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RESEARCH ARTICLE

Differentiated Learning: A Systematic Review

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ABSTRACT

This study aims to examine scientific journals to collect relevant sources related to the differentiated approach. Differentiated learning is learning that accommodates, serves, and recognizes the diversity of students in learning according to student's readiness, interests, and learning preferences. The method used in writing this article is a literature review. The research begins by looking for articles related to the research topic to be carried out. The criteria for scientific articles used as data are in the form of scientific articles sourced from national and international journals with updates in the last 10 years, namely from 2012-2022. The results of the analysis of 11 journal articles obtained developed more types of PTK research and literature reviews than other types of research. Then the instruments used tend to measure learning outcomes, learning styles and student interests, not yet touching other domains. There are not many articles that describe the four differentiation learning.

INTRODUCTION

Education plays an important role for the development and realization of each individual. Education can be said as a tool to achieve happiness and prosperity for all mankind. Quality education will reflect a society that is advanced, peaceful and leads to constructive traits. Nowadays education is experiencing a very surprising change with the co-19 pandemic. This is of course the focus of all stakeholders, giving rise to various concepts of curriculum changes that are made to adapt to existing conditions (Faiz & Faridah, 2022).

Curriculumchanges aim at enhancing and updating the earlier curriculum, specifically by shifting curriculum 2013 to a standalone curriculum. Teachers are key players in promoting independent learning, as they help create strategies and learning approaches based on the independent curriculum (Kurikulum Merdeka). Many educators struggle with applying the independent curriculum because they lack experience with the idea of independent learning and there is insufficient reference material to create and execute independent learning. A lot of chemistry teachers are not familiar with differentiated learning (Widarti et.al, 2024). As an educator, it is crucial to deliver lessons that promote an efficient learning experience, leading to success in the teaching process. Effective learning uses suitable methods to tackle the challenges encountered (Wahyuni, R. S, et.al., 2024). Differentiated learning is a way to adjust the classroom learning experience to fit the unique learning needs of every student. This approach helps learners according to their individual learning requirements (Heacox, 2012).

The differentiation of lessons is carried out to meet the learning needs, preferences, or interests of each student. Simply put, as stated by Alhafiz (2022), differentiated learning is a collection of practical choices made by teachers that focus on the needs of students.

Differentiated learning is a change in how students' interests, ways of learning, and readiness are addressed to support improved learning outcomes. This connects with previous research indicating that applying new differentiatedlearning techniques in math can boost student participation from being initially disengaged toactive (Arifin et al., 2018; Haryanto et al., 2023).

Furthermore, another study emphasizes that using differentiated learning in professional communication training in Germany provides real advantages in three areas of conersation skills:

a. Starting conversations,

b. Improving problem-solving abilities.

c. Fostering healthy personal relationships. Differentiated learning is an important method for teaching and learning in today's world (Ayub et al., 2021).

Rahayu, S (2021) emphasizes that boosting the scientific literacy of Indonesian children is vital in today's modern era. The evidence indicates that the scientific literacy of Indonesian children, according to the PISA evaluation, is quite low compared to many other countries globally. This situation could affect the future of Indonesia. Well-informed students in science are a primary aim of science education worldwide, including Indonesia. Educators, as key contributors to education, are expected to guide students in a way that cultivates a scientifically literate society, one that possesses knowledge and comprehends scientific ideas and processes needed to make decisions, engage in discussions, and respond thoughtfully to societal and global issues. To achieve this, classroom instruction must be thoughtfully structured, ensuring that content, process, and scientific context are in harmony. For instance, incorporating socio-scientific issues into science content, clarifying the nature of science (NOS), and focusing on critical thinking skills are essential for fostering the scientific processes vital for scientific literacy (Rahayu S, 2015).

Currently all teacher in Indonesia are required to apply different types of learning based on the needs of students in independent study. Chemistry instructors should effectively use diverse learning strategies. Scientific literacy skill include inquiry abilities, critical thinking and combining explanations from different scientific fields and technologies in real world situations from different scientific fields and technologies in real world situations. Educators must instruct on the significance of self evaluation. (Hasna,I.,etal., 2017).

Therefore, actions are to enhance the standard of education, which includes boosting teacher's conceptual knowledge and examining chemistry educator's understanding (Ilmah et.al, 2020).

One of them is the emergence of a new educational paradigm curriculum. Teachers can tailor learning plans and assessments to each student's characteristics and requirements with the help of new paradigm learning. New paradigm learning ensures learning practices to be student-centered. The mapping of competency standards, the planning of the learning process, and the implementation of assessments to enhance learning so that students can attain the expected competencies comprise the learning cycle (Kemdikbud, 2021). The competencies in question are 21st century skills, namely, creativity and innovation, collaboration, critical thinking, problem-solving, and communication (Century, 2007). These skills must be mastered by students in order to prepare themselves to enter the world of work and real life (Zubaidah, 2016). On the other hand, the learning process in the classroom must also be supported by adequate infrastructure, approaches and learning models used by teachers must be able to accommodate the needs from each student. Educators play a role in facilitating the process of achieving educational goals. It is important for educators to have the ability to design learning, so they are able to design and carry out learning according to the characteristics of their students (Kemdikbud, 2021).

