

Analysis of The Differentiated Learning Implementation in Science and Social Science Learning on the Independent Curriculum at Elementary School

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Abstract

This study was conducted with the aim of analyzing whether the application of differentiated learning has accommodated the needs of students' learning styles and reviewing in more depth how the application of differentiated learning in science subjects in optimizing the independent curriculum. The number of informants in this study was one fourth grade teacher. And thirty students in the application of learning in class. This type of research uses a qualitative method and uses a descriptive approach. Data collection through interview methods with fourth grade teachers, observation and documentation obtained from teaching modules, LKPD, produced by students, teaching materials and other supporting documents. Data validity testing uses triangulation of techniques and sources. The data analysis technique follows the Miles and Huberman procedure which contains three techniques; data reduction in the context of this study in the form of interview results, observations, documentation and student learning questionnaire results, presentation of data from the results of the reduction is presented in the form of tables and descriptive narratives and finally drawing conclusions. The findings of the analysis show that learning styles influence the achievement and learning outcomes through a differentiated approach. By implementing the four aspects and steps of differentiated learning, learning is not only more focused but also makes it look enthusiastic, the classroom atmosphere becomes fun which is supported by adequate facilities and infrastructure and improves student learning outcomes. This study, the application of differentiated learning is an effective approach because students get learning experiences that are in accordance with their interests and learning needs so that students become more motivated and appreciate differences in learning styles and teachers become more creative and innovative even though they sometimes add lessons outside of class hours so that students get good learning grades.

Keywords: Differentiated Learning, Implementation, Independent Curriculum, Science and Social Science Learning

Abstrak

Penelitian ini dilakukan bertujuan untuk menganalisa apakah penerapan pembelajaran berdiferensiasi ini sudah mengakomodasi kebutuhan dari gaya belajar peserta didik dan mengulas lebih mendalam bagaimana penerapan pembelajaran berdiferensiasi pada mata pelajaran IPAS dalam mengoptimalkan kurikulum merdeka. Jumlah informan dalam penelitian ini adalah satu orang guru kelas IV. Serta tiga puluh peserta didik dalam penerapan pembelajaran dikelas. Jenis penelitian ini menggunakan metode kualitatif dan memakai pendekatan deskriptif. Pengumpulan data melalui metode wawancara dengan guru kelas IV, observasi dan dokumentasi diperoleh dari modul ajar, LKPD, yang dihasilkan peserta didik, bahan ajar serta dokumen pendukung lainnya. Uji keabsahan data menggunakan triangulasi teknik dan sumber. Teknik analisis data mengikuti prosedur Miles dan Huberman yang terdapat tiga teknik; reduksi data dalam konteks penelitian ini

berupa hasil wawancara, observasi, dokumentasi serta hasil angket belajar peserta didik, penyajian data dari hasil reduksi dipaparkan berupa tabel dan narasi deskriptif dan yang terakhir penarikan kesimpulan. Temuan analisis menunjukkan bahwa gaya belajar peserta didik yang bervariasi namun pembelajaran yang sering monoton dengan satu arah pembelajaran berpengaruh terhadap tujuan pembelajaran melalui penerapan berdiferensiasi. Setelah melakukan wawancara dengan guru kelas IV, teridentifikasi bervariasinya gaya belajar peserta didik seperti gaya belajar visual, auditori dan kinestetik. Dengan menerapkan keempat aspek dan langkah-langkah pembelajaran berdiferensiasi pembelajaran tidak hanya lebih terarah tetapi juga membuat terlihat antusias, suasana kelas menjadi menyenangkan yang ditunjang dengan sarana dan prasarana yang memadai serta membuat hasil belajar peserta didik meningkat. Penerapan pembelajaran berdiferensiasi pada mata pelajaran IPAS di SD Kliwonan merupakan pendekatan yang efektif karena peserta didik mendapatkan pengalaman belajar yang sesuai dengan minat dan kebutuhan belajar masing-masing sehingga peserta didik menjadi lebih bermotivasi dan menghargai perbedaan dalam gaya belajar serta guru menjadi lebih kreatif dan inovatif walaupun kadang menambah pelajaran diluar jam pelajaran supaya peserta didik mendapatkan nilai belajar yang baik.

