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Aplikasi I-CIBI: Respon Positif Dari Guru, Orangtua dan Anak Dengan Kecerdasan dan Bakat Istimewa

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Abstract
This study explores the positive response to the I-CIBI application, an innovative solution to support learning for gifted and talented children in Indonesia. Using a mixed-method approach with a sequential explanatory design, this research involved 29 respondents, consisting of teachers and parents. The results show that the I-CIBI application successfully meets specific needs in gifted education, with features including comprehensive testing and evaluation, personalized learning, and social-emotional skills development. Evidence-based pedagogical approaches and adaptive technology integration promote student motivation and active engagement. Despite implementation challenges, such as technology accessibility and integration with the national curriculum, the I-CIBI application demonstrates significant potential in optimizing the development of gifted and talented children. This research highlights the importance of collaboration among education stakeholders and continuous evaluation to ensure the long-term effectiveness of the application in the Indonesian educational context.

Keywords: *I-CIBI Application, Gifted and talented children, Educational Technology, Personalized Learning, Inclusive Education.*

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INTRODUCTION

Education is a fundamental aspect in developing the potential of each individual, including children with gifted and talented (CIBI). In the increasingly advanced digital era, the integration of technology in learning is a must to optimize the teaching and learning process. Gifted and talented children, with unique cognitive characteristics and rapid learning abilities, require a different and more challenging learning approach compared to children in general. The characteristics of gifted and talented children at an early age, as outlined by (Daglioglu, 2004), include extraordinary energy, increased sensory reactions, extraordinary memory, abstract thinking, problem-solving skills, vivid imagination, sensitivity, and constant questions. This is a challenge for educators and the education system to be able to accommodate their special needs. (Reis & Peters, 2021). Maintaining creative and talented individuals is key to the advancement of civilization because they drive growth, prosperity, and the well-being of society (Farizi, Umamah,

& Soepeno, 2023(Torres, 2021). The development of information and communication technology has opened up new opportunities in the world of education, especially in the development of learning applications that can be tailored to individual needs (Olszewski-Kubilius & Corwith, 2010& (Potts, 2019) (Alshehri, 2022). The I-CIBI application is here as an innovative solution to meet the learning needs of gifted and talented children. This application is designed by considering the cognitive, emotional, and social characteristics of gifted and talented children, and integrating various effective learning methods to develop their potential optimally.

Procedures used to identify gifted students are largely based on an individual's score on a standardized IQ test (N. M. Robinson, 2005; Wor-rel, 2009). For example, a student is typically labeled as gifted and talented after scoring 120, 125, or 130 on the Stanford-Binet or Wechsler Intelligence Scale. A student referred for gifted identification who does not achieve the established cutoff score on an IQ test is often considered "not gifted" or ineligible for gifted programs and services (Brown, Renzulli, Gubbins, Zhag, & Chen, 2005; Pfeiffer, 2008, in press-a). There is a large research literature supporting the validity of IQ scores as predictors of academic achievement, as well as job performance, socioeconomic status, and other important life outcomes (Duckworth, Matthews, Kelly, & Peterson, 2007; Neisser et al., 1996; Rushton & Jensen, 2010). Therefore, the belief persists in the minds of many educators, psychologists, and policy makers that IQ scores provide the metric for defining giftedness (Borland, 2009; Cramond, 2004; Pfeiffer, forthcoming-a, forthcoming-b). On the other hand, there is a growing consensus in the giftedness field that advocates the use of diverse and alternative approaches to identifying gifted children. However, authorities in the giftedness field report that school districts across the country have been slow to adopt new identification methods and alternative procedures (Callahan, 2009; Reis & Renzulli, 2009; VanTassel-Baska & Stam-baugh, 2005)

