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Student Perceptions of the Implementation of Big Data in Sinergy as Learning Optimization at the Bali Institute of Design and Business

I Made Satrya Ramayu[1], Handrean Manurung[1], Muhammad Febrian Rachmadhan Amri[2], Gede Surya Mahendra[3], I Putu Yoga Indrawan[4]

[1]*Department of Digital Business, Bali Design & Business Institute, Indonesia*
[2]*Department of Information Systems and Technology, Bali Design & Business Institute, Indonesia*
[3]*Department of Information Systems, Faculty of Engineering and Vocational Studies, Universitas Pendidikan Ganesha, Indonesia*
[4]*Department of Informatics Engineering, Indonesian Institute of Business and Technology, Indonesia*

**Corresponding author Email:*
satrya.ramayu@idbbali.ac.id , [4] gmahendra@undiksha.ac.id, [5]Yoga.indrawan@instiki.ac.id

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Abstract

The current digital era is characterized by exponential data growth, presenting unprecedented opportunities and challenges in extensive data analysis. Data's increasing complexity and volume demand more efficient and effective analysis methods. In overcoming this challenge, big data technology is an innovative solution in data analysis. Semantic technology enriches the data modeling process by providing deeper context and meaning and facilitates more intuitive and accurate analysis, which is critical in managing diverse big data. The use of big data is an essential aspect of the learning system in information technology, especially at the Bali Design and Business Institute. This research aims to describe the implementation of big data on the Synergy platform as an effort to optimize learning at the Bali Design and Business Institute based on a literature review. Information technology that continues to develop has changed the learning paradigm by adopting Big Data in the context of e-learning. Synergy, as an innovative e-learning platform, has the potential to use Big Data to increase the personalization and effectiveness of learning for students. This research takes a qualitative approach by analyzing relevant literature and discussing the use of big data in education and e-learning. This literature review aims to understand how implementing Big Data can influence learning interactions, academic decision-making, and the development of adaptive learning strategies in educational environments. The literature review results show that using Big Data in e-learning can strengthen the personalization of learning, improve academic predictions, and provide deeper insight into student learning behavior. The implications of this research provide a solid theoretical basis for developing strategies for implementing Big Data at Synergy so that it can support improving the quality of learning at the Bali Institute of Design and Business.

Keywords: *Big Data, E-Learning, Adaptive Learning, Synergy Platform, Literature Review.*

1. Introduction

Higher education institutions face significant challenges in utilizing technology to improve the quality of learning. One of the leading innovations in this field is the application of Big Data in e-learning. Big Data, which involves the management of large volumes of data, fast processing, and various types of information, offers excellent potential to improve the personalization of learning and academic decision-making in educational institutions [1] [2] [3].
As a progressive educational institution, the Bali Institute of Design and Business (IDB) is actively developing an e-learning platform called Synergy to improve learning interactions and the overall quality of education. It is hoped that applying Big Data on the Synergy

platform can provide intelligent solutions to support a more adaptive learning experience for students that suits their needs and characteristics. Big Data in the synergy platform includes student names, student identification numbers, student transcripts, pictures, student assignment results files, and others [4] [5].

The main challenge in implementing Big Data in the educational environment is understanding how this big data can be collected, analyzed, and utilized effectively to improve learning strategies and student academic achievement. For this reason, this research aims to investigate more deeply how Big Data can be integrated into Synergy to optimize the learning process at IDB [6] [7].

Literature reviews are essential in providing an in-depth understanding of the perspectives, current research, and impact of Big Data implementation in e-learning. By understanding this, it is hoped that valuable recommendations can be developed for developing more sophisticated and adaptive technology-based educational strategies in the future [8].

2. Literature Review

Literature research is carried out by reviewing literature related to various relevant aspects. The following is a more detailed breakdown of the literature study:

1. Big Data in Education
   a. Definition and Characteristics of Big Data: Examining the Definition of Big Data: Big Data is a collection of data with large volumes, high speeds, and wide variations that require new technology and methods to capture, store, and analyze. These three key characteristics are known as the "3Vs" – Volume, Velocity, and Variety [9].
   b. Main Characteristics of Big Data: Big Data is not only about large amounts of data but also the speed at which it is processed and the variety of available data, including structured, unstructured, and semi-structured data. For example, academic data [10].
   c. Predictive Analytics in Education: Big Data is used for predictive analysis that helps determine individual learning needs, improve learning outcomes, and reduce drop-out rates. For example, historical data analysis can identify students at risk of academic failure and offer timely intervention [11].
   d. Monitoring and Evaluation of Academic Performance: With big data, educational institutions can monitor and evaluate academic performance in real time, enabling them to make better decisions and improve teaching strategies. This includes analyzing student learning and interaction patterns to identify areas that require special attention [12].
2. Factors that Influence Student Perceptions of Elearning and Big Data:
   a. Previous Technology Experience: Previous technology experience, digital skills, and support from educational institutions influence students' perceptions of e-learning and the use of Big Data [13] [14].
   b. Perception of Data Privacy and Security: Student perceptions of data privacy and security are crucial in accepting Big Data technology. Students are often concerned about how their data is used and protected [15] [16].
3. This introduction provides a solid foundation to deepen the importance of this research in the context of the development of modern educational technology, especially at the Bali Institute of Design and Business [17].

