

Implementation of Differentiated Learning with Project Based Learning (PjBL) Models in Science Content for Class V Elementary School Student

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ABSTRACT

This study aims to determine the implementation of differentiated learning using the Project Based Learning (PjBL) learning model in the science content of fifth grade elementary school students. Differentiated learning practices are important to share because differentiated learning can accommodate the diversity of learning needs, abilities and characteristics of students. This research uses descriptive qualitative method. Differentiated learning strategies used are content, process, and product. The results of this study indicate that the practice of differentiated learning has a positive impact on both educators and students. the learning atmosphere becomes more fun because students are more enthusiastic and enthusiastic in learning. Muird is also free to express his potential according to his interests so that learning feels more meaningful

Keywords: Implementation, Differentiated Learning, PjBL

1. INTRODUCTION

Changes in the educational paradigm are inevitable. These changes occur in curriculum changes that are adapted to the times and the needs of students. Regarding the needs of students, of course each student has different needs. Referring to the learning objectives put forward by the Father of Education, Ki Hadjar Dewantara, who stated that the objectives of education are to provide guidance for all the natural strengths that children possess so that they are able to achieve the highest safety and happiness both as a human being and as a member of society. Often around us we still find parents and teachers who still compare their children's learning achievements with other children without ever understanding the natural strengths and talents that the child has.

Activities that will be carried out so that the learning process reflects Ki Hajar Dewantara's thoughts are realized, namely implementing independent learning that is student-oriented through a holistic educational approach, namely developing all the potential that exists in students in a balanced way, including intellectual, emotional, physical, social, artistic, and spiritual potential go hand in hand. If we think about it, as a teacher, we must have encountered a condition where the atmosphere or learning conditions were different from other students. The concept of differentiated learning is one of the ways

teachers empower students to explore all the potential possessed by the nature of the times and the nature of nature [1]

The difference can be seen from the way of learning, learning abilities, and our learning interests. These various differences certainly cannot be equated. If there are 20 students in a class, there will also be 20 different characters, learning styles, learning needs, readiness to learn and interests. Therefore, as a teacher, you should realize that every child has their own nature and abilities. The characteristics of elementary school students are very unique compared to other school-age developmental periods. Therefore, in the application of differentiation learning, teachers need to know in depth related to the characteristics of elementary school students [2]. Differentiated instruction is the adaptation of curriculum components in the parts of content, process, and product and refers to the needs of students according to their interests, readiness, and learning profiles [3]. Differentiated instruction is a teaching approach that allows teachers to meet the individual needs of each student. In differentiated instruction, the teaching and learning activities are tailored to the abilities, interests, and needs of each student [4]

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Students in one class are not the same. They come different families. Coming from different from backgrounds, having different learning styles, different interests, or learning at different speeds so their learning readiness is different. Based on the analysis above, researchers want to implement learning that is able to accommodate all students' needs, namely through differentiated learning. Differentiated learning is an effective learning process that considers the differences of each student in increasing their potential according to the readiness, interests and learning profile of students [5]. Differentiated instruction (DI) is a philosophy of teaching and assessment that supports planning for diversity within classrooms. Increasingly, students with a range of needs, strengths, backgrounds, and linguistic profiles are taught in inclusive classrooms alongside same-age peers [6]

In module 2.1 Teacher Education The driver of differentiated learning is a series of common sense decisions made by teachers that are oriented to student needs. In addition, it is stated that differentiated learning is an effort to adapt the learning process in the classroom to meet individual learning needs. The characteristics or characteristics of differentiated learning according to Maryam (2021:34) include: the learning environment invites students to learn, the curriculum has clearly defined learning objectives, there is continuous assessment, the teacher responds to or responds to learning needs students, and effective classroom management. An example of a class that implements differentiated learning is when the teacher's learning process uses a variety of methods, so that students can explore the content of the curriculum, the teacher also provides a variety of reasonable activities so that students understand and have information or ideas and the teacher provides a variety of choices where students can demonstrate what they have learned they learn.

