Hajar Dewantara’s motto: “Ing ngarso sung tulodo, ing madya manguk karso, tut wuri handayani,” which means “lead by example, inspire enthusiasm in the midst, and provide encouragement from behind” (Ichsan, 2021; RAHAYUNINGSIH, 2022).

A positive image within an educational institution reflects the quality and integrity of the education provided (Hwang & Choi, 2019). A positive image can also be fostered through accountability, which is the result of various decisions aligned with tiered and sustainable objectives (Abhayawansa et al., 2021). Understanding various management factors, particularly transparency and accountability, can lead to the creation of effective evaluation and monitoring systems and foster a positive image within educational institutions (Sholeh, 2023).

A teachers’ working group (KKG) is an organization or forum where professional teachers gather to discuss issues related to teaching and learning at the cluster or subdistrict level (Habibie et al., 2021). According to (Herwin et al., 2021), a teacher working group is defined as an organizational group serving as a forum for professional teachers at the elementary school (SD) or madrasah ibtidaiyah (MI) level, operating at the sub-district level or among a consortium of schools, with the aim of improving the quality of education.

Meanwhile, according to (Zainuddin et al., 2020),

The primary objective of a teacher working group is to enhance teachers' competencies and professionalism through various collaborative activities, such as group discussions, workshops, and training (Purba et al., 2022). Teacher working groups are established as part of a systematic effort to improve the quality of education in Indonesia. According to (García-Martínez et al., 2021), collaboration among teachers can facilitate the improvement of human resources in terms of teaching skills and expand teachers' knowledge of systematic and effective learning methods.

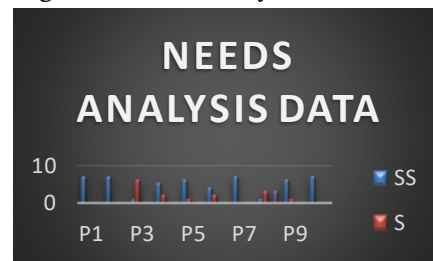
Research findings from (Mardan et al., 2023) indicate that KKG has a significant impact on elementary school teachers' performance, with 51.1% showing a significant effect; however, in practice, there is a perception that the organization is viewed as a mere formality that contributes little to teachers' professional development unless supported by better facilities.

According to (Harahap & Sihombing, 2024), several other issues have also emerged in physical education in schools today, such as the creation of teaching modules or lesson plans (RPP); all of these must be directed first before they can be successful. In this context, the main point is that educators have not yet fully understood the pedagogy within the Merdeka Curriculum. The solution lies in the consistent implementation of policies, which requires monitoring of all activities, increased funding for facilities that support teacher quality, and the enrichment of teachers' literacy regarding media, modules, strategies, and assessment.

In this modern digital era, technology is the application of scientific knowledge to solve various problems in life (Access, 2020). According to Julia & Jiddal Masyrurroh (2022), technology can take the form of tools, systems, or methods used to assist humans. The term "technology" itself derives from the word "technologia" or may

also stem from "techno," both of which signify expertise and knowledge (Elfi Husda & Wangdra, 2022). Technological advancements in the current era have led to the widespread dissemination of information technology, making it easier and faster to access information. This can impact reading interest, thereby causing changes in literacy culture that are important to understand (Tiara Dwi Pamungkas et al., 2024).

Figure 1. Needs Analysis Chart



Based on observations, interviews, documentation, and needs analysis of the Tegal Regency Physical Education Teachers' Working Group, all members still use a manual system. If this continues, several weaknesses will emerge, while at the same time, switching to an Android-based digital system would reveal its advantages. If the manual system persists, it will lead to limitations in data management and storage, resulting in disorganized data that is prone to loss or damage; monitoring and evaluation of activities become less effective and time-consuming; reliance on manual record-keeping is prone to human error, which can compromise the accuracy of reports and documentation; and the absence of automated reminder or notification features reduces work efficiency, potentially causing important tasks to be overlooked. In contrast, switching to an Android system offers various advantages as a solution, such as enabling centralized, real-time management of activity data accessible anywhere by members; simplifying activity monitoring and evaluation with accurate, automated reports; and supporting the development and improvement of modern, technology-adaptive management practices

for teacher working groups. Given these conditions, it is necessary to develop a system or application that can facilitate and support the digital management and monitoring of KKG PENJAS activities, thereby improving management effectiveness and accountability.

