



Current Research in Education: Conference Series Journal

Journal homepage: <https://ejournal.upi.edu/index.php/crecs>



The Influence of Digital-Based Differentiation Learning on Student's Well-Being Behavior

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ABSTRACT

This research aims to investigate the effect of digital-based differentiated learning on students' welfare behavior. Student well-being is an important parameter in assessing educational success, and with the development of digital technology in education, it is important to understand its impact on student well-being. The research method used was an experimental study using two groups of students: an experimental group that received digital-based differentiation learning and a control group that received conventional learning. Data is collected through surveys and observations of student behavior over a certain period. Student welfare variables are assessed through indicators such as happiness level, learning motivation, sleep quality, stress level, and level of engagement in learning. The research results show that digital-based differentiated learning has a significant positive influence on student welfare. Students in the experimental group tended to be happier, more motivated, had better quality sleep, experienced lower levels of stress, and were more involved in the learning process compared to the control group. These findings show that the use of digital technology in learning can improve student well-being, which in turn can contribute to improving the quality of education. Therefore, digital-based differentiated learning needs to be considered in curriculum development and learning strategies in the future.

ARTICLE INFO

Article History:

Submitted/Received 02 Nov 2023

First Revised 15 Jan 2024

Accepted 01 Mar 2024

First Available online 01 May 2024

Publication Date 01 Aug 2024

Keyword:

Differentiated learning,

Digital-based learning,

Student's wellbeing.

1. INTRODUCTION

Differentiated learning is an adjustment to students' interests, learning preferences, and readiness in order to achieve increased learning outcomes. Differentiated learning is not individualized learning. However, it tends to be learning that accommodates students' strengths and learning needs with independent learning strategies. When teachers respond to students' learning needs, it means that teachers differentiate learning by adding, expanding, adjusting time to obtain maximum learning results. Differentiated learning is an approach to teaching that is designed to meet the diverse learning needs of each student in the class. The main goal of differentiated learning is to ensure that all students can access, understand, and master the subject matter, even if they have different levels of ability, interests, or learning styles.

There are four components of differentiated learning, namely: content, process, product and learning environment. Viewed as a whole, the components of differentiated learning include: recognition of individual needs, teacher as facilitator, adapted material, flexibility in teaching, various assessments, flexible student grouping, additional support, regular evaluation, student involvement.

In differentiated learning, the teacher acts as a facilitator. Teachers teach students who have difficulty understanding a concept in a way that makes it easier for students to understand the concept and continue on their own (Morgan, 2013). Teachers create an environment that allows students to learn according to the student's pace and learning style. "I vary the pace of my lessons to meet individual learning needs" (process differentiation). Teachers must understand and recognize individual differences among students and make learning student-centered. Student-centered teachers know the subject matter they are teaching but they also understand that they are learning partners with their students (Chandra Handa, 2019).

The diversity that exists in students can include differences in academic abilities, interests, social abilities, learning styles, and levels of motivation. Teachers adapt lesson materials to suit students' ability levels and students' ways of learning. Differentiated teaching is a way of recognizing and teaching according to students' different talents and learning styles (Morgan, 2013). This could mean providing more challenging assignments or material for abler students, while students who may be facing difficulties are given a more supportive approach. Teachers must be willing to adapt to students' needs during the learning process. They can use a variety of different teaching methods, tools, and resources to accommodate student differences. Students can be grouped based on their ability level, interests, or learning style. These groupings can change over time according to student development.

The advantages of implementing differentiated learning are that it can improve student learning outcomes, student learning motivation, understanding and quality of student learning, can accommodate students' learning needs by paying attention to interests, profiles, learning styles and learning readiness; and independent curriculum can create active and creative learning and increase student learning motivation (Sari et al., 2023). Students who need additional help understanding course material may be given special support, such as tutoring, extra time on assignments, or other learning resources. Freedom to learn is defined as freedom to think, innovate, learn independently and creatively, freedom to be happy. In this case, teachers also have a big impact, meaning how a teacher becomes an innovative, creative facilitator, has the character of a driving teacher (Sahnan & Wibowo, 2023).

