



Development of A Web-Based Application for Identifying Sport Talent in Children Aged 11-15 Years

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Article Info

History Articles

Received:
January 2026
Accepted:
January 2026
Published:
June 2026

Keywords:

Sports Talent Identification,
Web-Based Application,
Sport Search Methode

Abstract

The identification of athletic talent at the school level in Indonesia still relies heavily on the subjective observations of physical education teachers and coaches, with limited use of data analysis technology. This situation has the potential to lead to inaccuracies in talent guidance and inefficient coaching decisions. This study aims to develop and evaluate the feasibility and effectiveness of the SIBAKAT ID web-based application as a tool for identifying athletic talent in children aged 11–15 years through the processing of biomotor and anthropometric data using the Sport Search method. This study uses a Research and Development approach that includes needs analysis, system design, expert validation, small-scale trials, and large-scale trials. The research subjects involved physical education teachers, coaches, and sports academics. The data were analyzed using quantitative and qualitative descriptive techniques. The results showed that the SIBAKAT ID application had a very high level of feasibility in terms of material suitability and media quality based on the results of expert validation and user trials. Effectiveness tests show that the application is capable of systematically processing test data, displaying talent potential rankings, and providing efficient sports branch recommendations. It can be concluded that the SIBAKAT ID application is feasible and effective for use as a data-based decision-making support tool in the process

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p-ISSN 2252-648X
e-ISSN 2502-4477

INTRODUCTION

The rapid development of technology in the field of sports has brought about changes to the paradigm of sports performance development. Efforts to achieve elite-level sports performance no longer rely solely on intuition or subjective observation, but increasingly depend on a systematic, planned, and continuous process of scientific talent identification. The success of sports performance development is determined by the accuracy of the talent identification process, which must be objective and scientific (Bompa & Haff, 2009; Roberts et al., 2019; Vaeyens et al., 2008). In line with the view of Hadi et al (2019) that sports coaching cannot be separated from the existence of educational institutions, it can make a very significant contribution and play a very significant role in achieving sporting achievements. The above statement is also reinforced by Law No. 11 of 2022, Article 22, which states that sports coaching must be carried out through the stages of introduction, monitoring, guidance, and continuous talent development. However, in practice, the sports coaching system in schools is still natural and highly dependent on the subjective observations of physical education teachers without being supported by measurable and systematically documented data (Abbott & Collins, 2004; Mansur, 2011).

Identifying athletic talent is a crucial initial stage in the performance development system because it serves as a selection process for finding potential talent from an early age. This process aims to minimize training errors due to inaccuracies in directing sports and to increase efficiency in determining long-term training programs. Without proper talent identification, children's potential risks not developing optimally and may even be overlooked

(Harre & Barsch, 1999). Therefore, the accuracy of identification instruments and methods in the early stages is key to determining the quality of athletes in the national sports development cycle.

In Indonesia, despite the prevalence of student sports competitions through various programs such as the National Student Sports Olympics (O2SN), Regional Student Sports Week (POPDA), and National Student Sports Week (POPNAS), the basic mechanism for identifying talent is still not systematically structured. Many sports practitioners still rely on a selection process based on the subjective observations of physical education teachers or coaches, which has the potential to overlook children with superior physical potential but who do not stand out in terms of performance (Achmad et al., 2019; Satriawan et al., 2023; Yunyun et al., 2007). This condition indicates a gap between the availability of potential athletes and a talent identification system capable of reaching them widely.

Identifying athletic talent at an early age is a fundamental step in discovering a child's natural potential, allowing them to be directed toward sports that suit their physical, psychological, and biomotor characteristics (Andi Atssam Mappaanyukki et al., 2024; Simwanza & Paul, 2023; Yuliawan, 2023). Research indicates that effective sports development must begin with systematic observation and talent scouting to identify high-potential athletes from a young age (Hadi et al., 2019). This process becomes even more important between the ages of 11 and 15, often referred to as the golden age, when motor coordination and biological growth occur rapidly and plastically (Shahidi et al., 2023; Soenyoto, 2017; Yudho et al., 2022).