Kata Kunci: *Pembelajaran Diferensiasi, Implementasi, Kurikulum Merdeka, Ilmu Pengetahuan Alam dan Sosial*

INTRODUCTION

The curriculum is a plan, design, and arrangement that contains the objectives, content, and learning materials used as guidelines for organizing learning activities to achieve certain educational goals. The curriculum is a vital and essential component in the education system. The field of education is highly dependent on the curriculum (Rosiyani et al. 2024). The curriculum is also contained in Law No. 20 of 2003 concerning the national education system explaining that the function of national education is to regulate the types and levels including education, formal, non-formal and informal education and to educate citizens in order to increase their capacity to develop into independent, democratic, and responsible human beings, who believe and obey God Almighty

In Indonesia, the curriculum has undergone several changes and improvements starting from 1947, 1952, 1964, 1968, 1975, 1984, 1994, 1999 (revised 1994 Curriculum), 2004 (Competency-Based Curriculum), and 2006 (Education Unit Level Curriculum), the Ministry of National Education returned to the Independent Curriculum (Kurtilas) in 2013, and in 2018 it was revised again to become the Revised Kurtilas (Kurniawati 2022). And the curriculum used in learning is the Independent Learning Curriculum which is designed according to the country's wishes to be able to realize its vision in 2030. Curriculum updates, especially differentiated learning, are an effective method to accommodate differences between students (Sulastianingrum, E., Fauziati, E., Rohmah, W., & Muhibbin 2023). However, the Independent Learning curriculum policy may face a number of problems during its implementation (Susetyo et al. 2022).

The 1947 curriculum is a curriculum that was created right after two years of independence. This curriculum is designed to form the character of Indonesian people who are independent, sovereign and equal to other nations. It has not focused on mental education. The government made improvements to the curriculum in 1952. This curriculum regulates the discussion of topics in each subject that must be related to community life (Syahrir et al. 2024). The learning concept of the 1964 curriculum focuses on the development of morals, intelligence, skills and physical. The implementation of the 1964 curriculum in the learning process is carried out actively, creatively and productively. It aims to instill academic knowledge from the Elementary School level (Purwawidodo, A., & Mufidah 2024). The government has set Saturday as a day for students to practice various activities according to their interests and talents (Meitasari, Suyoto, and Ngazizah 2020). The improvements in the 1968 curriculum have characteristics from the lower education level that have a correlation with the next level of education. According to (Ikhsani and Alfiansyah 2023) the main

objective of this curriculum is to form a true Pancasila human being, strong, physically healthy, increase intelligence and physical skills, morals, religious beliefs and in this curriculum the majoring system starts in class 2 of high school. The first stage of the Five-Year Development Plan (Repelita) program during the New Order government was used in the 1975 curriculum which emphasized more effective and efficient education. This curriculum details the methods, materials and objectives of teaching in the Instructional System Development Procedure (PPSI) (Ngazizah et al. 2023). However, the implementation of this curriculum was criticized because teachers became busier writing down details of each learning activity and several subjects such as Natural Sciences and Life Sciences were changed to Natural Sciences (Mulyawati, Zulela, and Edwita 2022). In 1984, there was a change in the curriculum because the previous one was considered slow in responding to progress in society. This curriculum added the subject of National Struggle History Education (Supriyanto, DS, and Herdianto 2020).

Both the 1994 and 1998 curricula were a combination of the 1975 and 1984 curricula where the PSPB subjects were removed and the high school majors were divided into 3 programs, namely Science, Social Sciences and Language (Rafiska and Susanti 2023). After 10 years, this curriculum was replaced with the Competency-Based Curriculum (KBK) in 2004. Which emphasizes 3 main elements of competence, namely competency selection, evaluation indicators in determining the success of achievement and development of learning for students and teachers. The 2006 Education Unit Level Curriculum (KTSP) is almost similar to the previous curriculum which only sets competency standards and basic competencies. The government made improvements to the curriculum in 2013 which emphasized competency-based learning and a scientific approach that forms active, creative, innovative students who are able to face the challenges of the 21st century. The Ministry of Education, Culture, Research and Technology in February 2022 introduced the Independent Curriculum with differentiated learning. Which focuses on honing children's interests and talents as early as possible. So that there is a massive adaptation by all elements of the education system (Thana and Hanipah, 2023)