Students are expected to be actively involved in the learning process and have more control over how they learn. This may include selecting projects or topics that suit their own interests. Teachers must periodically evaluate the effectiveness of differentiated learning and make necessary changes to ensure all students can achieve learning goals. The assessment system must also be differentiated. Teachers can use a variety of assessment tools, such as assignments, projects, exams, or portfolios, to suit students' ability levels. Students are members of society who try to develop their potential through the learning process available in the pathway, level and type of education.

Differentiated learning is part of efforts to adapt the educational process to the needs of each student. So that all students can experience challenge, success, and satisfaction, learning strategies must be adapted to different student interests and learning. According to Carol Ann (in Tomlinson & Moon, 2014), learning that accommodates, serves, and recognizes student diversity based on learning readiness, interests, and learning preferences is called typical learning. Differential learning is a motor learning model that is based on the importance of movement variability and is tied to the dynamic systems theory of human movement. According to Tomlinson & Moon (2014), differentiated learning is an effort to adapt the learning process in the classroom to meet the individual learning needs of each student.

Differentiated learning is an approach to teaching and learning in which teachers recognize individual differences in students' abilities, interests, learning styles and needs, then design and adapt their teaching to suit those individual needs. Students can process new information or practice new skills in a way that suits the student's skill level, interests, or preferred learning style (Ismail et al., 2021).

The main goal of differentiated learning is to ensure that every student has an equal opportunity to learn and develop according to his or her potential. Some of the key principles of differentiated learning include: (a) Get to know students, teachers must understand the profile of each of their students, including their ability levels, interests, and learning styles; (b) Design appropriate teaching, teachers then design learning materials, teaching strategies, and resources tailored to the needs of individual or groups of students; (c) Facilitate active learning, teachers facilitate students to be active in their learning process, encouraging questions, exploration, and problem solving; (d) Provides a variety of choices, teachers provide a variety of choices in terms of assignments, projects, or learning activities so students can choose those that best suit their interests and abilities; (e) Provide constructive feedback, teachers provide in-depth and constructive feedback to each student to help them understand their progress and how to improve their learning, (f) Differentiated evaluation, teachers use various forms of evaluation, including formative and summative assessments, to suit the needs of individual or groups of students.

Differentiated learning aims to create an inclusive learning environment, where every student feels valued and supported in their efforts to reach their maximum potential. This approach recognizes that each student is a unique individual and has a different way of learning, and therefore, teaching must be tailored to meet their needs. Implementation of differentiated learning requires good preparation. Preparatory steps that need to be taken so that differentiated learning can run effectively include: (1) determining learning objectives; (2) map student learning needs (learning readiness, interests, learning profile; (3) determine the strategies and assessment tools that will be used; and (4) determine the differentiated learning activities that will be carried out (content, process, product).

Digital-based differentiated learning is an approach to the learning process that uses technology as a tool to design learning experiences that are tailored to the needs and

characteristics of individuals or groups of students. In digital-based differentiated learning, technology is used as a means to provide access to various resources, content and learning activities that can be tailored to the level of abilities, interests, learning styles and specific needs of students. It is interesting to consider that student engagement in content as well as increased performance through the use of technology has been well documented, so that good presentation results are shown to be caused by high student involvement (Gregorius et al., 2010).

Digital learning technology can integrate content that can adapt to students' ability levels. This means students of different abilities can access material tailored to the level of difficulty that suits them. Students can choose the learning method that best suits them. Teachers can use online learning platforms to upload learning materials, assignments and resources that can be accessed by students from anywhere and at any time. This allows students to learn independently at their own pace. Some digital learning platforms can provide automated feedback on students' performance on assignments or exams, which can help students track their progress. Digitally Based Differentiated Learning can also support collaboration between students, even if they are not in the same physical location. This helps in the development of social and collaborative skills.

Digital-Based Differentiated Learning combines the advantages of technology with a differentiated learning approach, which aims to meet the unique needs of each learner. However, it is important to remember that effective implementation requires good planning, teacher training, and adequate access to digital tools and resources (Roslin, 2014).