It is in this context differentiated instruction can be a method that can help teachers in facilitating effective classroom management that would facilitate students' diversity in learning and put students at the core and center of learning process [7]. Differentiated instruction implementation plans can be arranged based on the first readiness of students, what is meant by readiness of students in this case is if the learning plan contains assignments that are in accordance with student skills and previous student understanding [8]

Differentiated Instruction (DI) approach is required to think about contrasts between understudies, recognize their qualities, and oblige their impediments. Meeting understudy contrasts is a test because these distinctions can be ascribed to different understudy attributes, for example, student interests, learning styles, level of advancement, learning speed, capacities, social foundation, language level, perspectives, administrative methodology, and so on [9]. Differentiated instructions are typically provided with a variety of variants to accommodate the varied qualities of individual students [10]

Differentiated learning is an attempt to adjust the learning process in class to meet the learning needs of

each individual. Differentiated learning is creating a class that has diversity by providing opportunities for students to master the material, process ideas, and improve the learning outcomes of each student so that they can learn even more effectively [11]. Differentiated learning is a cycle of finding out about students and responding to their learning needs, interests, and learning profiles based on differences. When teachers continue to learn about the diversity of their students, professional, effective, and efficient learning will be realized [12]

This differentiated learning aims to create equality of learning for all students and bridge the learning gap between those who achieve and those who do not achieve. In short, differentiated learning is a learning process that is made in such a way that students feel challenged to learn. The process, content, and product are intertwined, and teachers should take these three components into consideration when designing and delivering instruction rather than focusing on students' peer assistance and classroom managerial strategies. Teachers should endeavor to differentiate process, product, and content when facing a mixed-level class [13]

To collaborate in implementing differentiated learning, teachers need to design teaching strategies that are different from usual, real and close to students. One strategy option that can be implemented to collaborate on differentiated learning is by implementing the Project Based Learning (PjBL) model. Project Based Learning or problem-based project learning is a learning model that involves students' activeness in solving problems, carried out in groups/independently through scientific stages with a certain time limit which is outlined in a product to then be presented to others.

Learning using the PjBL model requires students to work in small groups which allows for communication and collaboration between students. This will encourage the effectiveness of the implementation of differentiated learning because this model is a learning model that involves students in solving a problem related to the project so that students gain direct experience of the process of discovering the concepts they learn in completing the project. In this case the project completed by students according to learning style, ability, interests and talents of students.

To achieve the goal of learning to produce graduates with high competitiveness, hence the need for an improvement in the learning process. Effective learning method in accordance with the characteristics of the subjects is key in achieving the objectives of the intended learning [14]

There are six distinctive characteristics of PjBL: making basic questions, focusing on learning objectives, actively participating in learning activities, collaborating with students, using technology, and creating actual artifacts. According to the PJBL learning model has steps that distinguish it from other learning models, namely: 1) determining fundamental questions related to the material, 2) designing projects, 3) planning project schedules, 4) monitoring project experience. This PjBL learning model is 1) to provide students with broad insights to deal with the problems faced and 2) to develop critical thinking skills [15]

Efforts to improve students' creative thinking by implementing the PjBL learning model in the learning process. PjBL is a learning model that uses a constructivist approach that provides students with the opportunity to explore real-world problems and challenges, simultaneously developing cross-curricular skills while working in groups [11]

Students registered at Pungkuran State Elementary School have different profiles. Of the 206 students recorded, their potential, abilities, interests and talents cannot be generalized. The diverse profile of students cannot be made uniform by teachers. Likewise with the profile of students in class V at SDN Pungkuran, totaling 22 students. Of course, the 22 students also have 22 different potentials, abilities, interests, talents, learning styles, and parental profiles, which causes the learning needs of each student to be different.

The different learning needs of 22 students in class V were facilitated as much as possible by the teacher with appropriate strategies according to their individual needs. If the 22 students are equalized, of course the abilities, interests, talents and potential of the students will not be able to develop optimally, they will not be facilitated according to their learning needs so that learning will be less meaningful and impartial and will have an impact on the students.

The solution to this diversity can be overcome by teachers by implementing innovative good practices in differentiated learning. Why do teachers need to implement good practices of differentiated learning? Teachers really need to implement good differentiated learning practices because student learning needs vary from one student to another. Differentiated learning will provide different treatment in class based on 3 considerations, namely based on learning readiness, interests and learning profile. Different treatment according to learning needs, interests and learning styles will maximize all students' abilities and potential.

In this good practice of differentiated learning, I as the class V teacher play a role and take full responsibility for implementing this good practice of differentiated learning. I play a role in planning, implementing and evaluating the implementation of these good practices. In the role of planning good practices, I first map students' learning needs which can be considered in 3 aspects, namely how ready they are to learn, what the students' interests are and what the students' learning profile is. I distributed questionnaires to find out students' profiles and learning styles. Apart from that, I also conducted interviews and observations.