Gifted and talented children have a high learning rate, more advanced abstract thinking skills, and great curiosity about various topics (Clark, 2015; Marland Report, 1972; Ministry of National Education [MoNE], 2018; National Association for Gifted Children, 2019). According to Renzulli (1978) (AVCU & ER, 2020), high cognitive, outstanding academic achievement, outstanding creativity, strong leadership, or talent in a particular field such as visual arts or music (Ömeroÿlu et al., 2017). However, they also often face challenges in terms of social and emotional adjustment in conventional learning environments as well as lack of social interaction in the environment, depression, anxiety, and low self-esteem (Pilarinos & Solomon, 2016). A study states that a good learning environment can increase the stimulus needed for gifted and talented children to develop their potential to the fullest (Manullang & Silitonga, 2022) (Review et al., 2024). And recent research shows that gifted and talented children are at risk of underachievement and psychosocial problems if they do not receive appropriate stimulation and support. (Cross & Cross, 2021). Therefore, the development of learning applications that can accommodate their special needs is very important. The I-CIBI application is developed with a student-centered learning approach, allowing gifted and talented children to explore learning materials according to their interests and learning speed. Features such as adaptive learning, enriched content, and customized cognitive challenges are designed to maintain the motivation and engagement of gifted and talented children in the learning process. In addition, this application also provides space for the development of social-emotional skills and creativity, which are often areas that are less considered in the education of gifted and talented children. (Olszewski-Kubilius, 2024).

The implementation of technology in gifted and talented children's education has shown promising results. New methods in education, including computer technology and collaborative approaches, can enhance students' creative and critical thinking. Fun, multimedia-based writing instruction has been shown to increase student motivation (Albertson & Billingsley, 2001; Chaffee, McMohan, & Stout, 2004; Davis & Rim, 2004; Peterson & Karlan, 2011) (Demir, 2022). Recent studies by (Al-Duraywish, 2023) demonstrated that the use of customized learning applications can improve not only academic achievement, but also intrinsic motivation and self-efficacy of gifted and talented children. This is in line with constructivist learning theory and

multiple intelligence theory which emphasize the importance of active learning and personalization in developing individual potential. However, the development and implementation of learning applications for gifted and talented children is not without challenges. Issues such as technology accessibility, curriculum adjustment, and integration with the formal education system need to be addressed comprehensively. Furthermore, it is important to ensure that the use of applications such as I-CIBI does not isolate Gifted and talented children from social interactions that are important for their development. (Pfeiffer, 2020).

In the Indonesian context, where attention to the education of Gifted and talented children is still limited, the development of the I-CIBI application can be a significant step in meeting the educational needs of this group. Research by (Pujaningsih & Alfi, 2022) shows that only a small percentage of schools in Indonesia have special programs for Gifted and talented children, and the majority of teachers feel underprepared to teach children with special abilities. The I-CIBI application can bridge this gap, providing accessible learning resources to Gifted and talented children across the country. The implementation of the I-CIBI application is also in line with the direction of Indonesia's national education policy which emphasizes the development of 21st century skills and digital literacy. By utilizing advanced technologies such as artificial intelligence and learning analytics, the application not only facilitates personalized learning but also prepares Gifted and talented children to become innovators and leaders in the future. (Judijanto, 2024).

This study aims to explore the positive responses of Gifted and talented children to the use of the I-CIBI application in their learning. By understanding how this application can improve the motivation, engagement, and learning achievement of Gifted and talented children, this study is expected to provide valuable insights for the development of more effective educational strategies for this group of gifted students. Furthermore, the results of this study can be the basis for improving the I-CIBI application and developing more inclusive educational policies for the needs of Gifted and talented children in Indonesia. This study seeks to answer fundamental questions about the effectiveness of the I-CIBI application in facilitating the learning of intelligent and gifted children. How do Gifted and talented children respond positively to the use of the I-CIBI application in their learning process? What aspects of the I-CIBI application are most influential in improving the motivation and learning achievement of Gifted and talented children? In addition, this study will also explore the challenges and opportunities in implementing the I-CIBI application in the context of the Indonesian education system, as well as how this application can be effectively integrated with traditional learning methods to create a holistic learning experience for Gifted and talented children.

This study is expected to provide significant contributions in developing more effective educational strategies for Gifted and talented children in Indonesia. The results of the study can be a reference for educational application developers, educators, and policy makers in designing and implementing learning programs that are more in line with the needs of Gifted and talented children. In addition, this study can also increase public awareness of the importance of tailored education for children with special abilities, as well as encourage further investment in the development of innovative educational technology. The main objective of this study is to analyze and understand the positive responses of intelligent and gifted children to the use of the I-CIBI application in their learning process. This study aims to identify the application features that are most effective in increasing motivation, engagement, and learning achievement of Gifted and talented children. Furthermore, this study also aims to evaluate the impact of using the I-CIBI application on the cognitive, social, and emotional development of Gifted and talented children, as well as explore the potential of this application in bridging the gap in gifted children's education in Indonesia. The results of the study are expected to provide concrete recommendations for improving the I-CIBI application and developing education policies that are more inclusive and responsive to the needs of Gifted and talented children.