Based on previous research conducted by Irine Kurniastuti and Saifuddin Azwar, Faculty of Psychology, Gadjah Mada University, entitled Construction of Student Well-being Scale for 4-6th Graders, published in the Psychology Journal in 2014, containing indicators of student well-being behavior (Chiu et al., 2023; Dodge et al., 2012), among others are:

- 1) Able to control emotions
 - Do not take actions that are contrary to social norms to fulfill a temporary need (impulsive) such as cheating, stealing, or committing aggressive acts.
 - Do not show excessive responses when angry/sad.
- 2) Resilient in facing problems
 - Remain enthusiastic about going to school after experiencing a bad incident (for example: being bullied by a friend or being scolded by a teacher)
 - Keep doing your homework even if there are obstacles (for example: lights out, no helper, broken pencil)
- 3) Not inferior (have high self-esteem)
 - Feel smart and capable in academic and school work
 - Don't worry about other people's opinions
- 4) Have high curiosity
 - Try to find solutions (e.g. answers to questions) even though it is not an obligation
 - Find out things related to the lesson that are not taught in class
- 5) Participate in learning and school activities
 - Participate in activities outside of learning hours (eg: extracurriculars, elective programs) with pleasure
 - Pay attention to the teacher's explanation and participate actively in the learning process (eg: answering questions, being active in groups)
- 6) Be persistent in the learning process
 - Be persistent in the learning process until you master the lesson Do your homework optimally

- 7) Able to communicate what he feels and thinks
 - Able to communicate what they feel (eg: expressing objections, asking for help when encountering difficulties)
 - Able to communicate what he feels
- 8) Able to position himself in someone else's position in a situation
 - Showing concern for the conditions experienced by others
 - Emotions fluctuate when they hear, see, or read heart-wrenching/funny stories
- 9) Demonstrate confidence and comfort in interacting with fellow teachers and community members
 - Feel comfortable among friends and teachers
 - Thinking that all friends and teachers are good
- 10) Maintain good relationships with friends, teachers and community members
 - Have a lot of friends
 - Relate well with friends and teachers without distinction of status, religion and race.

2. METHODS

2.1. Approach

The research approach used in this research is Mix Method, this approach was taken because in this research there are two types of data, namely qualitative data and quantitative data. Mix methods are a research method that combines two research methods at once, qualitative and quantitative in a research activity, so that more comprehensive, valid, reliable and objective data will be obtained. Qualitative data was obtained from the Digital-Based Differentiated Learning variable, while quantitative data was obtained from the Student's Well-being Behavior variable.

2.2. Method

The method used in this research is a quasi-experimental method. Quasi-experimental is the type of design that is most often used by student teachers (one of the reasons explained above) when carrying out research for final assignments (TA). Although, at the master's and doctoral levels, this type of research design is still often chosen or used.

2.3. Location

The location of the research was carried out at SD Negeri Baros Mandiri 4, Cimahi City. The reason is because this school is the only elementary school that has received a Ministry Decree for the Implementation of the Independent Curriculum with Independent Sharing status.

2.4. Data Collection Techniques

The method aspect consists of descriptive research, historical research, survey research, ex-post facto research, experimental research, quasi-experimental research. In this research, the instrument preparation was carried out in the form of a questionnaire and interview guide. The questionnaire that must be filled out by respondents uses a Likert scale with 4 alternative answers. In the Likert scale, 3, 4, 5, 6 and 7 intervals can be used. Using a likert scale, the instruments in this research were developed from each product development component and its indicators, can be seen **Table 1**.

Table 1. Research grid for data collection techniques.

No.	Variables	Data Type	Data Collection Methods and Instruments			
			Observation	Interview	Questionnaire	Literature Study
1	Quantitative Digital Based Differentiated Learning Student's Well- being Behavior Qualitative	Quantitative	√	√	√	-
2		Qualitative	√	√	√	√

2.5. Data Analysis Techniques

The data analysis technique will use Chi Square, also known as Kai Square. Chi Square is a type of non-parametric comparative test carried out on two variables, where the data scale for both variables is nominal. (If of the 2 variables, there is 1 variable with a nominal scale, then a chi square test is carried out, referring that the test at the lowest degree must be used).