METHODS

This study is an R&D (Research & Development) adaptation of the Borg & Gall model. The researcher simplified the steps into the following phases: 1) Research and data collection; 2) Product development phase; 3) Testing and evaluation phase. The research sample was determined using purposive sampling, with a small-scale pilot study involving 15 physical education teachers and a large-scale pilot study involving 50 physical education teachers. The instruments used were questionnaires for media experts, content experts, and application users.

RESULTS AND DISCUSSION

1. Research Findings and Data Collection

Based on the results of the initial analysis phase, the researcher determined that the Tegal Regency Physical Education Teachers' Working Group was facing certain challenges. The issues identified by the researcher were that all members were still using conventional or manual methods, which resulted in ineffective and inefficient monitoring of the implementation of a community spanning eighteen subdistricts in Tegal Regency. In this context, the researcher then sought alternative solutions to this problem.

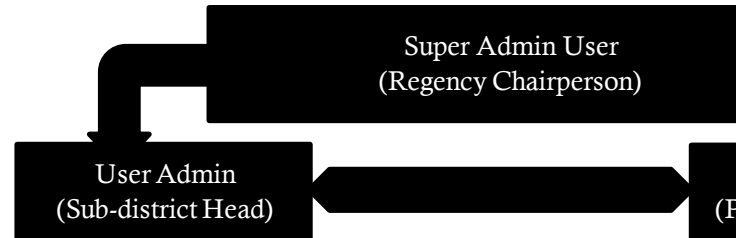
The product analysis results confirmed the issues identified in the initial analysis regarding the shortcomings and weaknesses of conventional or manual methods. In this context, the researcher employed a needs analysis to develop the Android-based S-Teach application, with the aim of helping to resolve these issues. This approach was

based on information gathered through interviews, questionnaires, and observations.

2. Product Development Results

The results of the S-Teach app product design are categorized into three user groups, namely:

Figure 2. Differences in Functionality



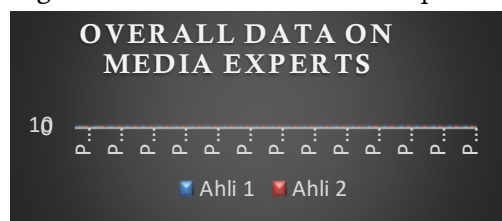
Super Admin User: In this role, the user is responsible for setting the direction and policies of the organization, bearing full responsibility for its operations, and monitoring all administrators and members in real time.

Admin User: In this role, the user is responsible for leading a specific department or unit, coordinating the members under their supervision regarding the division's work programs within the physical education teachers' working group, and implementing policies set by the chairperson.

Member User: In this role, the user is responsible for adhering to organizational regulations, carrying out assigned tasks, and contributing in real time.

The application, developed with input from media and content experts, has been named S-Teach (Teamwork Enhancement and Administration for Collaborative Hub) by the researcher, signifying the enhancement of teamwork and administration for a collaborative hub. In this context, the researcher has selected an expert validator to provide evaluations and recommendations for each component of the Android-based application system in order to serve as material for revising the product, thereby resulting in an organizational monitoring application system for the Tegal Regency Physical Education Teachers' Working Group with the following results:

Figure 3. Overall Data on Media Experts



The validation results from Media Expert 1 and Media Expert 2, based on the application's visual design and programming aspects—which received scores of 94% and 88%, respectively—were deemed “excellent” by both experts. The findings from the subject matter expert are explained as follows:

Figure 4. Overall Data on Subject Matter Experts



The validation results from Subject Matter Experts 1, 2, and 3, based on all aspects, yielded total scores of 96, 93, and 95, respectively, with average scores of 4.8 for Expert 1, 4.7 for Expert 2, and 4.8 for Expert 3, where the maximum score for each aspect is 100. In this case, the percentages obtained from Expert 1 (96%), Expert 2 (93%), and Expert 3 (95%) indicate that all aspects were rated as “very good” by the three subject matter experts who provided the evaluations, based on a total of 20 items.

3. Testing and Evaluation Results

Small-scale or limited trials are part of the process for gathering feedback that can later be used to evaluate a product; the goal is to obtain direct feedback from a limited number of users who, in this context, have a significant influence on the product's usability and provide information necessary to proceed with large-scale trials (Beets et al., 2021). According to (Okpatrioka, 2023; Rizky Dezricha Fannie & Rohati, 2022), the

purpose of small-scale testing is to assess effectiveness and identify product weaknesses so they can be addressed before mass implementation. This small-scale testing was conducted with the Physical Education Teachers' Working Group in Tegal Regency, involving fifteen teachers. The research process involved a detailed explanation of the S-Teach application, combined with instructions on how to operate it. Once this was completed and all participants understood the application's functionality, the next step involved the researcher providing guidance, starting from the installation process through to exploring all activities within the S-Teach application.