Based on the results of initial observations and interviews, researchers found several problems, including varying learning styles of students, learning that is often monotonous with one direction of learning, and differences in academic abilities of different students. These problems indicate that a learning strategy is needed so that students can successfully complete tasks in the learning process. The results of interviews with grade IV teachers revealed that the obstacles faced in implementing differentiated learning in the learning process, namely the preparation of teaching modules and the application of differentiated learning, took quite a long time. This is due to the adjustment of materials and learning methods for students who have different abilities.

The use of differentiated learning has been covered in a number of studies, therefore this is not the first. The first study (Setyo Adji Wahyudi, Mohammad Siddik, and Erna Suhartini 2023) the application of differentiated learning using three steps was able to improve students' learning abilities in science learning in grade V SDN 008 Samarinda Seberang. Second, research (Avandra Ricky and Desyandri 2023) on science learning in grade IV of SDN 09 Balai Satu, the application of differentiated learning can improve students' critical thinking skills. The third research (Kusumaningpuri 2024) on the application of differentiated learning makes and encourages teachers to think more creatively and innovatively in designing methods to accommodate the strengths and weaknesses of students, so as to achieve learning goals and increase student interest. Fourth, the application of 21st century learning requires the development of skills beyond memorization and reading comprehension; learning that can increase students' intellectual capacity is also needed (Rahayu et al. 2024). Fifth, research (Hasanah & Surakarta, 2024) which states that science learning with a differentiated approach in grade IV can improve students' motivation and learning outcomes, create positive relationships between students and teachers, and appreciate differences despite facing challenges. This research certainly has similarities and differences with other studies. Of course, the difference is that no research has been conducted on the topic of implementing individual learning,

especially in science and science-related disciplines in elementary school. In addition, several research sites were selected. While the similarity is the method applied, namely the application of differentiated learning in elementary school. Based on the discussion, this study aims to analyze the learning styles of students and the teacher's approach in implementing differentiated learning in the independent curriculum. Therefore, the novelty of this study lies in the success or obstacles of teachers in implementing this differentiated learning which is an added value of novelty in the study. Another novelty is that the final results of each student are different based on learning styles and emphasis on certain classes. The results of this study on the application of differentiated learning are expected to be a guideline for all.

METHOD

This study uses a qualitative method and a descriptive approach. Qualitative research with a descriptive approach emphasizes more on the presentation to describe or depict existing phenomena, both scientific and human engineering (Rosiyani et al. 2024). The data needed in the study were obtained through interviews, observations and documentation. Interview activities were carried out with grade IV teachers of SDN Kliwonan and several students using guidelines that had been prepared to ensure that all data was in accordance with the research objectives. While observations and documentation were obtained from direct observations with thirty students in the class to obtain accurate information, teaching modules, LKPD produced by students, teaching materials and other supporting documents. The data analysis technique refers to the method proposed by Miles and Huberman. In this research process, three methods were used simultaneously, namely data reduction, data presentation, and drawing conclusions (Millah et al. 2023). In this study, the researcher used the Miles and Huberman approach because it was effective in understanding complex research dynamics and in accordance with the research being aimed at.