In practice, physical education in elementary and junior high schools still faces various limitations in the talent identification

process, including the dominance of teachers' individual experiences, limited learning time, and minimal use of objective and standardized measurement instruments (Achmad et al., 2019). As a result, many children with superior biomotor potential are not optimally identified due to the absence of a measurement system capable of accurately and continuously recording and analyzing data (Nurhasan & Cholik, 2000).

Various literature reviews confirm that an effective sports talent identification system must consider multidimensional factors, including biomotor abilities, anthropometry, physiological aspects, and psychological aspects (Kenney et al., 2021; Mansur, 2011; Till & Baker, 2020). Identification approaches that focus solely on momentary performance have the potential to cause selection bias, including the relative age effect phenomenon, which can hinder the development of talented athletes with slower biological maturity (Prieto-ayuso et al., 2020; Śliwa et al., 2021). A multidimensional approach has also been used in sports talent identification research through integrated anthropometric, physiological, and biomotor measurements (Sanpasitt et al., 2023; Utami et al., 2024).

One scientific approach that is widely used in identifying athletic talent is the Sport Search method. This method integrates a series of anthropometric and biomotor tests to objectively map children's athletic potential (Suryadia, 2020). Sport Search is designed to help students aged 11–15 years find the right sport based on their physical characteristics and motor skills. Identification instruments tailored to the characteristics of specific sports have been proven to produce more relevant and applicable recommendations (Deprez et al., 2015; Han et al., 2023).

In Indonesia, the Sport Search method has been used as an instrument for

identifying talented prospective athletes, both in schools and in student sports coaching programs. Through standardized measurements, this method allows physical education teachers and coaches to obtain an objective picture of the potential of their students (Kastaniah et al., 2024; Sujatmiko et al., 2025). The lack of implementation of Sport Search, which is still done manually in calculations, has limitations in terms of time efficiency, data processing accuracy, and storage of identification results (Abrori et al., 2023). Similar conditions also indicate that the talent identification process requires a more structured and systematic system in order to support sustainable coaching decision-making (Hasanuddin, 2023).

With the development of information technology, the need for a digital-based talent identification system has become increasingly urgent. Web-based applications can automate data processing, improve the accuracy of analysis, and facilitate access without device and location limitations (Malik & Ardianto, 2020). In addition, web-based systems enable centralized data storage through an integrated database management system, thereby supporting the longitudinal monitoring of student development (Utamayasa, 2021).

Based on these conditions, the development of a web-based application for identifying athletic talent in 11–15-year-olds is a strategic step in supporting evidence-based sports coaching. The application developed in this study, SIBAKAT ID, is designed to automatically integrate biomotor and anthropometric tests based on the Sport Search method. Through a computerized data processing system, this application is expected to assist in making coaching decisions that are more objective, efficient, and valid compared to conventional systems.

Therefore, this study aims to develop a web-based application for identifying sports

talents among students aged 11–15 years and to test its feasibility and effectiveness. The results of this study are expected to contribute theoretically and practically to the development of a data-driven and sustainable student sports coaching system, while strengthening the role of schools as the main foundation for the development of national sports achievements in the era of digital transformation..

METHODS

This study uses Research and Development (R&D) adapted from the development stages proposed by Sugiyono. The R&D approach was chosen to develop, validate, and refine SIBAKAT ID, a web-based application designed to support the process of identifying athletic talent objectively.

Participants

Participants in this study included experts and application users. Application users consisted of physical education teachers, coaches, and sports academics. There were five expert validators, including four experts in the field of sports talent identification and guidance and one media expert with expertise in information technology. The research subjects in the pilot test phase consisted of 10 people in the small-scale test and 50 people in the large-scale test.

Sampling Procedures

In this study, the sampling procedure used purposive sampling to ensure that participants were highly relevant to the application development objectives. The sample consisted of five expert validators (in the fields of talent guidance and IT) for validation testing, as well as 60 users (physical education teachers, coaches, and academics) for small- and large-scale practical testing. In addition, 50 students

aged 11–15 years from five schools in Semarang City were involved as target users to test the functionality of the system in identifying talents based on their motor development phase.