3. Methods

The methodology used in this study is a literature review from journals on the internet related to research on Big Data.

4. Result and Discussion

a. Defining Big Data
   To understand Big Data, the right step is to define it first. Many experts from various areas of corporate interest, including team member management, hotel management, export-import management, government management, and others, have put forward the definition of Big Data. Big Data has three characteristics: velocity, volume, and variety. For example, VLDB uses "volume," a vast data volume (current conditions range from tens of terabytes to tens of petabytes). For example, OLTP uses "velocity," which is the frequency of data appearance and changes (the condition when the unit is above tens of transactions per second). Various data types include structured, unstructured, and semi-structured data.
b. Utilization of Big Data in the Student Learning Process
   This research examines the implementation of Big Data in the Synergy e-learning platform at the Bali Institute of Design and Business (IDB) through a qualitative literature review. Based on the results of the literature analysis, several main findings were found, which can be discussed further. Data collection in e-learning involves various data sources such as user activity logs, interactions in discussion forums, quiz and exam results, and student feedback. This data is collected automatically by e-learning systems and stored in large databases for further analysis. The Big Data analysis process in an e-learning context involves using advanced techniques such as machine learning, predictive analysis, and data mining. These techniques identify student learning patterns, predict academic performance, and provide personalized recommendations.
   Student Perceptions of Big Data Implementation on Synergy This research also examines student perceptions of Big Data implementation on the Synergy platform at IDB. These student perceptions are evaluated from various aspects, including learning effectiveness, material personalization, and the overall learning experience. Based on the literature review, student perceptions can be grouped into several main themes.
c. Learning Effectiveness:
   Students feel that the use of Big Data in Synergy increases the effectiveness of their learning. In-depth data analysis enables rapid identification of academic weaknesses and strengths, which can be translated into timely pedagogical interventions. For example, students with difficulty with certain concepts can be given additional material or alternative teaching approaches.
d. Personalization of Learning Materials:
   Big Data enables better personalization of learning materials. Students report receiving recommendations more relevant to their learning styles and specific academic needs. This increases their understanding of the material and makes learning more exciting and relevant.

e. Feedback and Evaluation

Implementing Big Data also speeds up the process of providing feedback and academic evaluation. Students appreciate fast and accurate feedback on their performance, allowing them to identify improvement areas and take necessary action quickly. This also encourages more active involvement in the learning process.

f. Motivation and Learning Satisfaction
With personalization and fast feedback, student motivation and learning satisfaction increase. Students feel more valued and understood as individuals, increasing their involvement in education. They are more motivated to achieve their academic goals because they feel supported by a responsive and adaptive system.

g. Academic Decision Making
The use of Big Data in Synergy also influences student academic decision-making. The available analytical data helps them better plan their learning path, select appropriate courses, and identify self-development opportunities. This gives students better tools to manage their academic careers independently.

h. Privacy and Security Concerns
Despite the many benefits, some students also voiced their concerns regarding the privacy and security of their data. They emphasize the importance of transparency and clear policies regarding the use of their data. Institutions must ensure that student data is appropriately protected and only used for legitimate educational purposes.

5. Conclusions

This research reveals that implementing Big Data in the Synergy learning platform at the Bali Institute of Design and Business (IDB) has excellent potential to bring various significant benefits. These benefits include increased personalization of learning, which enables the adjustment of teaching materials to suit individual student needs, and more intelligent, data-based academic decision-making. The use of big data allows for a deeper analysis of student learning behavior, which in turn can help identify areas that require special attention and further intervention.

In addition, the results of the data analysis obtained can be used to develop more effective and efficient learning strategies to increase student involvement and motivation in the learning process. Real-time data collection also enables a faster response to student learning needs and supports the development of a more dynamic and responsive curriculum that changes educational needs.

However, applying Big Data in the educational context also faces several significant challenges. The main challenges include privacy and data security issues, where the protection of student personal data must be a top priority by applicable regulations. Additionally, the need for adequate technological infrastructure and proper training for faculty and staff in using data analysis systems are essential aspects that need to be considered to ensure effective and sustainable implementation.

This literature review also shows that students' perceptions of using Big Data in learning are generally positive. Students feel helped by personalized materials and faster and more accurate feedback on their learning progress. This positive perception strengthens the argument that Big Data has great potential to improve the quality of education and provide a better learning experience for students.

This research provides a solid theoretical foundation for developing Big Data implementation strategies on the Synergy platform. By leveraging insights from extensive data analysis, IDB can create a more adaptive and responsive learning environment, ultimately supporting and improving the overall quality of education. This research also opens up opportunities for further research that can explore more deeply the long-term impact of using Big Data in education and the development of more sophisticated and safe supporting technology.

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