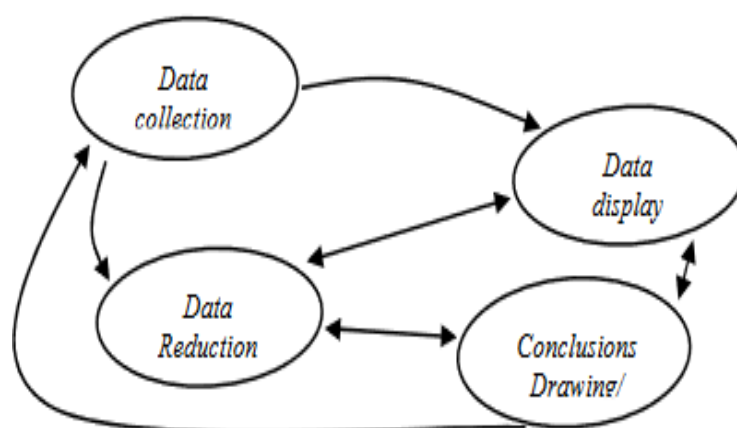


Figure 1. Interactive Analysis Model

Data reduction is summarizing, finding and prioritizing important points and things, identifying patterns and themes (Gee and Harefa 2021). The method of presenting data refers to the way of presenting and organizing data so that it is easy to understand and analyze (Fadli 2021). Researchers use tables to facilitate comparison and analysis. Triangulation of techniques and sources is a way to check the validity of the data that is carried out. Triangulation is the process of verifying and integrating information collected from observations, interviews, and documents. Source triangulation, on the other hand, involves verifying and integrating data collected from source interviews.

Table 1. Grid of student learning needs instrument questionnaire

No	Aspect	Indicator
1.	Visual Learning	1. How to learn by reading 2. Likes to take notes 3. Read quickly and diligently 4. Easily remember what is seen rather than what is heard
2.	Auditory Learning	1. How to learn by listening 2. Difficulty writing/taking notes but good at telling stories 3. Reading aloud 4. It is easier to remember what is discussed/explained than what is seen.
3.	Kinesthetic Learning	1. How to learn happily with practice models 2. Writing a lot without rereading 3. Read with your finger as a pointer 4. Remembering by writing down information repeatedly 5. Cannot sit still for long periods of time

(Mutiara Intan Lestari, Ichsan Anshory 2024)

RESULT AND DISCUSSION

This study was conducted in November 2024 at SDN Kliwonan by interviewing the fourth grade teacher as the main informant to find out whether the learning designed by the teacher in the form of a teaching module is in accordance with the understanding and learning needs of each student. This study focuses on how to apply differentiated learning to the subject of science and natural sciences. The main objective is to analyze whether the learning method used is in accordance with the needs of the students.

The results of interviews with fourth grade teachers at SDN Kliwonan showed that the first thing the teacher did was analyze the needs of students through direct observation and diagnostic assessments at the beginning of the school year. This step is necessary to identify the characteristics, behavior patterns and learning readiness of students. Teachers in designing the teaching module for the subject of science and natural sciences adjust the learning objectives and design assessments. Furthermore, teachers identify the needs of students, adjust the learning materials and methods, and deliver the material clearly and effectively in the implementation of learning. The language used is polite and friendly so that the learning atmosphere remains pleasant. Sometimes teachers do ice breaking in the middle of learning so as not to get bored. For assessment, teachers use formative assessments with instruments including assessments of skills, attitudes and knowledge with summative assessments at the end of learning (Rosiyani et al. 2024).

The challenges faced by teachers in implementing differentiated learning include several important aspects. Time constraints due to planning, analyzing student needs and implementing differentiated learning for students require more time and intensive preparation. This is difficult to do with a large number of students and adjusting to student needs. Limited resources are also a challenge because schools have limited access to the materials and tools needed to support the implementation of differentiated learning. With the implementation of differentiated learning, students are more connected to the material and become enthusiastic and motivated in learning. Students feel more cared for and supported in learning because it is tailored to their respective needs. By implementing differentiated learning, teachers can design more effective learning so that students feel the learning process is easier and more enjoyable (Budiastuti, Abdullah, and Soedjono 2023). Enjoyable learning contributes to increasing student involvement in learning activities.

The results of observations conducted by observing grade IV students of SDN Kliwonan consist of visual, auditory and kinesthetic learning styles. In the application of science learning about

single substances and mixed substances in grade IV, visual learners learn by listening to explanations from teachers supported by images related to the material. Auditory learners learn by seeing, listening, writing while watching learning videos related to the material. Kinesthetic learners carry out learning activities by directly practicing activities related to single substances and mixed substances around them accompanied by teachers (Suwartiningsih 2021). By implementing this differentiated learning, students can actively participate according to their learning styles so that learning becomes more effective and enjoyable. This differentiated learning encourages a deeper understanding of simple single substances and mixed substances around them.