Materials and Apparatus

The product developed in this study is a web-based application for identifying athletic talent in 11- to 15-year-olds called “SIBAKAT ID,” which is designed as a tool for analyzing athletic talent. To determine its feasibility and effectiveness, a questionnaire with a 1–4 Likert scale was created for this research instrument. This research instrument has also been validated and its reliability confirmed with a Cronbach's alpha coefficient of 0.975, indicating excellent internal consistency.

Procedures

The research procedure for developing a web-based application for identifying sports for ages 11-15 began with preliminary observations that were used as a basis for analyzing product development needs. The research then continued through the stages of identifying potential and problems, product design, product validation by four subject matter experts and one media expert, product revision, small group testing involving 10 respondents, revision based on the results of the small-scale trial, a large-scale trial involving 50 respondents, revision of the large-scale trial results, product effectiveness testing, and finally the mass production stage of the web-based application “SIBAKAT ID”. All participants received an explanation of the research objectives and procedures and gave their consent to participate.

Design or Data Analysis

This study uses a mixed-method approach in data analysis. Quantitative data obtained from expert and user assessment questionnaires are analyzed using descriptive statistics to determine the level of feasibility,

practicality, and effectiveness of the application. Meanwhile, qualitative data in the form of comments and suggestions from expert validators and users were analyzed descriptively and used as a basis for gradual product revisions. System performance was also evaluated by testing the accuracy and consistency of Sport Search score conversions and the reliability of sports branch recommendations generated by the application..

Figure 1 SIBAKAT ID Application Home Screen

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Figure 2 SIBAKAT ID Application Child Database Display

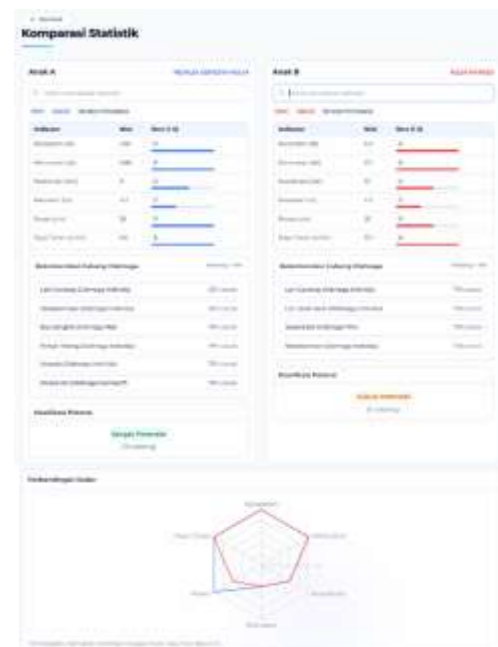
RESULTS AND DISCUSSION

Design Results

Flowcharts are an important stage in product development because they help developers design workflows systematically, making the manufacturing process more efficient and minimizing errors.

Development Results

After the flowchart is prepared, the next step is to begin the process of developing the SIBAKAT ID application based on software as the main medium for product creation.



**Figure 3 Data Analysis and Statistics
Comparison Feature Display of the SIBAKAT
ID Application**

The initial stages of research and development begin with product design. The conceptual design is systematically arranged through a flowchart and realized in the form of the SIBAKAT ID web-based application. This application was developed to assist in the processing of biomotor and anthropometric data and analysis, with reference to the sport search method as the basis for objective talent identification. After product development is complete, the application is then validated by involving experts to assess the feasibility, accuracy, and operational performance of the system. This validation process involves two fields of expertise, namely talent identification experts and information media experts, so that both the scientific aspects and the appearance of the application can meet the established standards.