The subsequent stage, following the implementation of the S-Teach application, involved the researcher distributing questionnaires to the respondents to gather direct feedback on the application. The objective was to determine the application's feasibility, effectiveness, functionality, and efficiency regarding the organizational processes of the Physical Education teachers' working group in Tegal Regency.

Table 1. Overall Results for All Aspects of the S-Teach Application

Overall Results for All Aspects of the S-Teach Application						
No	Assessment Criteria	Total Score	Maximum Score	Average	Percentage	Category
1	Effectiveness of the Application	680	750	4.53	91%	Well worth it
2	Application functions	672	750	4.48	90%	Well worth it
Grand Total		1352	1500	4.51	90%	Well worth it

Based on the results of the analysis of the questionnaire data above, which assessed the developed application, the results regarding the application's effectiveness and functionality yielded a total score of 1,352 out of a maximum of 1,500. The results of these two aspects indicate that the developed application has a level of usability that meets

the criteria for “highly suitable,” with a 90% effectiveness rate in supporting the monitoring process of the Physical Education Teachers’ Working Group in Tegal Regency. In this regard, the S-Teach application demonstrates that its various features can help users access information and monitor organizational activities in real time more effectively and efficiently. The data obtained from respondents was subsequently subjected to large-scale validity and reliability testing to ensure the results are valid and reliable, as follows:

Table 2. Results of the Respondent Validity Test

Statement	r-Count	r-Table	P (Sig.)	Description
P1	0,505	0,279	0,000	Valid
P2	0,448	0,279	0,001	Valid
P3	0,519	0,279	0,000	Valid
P4	0,478	0,279	0,000	Valid
P5	0,457	0,279	0,001	Valid
P6	0,468	0,279	0,001	Valid
P7	0,464	0,279	0,001	Valid
P8	0,497	0,279	0,000	Valid
P9	0,466	0,279	0,001	Valid
P10	0,420	0,279	0,002	Valid
P11	0,423	0,279	0,002	Valid
P12	0,428	0,279	0,002	Valid
P13	0,518	0,279	0,000	Valid
P14	0,464	0,279	0,001	Valid
P15	0,481	0,279	0,000	Valid
P16	0,653	0,279	0,000	Valid
P17	0,439	0,279	0,001	Valid
P18	0,524	0,279	0,000	Valid
P19	0,417	0,279	0,003	Valid
P20	0,456	0,279	0,001	Valid

Tabel 1 Hasil Data Uji Reliabilitas Responden

N of Items	Cronbach's Alpha	Requirements	Description
20	0,815	0,60	Reliable

Based on the validity and reliability test tables for both the application’s effectiveness and functionality, as presented above, the results overall indicate that each item has been deemed valid and reliable, as

the calculated r-value for the 20 items is greater than the table r-value of 0.279, and the significance level (Sig.) is < 0.05 , while the Cronbach’s Alpha value is $0.815 > 0.60$.

Validity and Reliability Tests were conducted on the application user survey instrument to assess responses regarding the effectiveness and functionality of the application within S-Teach. The data were analyzed using SPSS Version 26 to determine whether, in this context, the calculated r and alpha values were greater than the table r value; if so, the items were deemed valid and reliable

CONCLUSION

The conclusion of this study is the development of an Android-based monitoring system for the Physical Education Teachers’ Working Group in Tegal Regency. The S-Teach application facilitates the monitoring of organizational activities, such as attendance, program implementation, and activity evaluations. Administrators can monitor these activities directly through the S-Teach application system without being limited by time or location, using Android smartphones, tablets, or laptops. The use of the application can also reduce reliance on conventional methods, accelerate the reporting process, and minimize administrative errors, thereby enhancing organizational efficiency. This is evidenced by evaluations from media experts and subject matter experts, who stated that the S-Teach application is highly suitable for use in the activities of the KKG PENJAS organization. The implementation of this product has also received positive feedback from teachers, who state that the system is highly suitable, effective, and efficient in supporting their activities. This monitoring system holds significant potential within the KKG

PENJAS organization and is expected to continue evolving to support and enhance teacher quality in the digital age, ensuring they remain up-to-date with contemporary developments.

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