The application of differentiated learning in science subjects using a projector is very helpful in visualizing images or videos that can make learning more enjoyable so that students find it easier to understand concepts by displaying material visually (Latifa 2023). Visualization in this learning is clearer and maintains students' attention so that learning is more dynamic and not boring (Langoday, Nurrahma, and Rijal 2024).

Teachers also do group work in learning to facilitate students' understanding of the material. Because when discussing, students can exchange ideas and explain material that has not been understood (Hasanah and Surakarta 2024). Communication between students in group work not only improves individual understanding but also builds social skills, communication and mutual respect for differences in understanding between students (Ultra Meria Gusteti 2022). Learning by conducting experiments related to the material allows students to be more actively involved in a varied learning process (Rusadi and Munawaroh 2024). In addition, by adding or interspersing trigger questions, ice breaking, and outdoor activities in the learning implementation process so that it is not boring (Astuti and Afendi 2022). Learning by learning through movement, outdoor activation makes kinesthetic students not bored in following the learning process (Naibaho 2023).

According to research results (Pratiwi and Sukartono 2023) Students with a visual learning style in the application of differentiated learning in science subjects easily understand information through listening supported by images to understand the subject matter. Students with an auditory learning style in differentiated learning in science subjects easily understand through listening from watching videos related to the subject matter provided by the teacher. In the application of differentiated learning in science subjects, students with a kinesthetic learning style enjoy doing physical activities and direct experiences such as experiments. They find it difficult to sit still for a long time because they have a desire to move and explore the surrounding environment (Halimah, Hardiyanto, and Rusdinal 2023).

Based on the results of interviews and direct observations with grade IV teachers and students in learning, it was found that the application of differentiated learning significantly influenced the success of the learning process to optimize the Independent Curriculum. The application of differentiated learning with the characteristics of different learning styles of students has proven effective in accommodating the needs of various learning styles of students. In line with the definition of differentiated learning as a strategy that adapts teaching to the needs, abilities, characteristics of each student (Setyo Adji Wahyudi et al. 2023). Differentiated learning is a bridge to create learning experiences that are in accordance with the needs and interests of students by adjusting various strategies, methods and learning materials based on the learning styles of each student. This learning facilitates a deeper understanding and creates an inclusive and responsive learning environment to the diversity of student characteristics. The different learning styles of each student require various strategies or methods from the teacher so that students can learn in the way that suits them best (Komang Arie Suwastini 2021). Teachers can deliver lesson materials more precisely and interestingly when they understand and recognize the learning styles of each of their students. This can improve students' understanding of the material, thus helping them achieve learning goals more effectively and efficiently. So teachers need to continue to develop knowledge about students' learning styles as part of a learning strategy to maximize the process, goals and learning outcomes.

This study is in line with the eight intelligences of students according to Howard Gardner, namely linguistic, logical-mathematical, visual-spatial, kinesthetic, musical, interpersonal, intrapersonal and naturalistic intelligence. The results of the observation show that students with a visual learning style have the characteristics of visual-spatial intelligence. Where it can be seen from the definition of spatial intelligence is the ability to think in oral and written form and absorb, change and recreate aspects of the visual-spatial world (Widyawati and Rachmadyanti 2023). Students with an auditory learning style have the characteristics of musical intelligence which can be seen from the intelligence of creating, expressing and enjoying music and sound. Students with this intelligence find it easier to accept learning materials by integrating sound elements in the learning process, thus helping them understand the material faster when accompanied by videos (Sarrie 2022). Then students with a kinesthetic learning style have the characteristics of gestural intelligence which can be seen in their ability to use gestures to express their ideas and emotions in participating in learning (Sulistiyosari, Karwur, and Sultan 2022). In the application of differentiated learning, teachers provide materials by paying attention to the level of ability, skills, interests and talents of students. In addition, teachers also adjust the content of the lesson, learning objectives and processes, learning outcomes and the environment where students learn (Wahyuni 2022).