2.6. Research Procedures

1) Study the results of previous research

The researcher collected articles or scientific works related to the research theme that the researcher raised, namely Digital-Based Differentiated Learning for Student's Well-being Behavior. The results of previous research were used as a basis for developing this research.

2) Make a research proposal

This proposal will help researchers formulate research ideas in detail and obtain approval from academic supervisors.

3) Identify research objectives

Determine the research objectives and hypotheses then explain what the researcher wants to learn or test in this research.

4) Provide guidance with academic supervisors

The academic supervisor will provide directions regarding the research being raised, thereby helping researchers perfect their research design so that it can be continued into a good research report.

5) Sample Selection

Select a sample of subjects or units that you will use in your research. Ensure the sample represents the relevant population for your research.

6) Selection of Experimental and Control Groups

Identify the experimental group and the control group. The experimental group will receive treatment or intervention, while the control group will not receive it.

7) Development of Independent Variables

Determine the independent variables or factors that will be manipulated or observed in this research. Ensure this variable can be differentiated between the experimental and control groups.

8) Initial Data Collection

Before the intervention, collect initial or baseline data about the dependent variable you want to measure. This will be the basis for comparing changes after the intervention.

- 9) Introduction to Intervention
Apply intervention or treatment to the experimental group according to the independent variables you determine. Ensure to carefully record details of implementation of the intervention.
- 10) Data Collection During Intervention
During the intervention period, collect data regularly on the dependent variable. This may involve periodic measurements or observations.
- 11) Data Analysis
Analyze the data to assess whether there are significant differences between the experimental group and the control group after the intervention. This can involve using statistics to test hypotheses.
- 12) Interpretation of Result
Interpret the results of data analysis and determine whether the intervention has a significant impact on the dependent variable.
- 13) Preparation of Research Reports
Present research results in a research report which includes introduction, methods, results, discussion and conclusions. Explain in detail the research process.
- 14) Reflection and Evaluation
Evaluate the research process, including the strengths and weaknesses of the quasi-experimental methods used. Review whether there are factors that could affect the validity of your findings.
- 15) Preparation of Recommendations
Based on the findings, researchers will develop recommendations for further development or improvement in contexts relevant to the research.
- 16) Presentation of Result
Present research results in the form of reports, presentations, or publications in accordance with campus scientific writing.

3. RESULTS AND DISCUSSION

3.1. Implementation of Digital-Based Differentiated Learning

Teachers implemented digital-based differentiated learning through three main aspects: content, process, and product. In terms of content, teachers utilized digital media such as interactive learning videos and learning management systems to adjust the difficulty level of materials according to students' readiness. In terms of process, students were allowed to choose learning activities based on their interests (e.g., video projects, online quizzes, or material exploration). In terms of product, students' learning outcomes were compiled into digital portfolios that reflected creativity and self-reflection.

3.2. Differences in Well-Being Behavior Between Experimental and Control Classes

The t-test analysis indicated a significant difference between the experimental and control classes ($p < 0.05$). Students in the experimental class showed higher improvements in the dimensions of engagement, positive relationships, and meaning in learning. This finding supports Morgan (2013) and Rosln (2014), who stated that differentiated instruction can enhance students' intrinsic motivation and self-confidence.

3.3. Implications for Student Well-Being

Theoretically, students' well-being is influenced by learning experiences that provide meaning and autonomy (Dodge et al., 2012). Digital-based differentiated learning facilitates

this by allowing personalized learning, online collaboration, and rapid feedback that enhances students' sense of achievement. These findings align with recent research confirming that integrating technology into differentiation can improve students' learning satisfaction and emotional balance (Chiu et al., 2023). Moreover, teacher responsiveness to individual needs strengthens students' sense of connectedness and psychological well-being (Sari et al., 2023).

4. CONCLUSION

Digital-based differentiated learning positively influences elementary students' well-being behavior. Through this strategy, teachers can more effectively tailor instruction to students' needs, interests, and readiness levels. Improvements in students' well-being were reflected in increased engagement, social relationships, and learning meaning. Practically, the findings highlight the importance of teacher training in designing digital differentiation and the need for school policies supporting equitable access to technology and learning resources.

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