2. METHOD

This study uses a descriptive qualitative research approach. The term "descriptive" is intended to collect information or data about the phenomenon being studied, for example the condition of something or an event, accompanied by information about the causal factors so that events may emerge that are described in detail, Implementation of Differentiated Learning with (PiBL) 185 sequentially and honestly (Arikunto, 2019: 26). This research discusses the implementation of differentiated learning with project-based learning in science lesson content at SDN Pungkuran, Bantul Regency. The presence of researchers in this research as the main instrument and in-depth data collectors by conducting interviews, observations and documentation studies. According to Moleong (2017) in qualitative research, the researcher himself is the main data collection tool. Researchers act as observers, planners, data collectors, analyzers, interpreters, and reporters of research results.

This research seeks to obtain information regarding differentiated learning in science subjects, which is obtained from teacher skills and student activities. Researchers then make observations or observations of learning in class. Apart from that, researchers also studied documents related to the implementation of project-based learning activities, photos related to learning activities and the assessment instruments used. Researchers made observations through various stages. The first stage begins with conducting broad general observations by describing the general condition of the school environment. Then the researcher made observations about the ongoing learning process.

All observations were recorded and recorded as field observations. In carrying out the observations, the researcher used the help of an image recording application from a smartphone to make it easier for the researcher to analyze the findings obtained during the research. After the data was collected, the researcher carried out data analysis using the Milles and Huberman Model which includes data collection, data reduction, data presentation and drawing conclusions.

3. RESEARCH TARGETS

The research subjects were the fifth student participants at SD Negeri Pungkuran, totaling 22 children consisting of 16 boys and 6 girls. This research began with a needs analysis, including: mapping learning needs based on three aspects, namely learning readiness, learning interest, and student learning profiles. The data collection technique uses a survey filled out via a smart phone. Second, plan differentiated learning based on the mapping results, namely providing various choices of strategies, materials and ways of learning. The next step is evaluating and reflecting on the learning that has taken place. The differentiation learning strategies used include content, process, and product differentiation.

4. TIME AND PLACE OF RESEARCH

The research was conducted at Pungkuran State Elementary School which is located in Pungkuran Hamlet, Pleret Village, Kapanewon Pleret, Bantul Regency, Yogyakarta Special Region Province. The research was carried out during the Even Semester of the 2022/2023 Academic Year which starts from April to June 2023. The research was carried out referring to the school academic calendar.

5. RESEARCH RESULTS

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Pungkuran Public Elementary School is located in Pleret Village, Pleret District, Bantul Regency, DIY. The situation that occurs is that, of all the students in class V, they have different characteristics, different initial abilities, different learning interests and learning styles. In order to accommodate these differences, differentiated learning is implemented. According to Wahyuni (2022:67), differentiated learning can be carried out using three strategies including content, process and product differentiation.

Before carrying out learning/pre-learning, I first map out the learning needs, interests and learning profiles of students and parents' profiles as well as habits at home. In mapping these learning needs I did by distributing questionnaires to students, interviews and also observations.



Figur 1 Mapping student learning styles

From the results of filling out questionnaires, interviews and observations, data was obtained that there were 8 students with a visual learning type, 8 students with an auditory learning type, and 6 students with a kinesthetic learning style. The students' interests and preferences were also varied, which I could group into 3 groups, namely students There are 10 students with an interest in drawing, 7 students with an interest in reading and writing and 5 students with an interest in singing.

In the learning process, the PjBL model learning syntax is implemented, namely asking basic questions, designing projects, preparing schedules, monitoring project activity and progress, testing results and evaluating.

In the learning process related to process differentiation, I chose the strategy of dividing students into 3 large groups based on their learning styles, namely students with a visual learning style. The learning process understands the material with content in the form of videos taken from the Pusdatin Learning Center learning resource. Students with an auditory learning style in their learning process listen to audio played from Radio Education which is another learning resource from the Pusdatin Learning House. Students with a kinesthetic learning style learn by looking for learning resources from posters made by the teacher using the Canva For Education application which are stuck on the classroom wall. During learning, I monitor the delivery of material and ask students to pay attention, write and discuss with their classmates the material being studied.



Figur 2 Differentiating content and process with instructional videos

In content differentiation, there are 3 variations of content, namely video, audio and poster content. In making projects, students are free to choose based on students' interests and preferences. There were 3 projects completed by students, namely products in the form of simple pictures/posters, concept maps and simple songs related to human digestive organs (product differentiation). Schedule for one hour project completion.