Differentiated learning is a process in learning where students learn material according to their abilities, needs, interests and talents (Marsela Yulianti et al. 2022). In the application of differentiated learning, there are four steps. The first step is Analysis, which is identifying and analyzing the characteristics of students. Through diagnostic assessments by working on mapping student needs. The second is Design, which plans or designs learning in a teaching module to adjust to student needs. The third step, Implementation, is implementing the differentiated according to the readiness and needs of students. The fourth step is Evaluation, which is teaching carried out at the end as a basis for improvement in the next learning process.

In the application of differentiated learning, teachers can control four aspects, namely content, process, product and environment or classroom climate. Teachers have the authority to determine how the implementation of the four elements will be applied in the learning process in the classroom (Digna and Widyasari 2023). And teachers have the ability and opportunity to adjust the environment and climate of the classroom, content, processes, and products in the classroom (Widyawati and Rachmadyanti 2023). The first is content. Content is the material that will be taught by the teacher. The strategies used by teachers in this learning include providing PPT slides, experimental media for learning, and various other supporting systems.

The second is the process. In this case, the term "process" refers to the activities carried out by students in the classroom. These activities must have meaning for students as learning experiences, not activities that are not relevant to the material in the learning. Numbers do not assess the activities carried out by students, but through qualitative assessments in the form of notes on attitudes, knowledge and skills that still need to be improved by students. In addition, activities that are meaningful to students in the classroom.

Third, the product is a tactic or phase used from the results of the learning process that shows the ability of students to demonstrate their knowledge, skills and understanding after adjusting one lesson unit in the form of notes or clippings to be given to the teacher as an assessment. Summative assessment is considered necessary. Completion of the product requires a long time and a deeper understanding of the material being taught. Therefore, products are often worked on not only in class but sometimes also outside the classroom. The implementation of this product can be done individually or in groups. Teachers in learning on the material of single substances and mixed substances are worked on in groups, the assessment system is arranged based on the contribution of each team member in completing the product. Fourth, the learning environment. The learning environment includes the physical space in the school, class or place of study of students. To motivate the environment must be adjusted to the needs, interests and learning talents of students.

The application of various learning method strategies shows how important it is to understand and accommodate the needs of different learning styles to improve motivation, academic ability and student engagement in learning (Fauzia and Hadikusuma Ramadan 2023). The role of teachers is vital in creating differentiated learning as expected by the Independent Curriculum, especially in learning science subjects (Cahyono 2023). When facing challenges in the middle of differentiated learning, teachers need to understand the concept of differentiated learning in depth (Sutrisno, Muhtar, and Herlambang 2023). Socialization and seminars on the application of differentiated learning in the independent curriculum must be increased, especially in schools in regions where educators need direct assistance in the implementation process. After understanding the concept, teachers can apply it in learning. In addition, support and guidance from all related parties, such as school principals, supervisors, and the government are very important to achieve the goals of this independent curriculum.

CONCLUSION

Based on the results of the research and discussion, differentiated learning is greatly influenced by the way educators vary differentiated learning to analyze students' learning styles according to their abilities. In the context of differentiated learning, it has been proven effective in accommodating various learning styles of students in line with the definition of differentiated learning as a strategy that adapts teaching to the needs and characteristics of students. In differentiated learning, learning methods and materials are adjusted to learning styles so that the learning process is more effective. In addition, the role of teachers is very important as facilitators who adjust the content, process, and products that involve students despite facing challenges such as limited time and resources.

The limitations of researcher subjectivity, limited generalization, validity and reliability, and resources in terms of learning materials and technological support can affect the effectiveness of the implementation of differentiated learning. The success of the implementation of differentiated learning depends on the principal, education office, and teacher assistance. With adequate support, the implementation of differentiated learning can improve. Therefore, support from various parties is needed to achieve the expected educational goals. The limitation of this study is that it only focuses on analyzing the implementation of differentiated learning carried out by teachers without considering other factors that can affect the effectiveness of learning, such as limited samples and only conducted in one school, namely SDN Kliwonan. Therefore, researchers in further research should conduct it in several schools that have different characteristics in order to obtain more representative and generalizable results

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