METHODS

This study adopted a mixed-method approach with a sequential explanatory design to explore the positive responses of intelligent and gifted children (CIBI) to the use of the I-CIBI application in learning. This method was chosen to gain a comprehensive understanding of the effectiveness of the application, by combining quantitative and qualitative data. The first stage of the study involved collecting quantitative data through an online survey distributed to teachers, parents, and principals involved in the CIBI education program in various schools in Indonesia. The survey was designed based on an instrument grid that covered various aspects such as users, functional, interactive, technical, training and support, management, pedagogical, motivation and engagement, learning environment, and sustainability. The use of a 5-point Likert scale will allow for descriptive and inferential statistical analysis to identify trends and patterns in user responses to the I-CIBI application.

Following the quantitative data analysis, the second phase of the research will involve collecting qualitative data through semi-structured interviews with a subset of survey respondents. These interviews will allow for a deeper exploration of the quantitative findings and provide contextual insights into users' experiences with the I-CIBI app. An interview protocol will be developed based on the survey results and will include open-ended questions that allow participants to share their experiences and perspectives in detail. In addition, direct observations will be conducted in selected schools to observe the use of the I-CIBI app in real-world learning settings. These observations will focus on students' interactions with the app, as well as how teachers integrate the app into their teaching practices.

Data analysis will involve triangulation of results from surveys, interviews, and observations to validate findings and develop a holistic picture of the effectiveness of the I-CIBI application. Thematic analysis will be used to identify key themes from qualitative data, while statistical analysis will be used for quantitative data. To ensure the validity and reliability of the study, several strategies will be implemented, including member checking for interview results, peer debriefing during the data analysis process, and the use of multiple coders for qualitative data analysis. Research ethics will be maintained by obtaining written informed consent from all participants, ensuring data confidentiality, and adhering to research ethics protocols established by the institutional ethics committee.

FINDING AND DISCUSSIONS

This study aims to explore the positive responses of gifted and talented children (CIBI) to the use of the I-CIBI application in learning. The results of this study are based on the analysis of the interview instrument grids and data from questionnaires distributed to teachers and parents. The following is a detailed description of the research results:

1. Respondent Profile

This study involved a total of 29 respondents consisting of teachers and parents. The distribution of respondents based on their roles can be seen in the following diagram

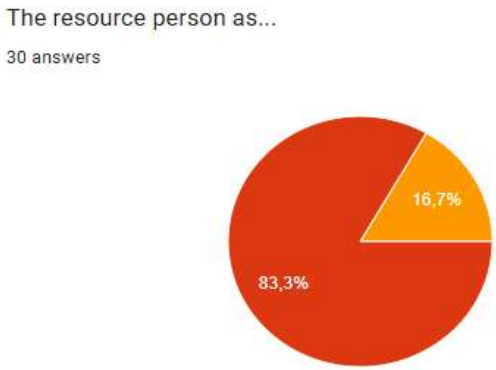
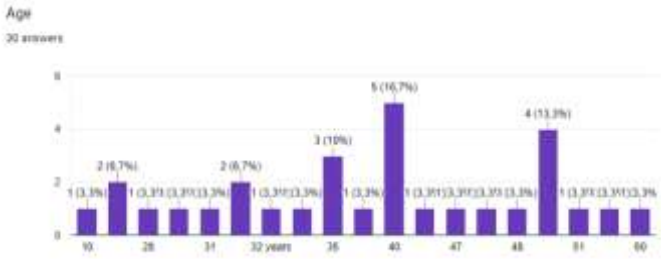


Diagram 1. Teacher Respondent Diagram

The diagram above shows that the majority of respondents are teachers, which is 82.8% (24 people), while 17.2% (5 people) are parents. This composition provides a strong perspective from the educator's point of view, which is very relevant in evaluating the effectiveness of the I-CIBI application in the context of learning. Parental involvement, although in smaller numbers, also provides valuable insights into the use of the application outside the school environment. The demographic characteristics of the respondents are also important to note. The age distribution of respondents can be seen in the following diagram:



This diagram shows a diverse age distribution among respondents, with the highest concentration in the 31-50 age range. This indicates that the majority of respondents are educators or parents who have sufficient experience in the field of education or childcare. This experience gives weight to their opinions and assessments of the I-CIBI application. In addition, the gender composition of respondents was also analyzed and can be seen in the following diagram:

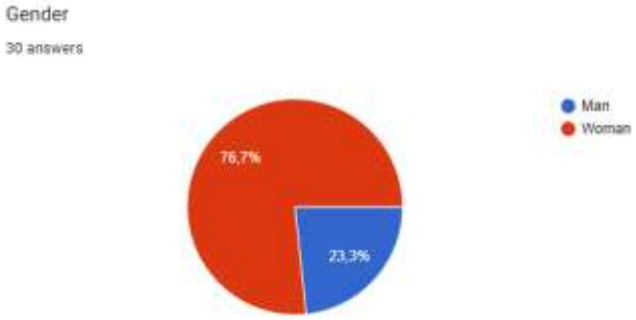


Diagram 2. Teacher Respondent Diagram

This diagram shows that the majority of respondents are female. This may reflect the general gender composition of primary and secondary education in Indonesia, where female teachers tend to be more numerous. Nevertheless, gender diversity in the sample is still important to provide a balanced perspective in the evaluation of the I-CIBI application.

2. User Needs Analysis

Based on the needs interview instrument grid, we identified several key aspects that are the focus in the development and implementation of the I-CIBI application. The following is a table that summarizes the main needs of the three main user groups:

Table 1. the diversity of needs from various stakeholders

Primary Needs	Teacher	Parent	Headmaster
Tools to identify and measure student potential	✓		
Teaching and learning support features	✓		
Training and technical support	✓		
Analysis tools for evaluating student development	✓		✓
Ease of understanding and monitoring children's development		✓	✓
Interactive features for engagement in children's learning		✓	
Effective communication channels with teachers and schools		✓	

Overall student development monitoring and evaluation system	✓
Integration with school management system	✓
Support for the school's vision and mission	✓

The table above illustrates the diversity of needs from various stakeholders in using the I-CIBI application. Teachers need tools that can help them identify student potential and support the learning process. This need reflects the importance of the application in facilitating a more personalized and effective learning approach for Gifted and talented children. Parents, on the other hand, need features that allow them to be actively involved in their child's learning process and communicate effectively with the school. This shows that the I-CIBI application does not only function as a learning tool, but also as a communication bridge between school and home. Meanwhile, school principals need features that support the management and evaluation of the overall CIBI education program, which reflects the application's role in supporting decision-making at the institutional level.

3. Functional and Technical Aspect Analysis

The functional and technical aspects of the I-CIBI application are critical components that determine the effectiveness and adoption of the application. The following table summarizes the main findings related to these aspects:

Table 2. Findings for functional and technical aspect

Aspect	Key Features	User Requirements
Functional	1. Tests and evaluations (psychometric, cognitive, aptitude interest) 2. Reporting and analysis of results 3. Personalize tests based on student profiles	1. Easy to understand report format 2. Analysis tools for teachers and parents 3. Secure storage and access of test result data
Technical	1. Multi-platform accessibility (web, mobile) 2. Data security 3. Ease of use and navigation	1. Protection of student personal data 2. Data access and storage security 3. Technical support and customer service
Interactive	1. Interactive learning modules 2. Collaboration features between users 3. Educational activities and games	1. Communication features between teachers, students and parents 2. Tools for collaboration in developing student potential

The table above shows that the I-CIBI application needs to provide various functional features that support the process of identifying, evaluating, and developing the potential of Gifted and talented children. Comprehensive test and evaluation features, equipped with an easy-to-understand reporting and analysis system, are key components in meeting the needs of teachers and parents. Personalization of tests based on student profiles reflects an adaptive approach to the diverse characteristics of Gifted and talented children. From a technical perspective, multi-platform accessibility and data security are top priorities. This shows the importance of flexible application use and protection of sensitive student information. Ease of use and navigation are also important factors in ensuring wide adoption among users with various levels of technological literacy. The interactive aspect of the I-CIBI application emphasizes the importance of active and collaborative learning. Interactive learning modules and collaboration features between users reflect a modern pedagogical approach that encourages active student involvement in the learning process.

Educational activities and games not only serve as learning tools, but also as a means to maintain the motivation and interest of CIBI students.