Next, the strategy used is to choose a strategy to divide students into 3 large groups based on their learning styles. Students with a visual learning style understand the learning process of the material with content in the form of videos taken from the Rumah Belajar Pusdatin learning resource. Students with an auditory learning style in their learning process listen to audio played from Radio Education which is another learning resource from the Rumah Belajar Pusdatin. Students with a kinesthetic learning style learn by looking for learning resources from posters made by the teacher using the Canva For Education application which are stuck on the classroom wall.



Figur 3 Content and process differentiation with audio

Content differentiation is what is taught to students. Content can be differentiated in response to students' readiness, interests, and learning profiles or as a combination of the three. Content differentiation is carried out by the author, namely preparing various learning resources for students which include reading books, videos, PowerPoint, pictures, and the environment.



Figur 4 Content and process differentiation with posters

Process differentiation refers to how students will understand or interpret what is being learned. Process differentiation can be done with tiered activities, providing guiding questions or challenges that need to be completed in the corners of interest, creating individual agendas for students in the form of task lists, varying the length of time students can take to complete assignments, and developing varied activities. Differentiation of the process carried out by the author is providing Student Worksheets which contain challenging activities for each different group according to their learning style by implementing the Project Based Learning (PjBL) learning model

Herwina (2022: 55) reveals product differentiation is the result of work or performance that students must show to the teacher, which can be in the form of essays, speeches, recordings, diagrams, or something that has a form. Product differentiation by the author is to give freedom to each group to present their learning results according to their interests and abilities. The challenges I faced in achieving the goals were first, how should I be able to map students' learning interests and abilities, design a Differentiated Learning Plan using the PjBL learning model, and evaluate the achievement of learning objectives. The second challenge is how should I prepare learning resources that match the interests and learning styles of students. The third challenge is how should I be able to implement differentiated learning using the Project Based Learning (PjBL) model.

The parties involved in this good practice are school principals, colleagues, and students. Before this lesson was implemented, I asked for permission and submitted a differentiated lesson plan to the principal, asking for suggestions and input from both the principal and colleagues based on the experience they had. Suggestions and input from the principal and colleagues really helped me in planning the best possible project learning. The steps used to deal with these challenges are the first the author uses a diagnostic test to map students' interests and learning profiles. Students work on cognitive and non-cognitive tests in the form of surveys via smartphones. After obtaining the data, the authors then designed a Differentiated Learning Plan with a complete PjBL Model. Second, the author prepares various learning resources for students which include reading books, videos, posters made by the teacher using Canva, Powerpoint, and pictures. Third, implementing Implementation of Differentiated Learning with (PjBL) 187 differentiated learning with the Project Based Learning (PjBL) model with its six syntaxes.

The first stage carried out in the differentiated learning process with the PjBL learning model is to prepare project questions/assignments. At this stage students are already grouped according to the type of learning style. There are 3 divisions of groups based on learning styles namely visual, auditory and kinesthetic. Students with a visual learning style understand material by watching video shows from the Ministry of Education and Culture's Learning Center. Students with an auditory learning style listen to audio learning resources from the Ministry of Education and Culture's Learning House Radio Education. Students with a kinesthetic learning style explore material by observing posters about the respiratory system that the teacher attaches to the classroom wall. At this stage the teacher gives contextual problems about the respiratory system in humans for students to analyze. At this stage the teacher provides alternative problem solving by using content and process differentiation. The content and activities carried out by students are adjusted to the level of learning readiness of students. At this stage too students explore their knowledge of the digestive organs in humans.

The second stage is designing the project plan. Students carry out project planning in each group, choose and know project procedures, besides that at this stage students also discuss the division of tasks such as preparing tools, materials and other resources needed. At this stage the teacher applies process and product differentiation. For products made by students based on student interests. Students are allowed to make different products according to their abilities and interests.

The third stage is the preparation of an activity schedule in completing the project. At this stage students in groups make an agreement to arrange a schedule and carry out work steps in making respiratory system products in humans. At this stage the teacher applies product differentiation. Students are free to choose what kind of product they will make. Students with an interest in drawing make posters, students with an interest in singing chants and students with an interest in writing create concept maps.