The material was validated by four experts in the field of sports talent identification, namely Dr. Adi S., M.Pd., Agus Darmawan, S.Pd., M.Pd., Syahru Romadhoni, S.Pd., M.Pd., and Aristyanto, S.Pd., as well as one media expert, Dr. Feddy Setio Pribadi, S.Pd., M.T. The SIBAKAT ID application was assessed using a structured questionnaire covering material and media aspects using a four-point Likert scale, ranging from a score of 1 (very unsuitable) to a score of 4 (very suitable). In addition to numerical assessments, the experts also provided input in the form of suggestions and criticism, which were used as a basis for the product improvement process. The validation data was then analyzed to determine the final feasibility level of the application, so that SIBAKAT ID was declared to have passed the empirical verification process before proceeding to the field trial stage. Next, a conversion table for the Material Aspect and Media Aspect is presented.

Tabel 1 Conversion of Expert Material and Media Validation Test Scores

Guidelines	Score Interval	Category
Material Aspect	$X \geq 33$	Very Appropriate/Very Suitable
	$33 > X \geq 27,5$	Appropriate/Suitable
	$27,5 > X \geq 22$	Inappropriate/Unsuitable
	$X < 22$	Very Inappropriate/Very Unsuitable
Media Aspect	$X \geq 33$	Very Appropriate/Very Suitable
	$33 > X \geq 27,5$	Appropriate/Suitable
	$27,5 > X \geq 22$	Inappropriate/Unsuitable
	$X < 22$	Very Inappropriate/Very Unsuitable

Tabel 2 Results of Expert Validation Assessment

No.	Aspects Assessed		Category
	Material Aspect	Media Aspect	
Material Expert 1	41	29	Very Appropriate/Very Feasible
Material Expert 2	38	41	Very Appropriate/Very Feasible
Material Expert 3	42	44	Very Appropriate/Very Feasible
Material Expert 4	43	42	Very Appropriate/Very Feasible
Media Expert	40	42	Very Appropriate/Very Feasible
Average score	40,80	39,60	Very Appropriate/Very Feasible

Based on the assessment results obtained, the average score is then calculated and classified according to the predetermined score conversion criteria. The average score for the material aspect obtained from five experts was 48.80 and was classified as Very

Appropriate/Very Suitable. Meanwhile, the average score for the media aspect assessed by five experts was 39.60 and was also classified as Very Appropriate/Very Suitable.

The next stage was the implementation of a small-scale product trial involving 10 research subjects consisting of PJOK teachers. The assessment at this stage focused on the aspects of material suitability and media feasibility. The following table presents the results of the conversion of assessment scores obtained in the small-scale product trial.

Tabel 3 Product Trial Score Conversion Score

Guidelines	Score Interval	Category
Accuracy of Material	$X \geq 30$	Very Appropriate/Very Suitable
	$30 > X \geq 25$	Appropriate/Suitable
	$25 > X \geq 20$	Inappropriate/Unsuitable
	$X < 20$	Very Inappropriate/Very Unsuitable
Media Feasibility Aspect	$X \geq 42$	Very Appropriate/Very Suitable
	$42 > X \geq 35$	Appropriate/Suitable
	$35 > X \geq 28$	Inappropriate/Unsuitable
	$X < 28$	Very Inappropriate/Very Unsuitable

A small-scale trial analysis was conducted using an assessment sheet designed to evaluate the web-based SIBAKAT ID application that had been developed. The assessment focused on the suitability of the material and the feasibility of the media. The results and discussion of the small-scale trial are presented in the following section.

Tabel 4 Small-Scale Trial Results Data

No.	Assessment Aspect	Score	Score
1.	Material Aspect	36,70	Very Appropriate/Very Suitable
2.	Media Aspect	52,80	Very Appropriate/Very Suitable

Table 4 presents the assessment results obtained from 10 respondents consisting of Physical Education teachers related to the development of web-based SIBAKAT ID media. Based on these assessment results, the material suitability aspect received a score of 36.70, while the media feasibility aspect received a score of 52.80. Furthermore, these assessment scores were converted according to the predetermined criteria, so it can be concluded that the results of the small-scale product trial are in the Very Suitable category.