4. Pedagogical and Motivational Aspects

The success of the I-CIBI application does not only depend on the technical aspects, but also on the pedagogical approach applied and its ability to motivate students. The following table summarizes the findings related to this aspect:

Table 3. Findings for pedagogical and motivational aspects

Aspect	Main Components	Implementation in Application
Pedagogical	1. Learning methodology 2. Educational content 3. Relevance to curriculum	1. Evidence-based pedagogical approaches in testing and evaluation 2. Content that suits the development needs of CIBI students 3. Integration with national education curriculum and programs
Motivation and Engagement	1. Reward system 2. Direct feedback 3. Gamification	1. Virtual awards for student achievement 2. Real-time feedback features for students and parents 3. Game elements to increase student engagement
Learning Environment	1. Social and emotional context 2. Community involvement	1. Features for the development of social and emotional skills 2. Platform for community engagement in developing children's potential

The table above illustrates that the I-CIBI application applies a holistic and evidence-based pedagogical approach. The learning methodology used in the application is tailored to the unique characteristics of Gifted and talented children, ensuring that the educational content presented is relevant and challenging for them. Integration with the national curriculum also shows an effort to ensure that the use of the application is in line with formal educational goals. The motivation and engagement aspects are of particular concern in the design of the I-CIBI application. The reward system and direct feedback aim to maintain students' intrinsic motivation, while gamification elements are integrated to increase active involvement in the learning process. This approach reflects the understanding that Gifted and talented children require consistent and challenging cognitive stimulation. The I-CIBI application also pays attention to aspects of the broader learning environment. Features for developing social and emotional skills show an awareness that academic intelligence needs to be balanced with emotional intelligence. Community involvement in the application opens up opportunities for CIBI students to interact with mentors, experts, or fellow talented students, enriching their learning experience.

5. Sustainability and Evaluation

Sustainability and ongoing evaluation aspects are important components in ensuring the long-term relevance and effectiveness of the I-CIBI application. Based on the instrument grid, we identified several key elements in this aspect:

a. Maintenance and Updates: The I-CIBI app is designed with regular maintenance and updates in mind. This includes updating educational content, customizing features based on user feedback, and improving technical performance. This approach ensures that the app remains relevant to the latest developments in CIBI child education and learning technology.
b. Continuous Evaluation: A continuous evaluation system is integrated into the I-CIBI application. This involves collecting regular feedback from users (teachers, parents, and

students), analyzing usage data, and assessing the impact on the academic and non-academic development of CIBI students. This evaluation process allows for refinement of the application based on empirical evidence and evolving user needs.

c. Adaptability to Curriculum Changes: The I-CIBI app is designed with the flexibility to adapt to changes in the national curriculum or educational standards for Gifted and talented children. This ensures that the app remains relevant and effective in supporting long-term educational goals.
d. User Community Development: Strategies to build and maintain an active user community are integral to the sustainability of the I-CIBI application. This includes online discussion forums, educational webinars, and ongoing training programs for teachers and parents.

This comprehensive approach to sustainability and evaluation reflects a commitment to continuously improving the quality and effectiveness of the I-CIBI app. Taking into account user feedback, technological developments, and changes in the educational landscape, the app is positioned to remain a relevant and valuable tool in supporting the development of the potential of Gifted and talented children in Indonesia. In conclusion, the results of this study indicate that the I-CIBI app has significant potential in supporting the learning and development of Gifted and talented children. Through its comprehensive features, appropriate pedagogical approach, and focus on sustainability, the app offers a holistic solution to the special educational needs of gifted children. However, effective implementation will require close collaboration between app developers, educators, parents, and other education stakeholders to ensure that the full potential of the I-CIBI app can be realized in the Indonesian education context.

The I-CIBI application emerged as an innovative solution to address the challenges of education for intelligent and gifted children (CIBI) in Indonesia. The results of the study showed that this application received a positive response from various stakeholders, especially teachers, parents, and principals. The success of the I-CIBI application can be attributed to several key factors that will be discussed in depth. First, user-centered application design is an important factor in increasing the adoption and effectiveness of I-CIBI. A comprehensive user needs analysis, as shown in Table 1, allows developers to design features that are relevant and useful for each user group. For example, teachers need tools to identify student potential and support the learning process, while parents need features to monitor their children's development and communicate with the school. This approach is in line with the findings (Blanuša Trošelj & Ćurić, 2023) which emphasizes the importance of personalization in Gifted and talented children's education.