The fourth stage is monitoring. The activity carried out at this stage is for students to complete a project about the digestive organs in humans. At this stage the teacher applies product differentiation by monitoring completed projects in the form of different products made by students. In the syntax for monitoring project progress, the teacher goes around to check and provide guidance if there are students who have difficulty completing it. In monitoring and guiding students in one class and one time with a situation of process, content and product differentiation is to carry out thorough monitoring by going around reaching all corners of the class. Apart from that, students are asked to discuss with their friends to understand the material being studied. The strategy carried out by the teacher maximizes students who tend to understand the material more quickly and complete their projects to become peer tutors in one group.

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Testing the results is the fifth stage in PjBL learning. At this stage, students and teachers together discuss the results of the implementation of the human respiratory system product project and present the results and respond to each other's work results between groups. At this stage, the product differentiation learning carried out is where students create work products such as posters, chants, composed songs and concept maps. These products are then displayed in front of the class. The final stage in PjBL learning is experience evaluation. At this stage, students explain their experiences in making projects on the respiratory system in humans. Apart from that, students and teachers together draw conclusions about the results of the project.



Figur 5 Product differentiation



Figur 6 Product differentiation



Figur 7 Product differentiation

In these steps the teacher involves various parties, namely the principal, colleagues and students. The results of the learning that has been carried out are that students are very happy and enthusiastic in participating in learning from start to finish. Differentiated learning that is carried out is able to accommodate the learning needs of students in one class in studying the digestive organs in humans. Students get the opportunity to learn naturally and efficiently because it suits their interests and learning profile.

The Project Based Learning learning model is very effective and supports differentiated learning. At the stage of determining the project theme, students are able to develop critical thinking skills. The differentiation of content and processes carried out is able to provide meaningful, challenging and relevant learning experiences for students. The product differentiation carried out is able to develop creative thinking and collaboration skills between students. The success factor of the teacher's learning is support from various parties including the principal, colleagues, and students, and parents.

After completing the good practices of differentiated learning, the teacher shares what has been implemented with colleagues from the same school or different schools. Teachers ask colleagues and school principals to provide feedback on the good practices implemented. Fellow teachers said that differentiated learning was more varied and better understood learning needs. The results are quite effective in facilitating different learning needs. This learning activity received a positive response from various parties. The principal really appreciates and urges other teachers to implement differentiated learning. Fellow teachers were very happy because they were inspired that differentiated learning was not as complicated as imagined. Students feel happy because they experience meaningful learning according to their interests and learning styles. Parents of students also support the learning that the author is doing, this is evident from giving messages via WhatsApp which contain that they are happy with the learning that has been carried out.

Apart from the success factor, the inhibiting factor in this research is that students with a kinesthetic learning style are also interested in listening to audio and watching video shows, even if only briefly. However, this can be overcome by involving students in watching videos and also listening to audio. The lesson learned from the whole process is that learning must be studentcentered. Not all students always find the same way to learn in the same way, equally relevant, and equally interesting. A teacher must know the learning needs of each student, so that he can design learning that can support and meet all the needs of students in the class through differentiated learning. Differentiated learning is a combination of whole class, group and individual learning. Differentiated learning uses several approaches to content, processes, and products.

The results of the reflection regarding the good practices that have been implemented are that the differentiated learning implemented is effective in facilitating the different learning needs of students. The impact is that students have different learning experiences, facilitated by learning needs, learning styles and also student interests. Learning is more varied, fun and more meaningful. Learning has an impact on students because it facilitates all different student profiles.

Based on this study, it can be concluded that the Project Based Learning model is effectively used to improve student learning outcomes in elementary schools and is one of the learning models that supports differentiated learning. Learning was carried out successfully because the strategies that were designed and implemented were in accordance with the learning styles of students in class V. Learning went smoothly and well. All students completed their projects which explained the material studied, namely the digestive organs in humans. The products completed by students are varied, students are given the freedom to choose according to their individual interests. As a result, 3 types of products were made, namely products in the form of concept maps, songs/pats and also posters about digestive organs.

The lessons we can take from the good practice activities of differentiated learning are that the learning needs of different students are better facilitated and more meaningful and varied.

CONCLUSIONS AND IMPLICATIONS

Differentiated learning is learning that gives students the freedom to increase their potential according to their learning readiness, interests, and learning profile. The three strategies in differentiated learning are content differentiation, process differentiation and product differentiation. In its implementation, we can choose one strategy or use all three. As teachers we must carry out learning by paying attention to the learning needs of students, so that learning objectives can be achieved effectively and efficiently.

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