Large-scale product testing was carried out by involving 50 respondents consisting of physical education teachers, trainers, and sports academics in the city of Semarang. At this stage, the assessment of the web-based SIBAKAT ID application focused on the aspects of material suitability and media feasibility. The results of the analysis and discussion of the large-scale trial are presented in the following section as a basis for conducting a comprehensive product feasibility evaluation.

Tabel 5 Large-Scale Trial Results Data

No.	Assessment Aspect	Score	Score
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1.	Material Aspect	36,46	Very Appropriate/Very Suitable
2.	Media Aspect	51,66	Very Appropriate/Very Suitable

Table 5 presents the assessment results obtained from 50 respondents consisting of physical education teachers, sports coaches, and sports academics regarding the SIBAKAT ID web-based application. The assessment results show that the accuracy of the material aspect received a score of 34.46, while the media suitability aspect received a score of 51.66. Based on the predetermined score conversion, both aspects are included in the Very Suitable category, which indicates that the SIBAKAT ID application has met the suitability criteria for use in the next implementation stage.

The effectiveness test was conducted descriptively by referring to six components of biomotor tests and the anthropometric data of students, which aimed to assess the application's ability to identify talent potential and provide recommendations for suitable sports. The analysis results showed differences in the level of talent potential among students, which were then displayed in the form of rankings through the application

Discussion

This web-based talent identification application was designed and developed as an analytical tool with the aim of facilitating physical education teachers, coaches, and sports academics in improving the training of athletes at the regional and national levels in the process of identifying talent from an early age, in line with developments in the modern era of sports. This product was developed based on studies by experts in the field of talent identification and guidance through

literature studies, as well as involving experts in the field of information media as the basis for the development of the media used.

After the product was designed, it underwent a validation process by material experts and media experts. The results of the validation by material experts and media experts showed an average score of 40.80 for material suitability, which falls into the category of highly suitable/highly feasible. Meanwhile, the results for media suitability showed an average score of 39.60, which also falls into the category of highly suitable/highly feasible. At this stage, several inputs and suggestions were obtained, including improving the application to make it more attractive in product development media, as well as adding a region feature to the application.

The results of product trials show that this web-based application functions as a tool and does not absolutely determine talent. The SIBAKAT ID application is capable of providing information on potential talent scores, biomotor and anthropometric ability analysis, and providing several recommendations for sports branches so that they can be used as a reference in choosing a sports branch in accordance with the child's abilities. It is also integrated with data storage as a longitudinal basis for directing and compiling training programs to suit the abilities of the children being trained.

Based on the results of development and feasibility testing, it can be concluded that the SIBAKAT ID talent potential analysis media is suitable for use and can assist physical education teachers, coaches, and sports academics in identifying children's talents from an early age and continuing the talent guidance process at the next stage based on the data stored in this application. However, this tool also has limitations that users need to be aware of, including that this web-based application can

only be accessed through a specific link and is not yet available through Google.

Despite its strengths and limitations, the SIBAKAT ID application is expected to assist physical education teachers, coaches, and sports academics in identifying talent from an early age. With this application, it is hoped that awareness of the importance of talent identification will increase, as well as the competence of physical education teachers in selecting and nurturing students' potential appropriately.

CONCLUSION

This research produced a web-based application for identifying athletic talent in 11- to 15-year-olds, called SIBAKAT ID, which serves as a practical tool for analyzing biomotor and anthropometric test results in the early stages of talent identification. This application was developed through a systematic research and development phase and has been verified by subject matter and media experts, with results showing a Very Suitable rating in terms of content suitability, ease of use, and system functionality. Based on the results of small and large-scale trials, as well as effectiveness tests, SIBAKAT ID is highly feasible and capable of processing data faster and more systematically than manual calculation methods. It also provides recommendations on sports tendencies based on the sport search method, demonstrating the relevance and importance of this application in supporting data-based sports talent identification in schools and training centers

ACKNOWLEDGEMENT

The authors wish to express their sincere gratitude to State University of Semarang, the physical education teachers, coaches, students, and all parties who

contributed to this research. Their invaluable support and assistance have been instrumental in the successful and optimal completion of this study.

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