The functional and technical aspects of the I-CIBI application, as described in Table 2, show that this application does not only focus on learning content, but also pays attention to data security and accessibility. Comprehensive test and evaluation features, equipped with an easy-to-understand reporting and analysis system, allow for more accurate identification and development of Gifted and talented children's potential. This supports the argument (Murad et al., 2019) that the use of adapted technology can improve academic achievement and intrinsic motivation of Gifted and talented children. The superiority of the I-CIBI application also lies in its holistic and evidence-based pedagogical approach, as illustrated in Table 3. The integration of adapted learning methodologies with the unique characteristics of Gifted and talented children shows a deep understanding of their special needs. This is in line with research (Saputri et al., 2024)which emphasizes the importance of consistent and challenging cognitive stimulation for Gifted and talented children to prevent underachievement and psychosocial problems.

The motivational and engagement aspects of the I-CIBI application deserve special attention. The reward system, direct feedback, and gamification elements integrated into the application reflect the understanding that Gifted and talented children require a different learning approach. These strategies support the findings(Yetenekliler et al., 2019)about the importance of maintaining the motivation and engagement of Gifted and talented children in the learning process. Furthermore, the I-CIBI application not only focuses on cognitive development, but also pays attention to social and emotional aspects. Features for the development of social and emotional skills, as well as a

platform for community engagement, demonstrate a holistic approach to the development of Gifted and talented children. This is in line with the recommendations(Pfeiffer, 2020)which emphasizes the importance of social interaction in the development of gifted children. In the context of Indonesian education, the I-CIBI application offers a solution to overcome the limitations of special programs for Gifted and talented children in schools. As shown by the study (Pujaningsih & Alfi, 2022), only a small number of schools in Indonesia have special programs for Gifted and talented children, and the majority of teachers feel underprepared to teach children with special abilities. The I-CIBI application can bridge this gap by providing learning resources that are accessible to Gifted and talented children across the country.

The sustainability and continuous evaluation aspects integrated into the I-CIBI application demonstrate a commitment to continuously improving the quality and effectiveness of the application. This approach is in line with the recommendations (Magdalena et al., 2024) on the importance of adaptability in educational technology to prepare Gifted and talented children to become future innovators and leaders. Although the I-CIBI application shows significant potential, its implementation is not without challenges. Issues such as accessibility of technology in various regions in Indonesia, adjustment to the national curriculum, and integration with the formal education system need to be addressed comprehensively. In addition, it is important to ensure that the use of the application does not isolate Gifted and talented children from social interactions that are essential for their development. In conclusion, the I-CIBI application offers an innovative and comprehensive solution to support the learning and development of Gifted and talented children in Indonesia. The positive response from users, evidence-based pedagogical approach, and focus on sustainability indicate the potential of this application to transform the landscape of gifted education in Indonesia. However, long-term success will depend on close collaboration between application developers, educators, parents, and education policymakers. Further research is needed to evaluate the long-term impact of the I-CIBI application on the academic achievement, social-emotional development, and career success of Gifted and talented children in Indonesia.

CONCLUSION

This study shows that the I-CIBI application has significant potential in supporting the learning and development of intelligent and gifted children (CIBI) in Indonesia. Positive responses from teachers, parents, and principals indicate that this application has successfully met the specific needs in the education of Gifted and talented children. Comprehensive features, evidence-based pedagogical approaches, and focus on cognitive, social, and emotional aspects make I-CIBI an effective tool in optimizing the potential of gifted children. However, successful implementation requires a holistic strategy. It is recommended that application developers continue to evaluate and update based on user feedback and the latest developments in the education of Gifted and talented children. Close collaboration between schools, parents, and education policy makers is also needed to integrate the I-CIBI application into the formal education system. Continuous training for teachers and parents in using this application effectively is also important to maximize its benefits. For further research, it is recommended to conduct a longitudinal study to evaluate the long-term impact of using the I-CIBI application on academic achievement, social-emotional development, and career success of Gifted and talented children. In addition, strategies need to be explored to expand access to this application to remote areas in Indonesia, as well as develop features that encourage collaboration and social interaction between users. With continuous improvement and proper implementation, the I-CIBI application has the potential to be a catalyst in the transformation of gifted children's education in Indonesia.

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