However, The study's findings indicate that little has changed in the way education is delivered, teachers are still implementing a learning system that considers all children to be the same regardless of the diversity of their abilities. It would appear that the instructor is instructing a single student in a single class, when in reality there are approximately 20 to 30 students with distinctive abilities and a variety of learning experiences in that class. As a result, it is not uncommon for students to feel bored and ultimately lack good learning motivation (Iskandar, 2021). Because they only come to school for exams, exams, and more exams, children frequently experience feelings of frustration and ultimately lack the motivation to study. (Andini et al., 2016). The findings of the 2018 Program for International Student Assessment (PISA) survey, which documented Indonesia's educational issues and was released in March 2019, lend credence to this assertion. Indonesia's score is low for reading, science, and math skills; it ranks 74th out of 79 countries. The OECD's survey data from 2009 to 2015 consistently place Indonesia in the bottom 10 countries. Indonesia's score in each of the three competency areas is always below average. The education curriculum, which has not been able to

meet the needs of students in terms of reasoning, is the primary reason why Indonesia consistently receives a low rating. Still, Indonesian students' reading, math, and science scores in the 2018 survey are among the lowest. In the literacy category, Indonesia is ranked 6th from the bottom (74) with an average score of 371. Down from 64th in 2015. Then in the mathematics category, Indonesia is ranked 7th from the bottom (73) with a score an average of 379. Down from rank 63 in 2015. While in the science performance category, Indonesia is ranked 9th from the bottom (71), namely with an average score of 396. Down from rank 62 in 2015. This special attention needs to be paid primarily to student motivation. There are 3 causes for the low results of the 2018 PISA including 1) the large percentage of low achieving students. The 2018 PISA results show that SMP/MTs students in villages tend to get low scores in reading and science competencies compared to students from other characteristic groups. 2) the high percentage of students repeating grades. 3) high student absence from class. The PISA survey found that students who skip school all day or during certain hours tend to get lower grades (Kemendikbud, 2019). This of course should be a focus for educators to supervise and increase student activity during the learning process so that no more students skip classes.

Surat (2019) states that learning activities are really needed by students to get maximum learning results. When students are passive, or only receive from the teacher, there is a tendency to quickly forget what has been given. It should be realized that the potential possessed by each student is very diverse. Every student is unique. Every student comes to school with the uniqueness and diversity inherent in each of them. The uniqueness and diversity inherent in each child include: learning styles (for example auditory learning styles, visual learning styles, kinesthetic learning styles), academic ability (high, medium, low), speed in understanding lessons (there are students who are fast in understanding learning, some are moderate, even slow), learning orientation (mastery, performance approach, performance avoidance) motivation (high, medium, low), self-efficacy (high, medium, low), interest (interest in certain subjects, for example mathematics , language, or science) personality (eg introverted or extroverted), including socioeconomic status/SSE (high, medium, low SSE). In one class which may consist of 20 to 40 students, the teacher will find a number of variations inherent in each student. With this fact, the teaching approach that equates every student actually needs to be reviewed. A teaching approach that generalizes for every student certainly cannot meet the needs of every student, because their needs are also diverse. Therefore we need a teaching approach that is able to meet the needs of each student. This approach can be a differentiated learning approach. A cyclical process of learning about students and responding to their learning based on differences is referred to as differentiated learning (Marlina, 2019). Herminia, (2021)states that differentiated learning is an effort to adjust the classroom learning process to meet each student's individual learning needs. The adjustments in question are related to interests, learning profiles, student readiness in order to achieve improved learning outcomes.

The description of the term differentiation is specific to each domain as is the case in education where differentiation basically means adapting teaching to meet the needs of particular students and their way of learning (VanTassel-Baska, 2012). In its most basic form, differentiation is a way of thinking about education (Tomlinson, 2001). The idea is that schools should help students reach their full potential rather than requiring them to meet predetermined standards. In addition, students should be given the opportunity to grow as quickly as possible, learning not only the necessary content but also taking responsibility for their own learning lives. The goal is to agree on each student's individual needs so that they can reach or exceed the expected standards (Taylor & Kieser, 2016). In this case the teacher in the learning process needs to be a teacher who understands learning and teaching in order to meet students' needs and the demands of their discipline, and be able to bridge between student experiences and curriculum goals (Bikić et al., 2016). This is in line with the results of Kamal's research (Aiman Faiz, Anis Pratama, 2019; (Iskandar, 2021); (Kamal, 2021); Suwartiningsih, 2021) which states that the application of differentiated learning can increase student activity and learning outcomes and is able to provide opportunities for students to be able to learn independently. Natural and efficient. Student learning activities in the learning process are an indicator of a desire to ask questions, submit opinions, do assignments and answer teacher questions. With student activity, it will lead to better learning motivation which will ultimately improve student learning outcomes (Surat, 2019). However, research related to differentiated learning is still limited, so this article was prepared with the aim of collecting various literature related to differentiated learning. The focus of the literature review is research that has been conducted by previous researchers regarding the

method/type of research used, the type of research conducted and the results. Expected in differentiation learning.

METHOD

This article was written using a systematic literature review. The first step in the research is to look for articles that are relevant to the subject of the study. The criteria for the scientific articles used as data are those from national and international journals that have been updated in the past ten years, from 2012 to 2022. In the early stages of searching for journal articles, 480 articles were obtained using the search keywords "differentiation learning", "differentiation learning motivation", and "differentiation learning science". Validating scientific articles by getting rid of them is the next step based on the title of the article that matches the idea of the topic raised. This procedure yields data from up to 25 scientific articles.. Furthermore, a review of the quality of scientific articles relevant to the research topic was carried out by reading the entire contents of scientific articles to see suitability with the research topic and obtaining a total of 11 scientific articles relevant to the research topic.

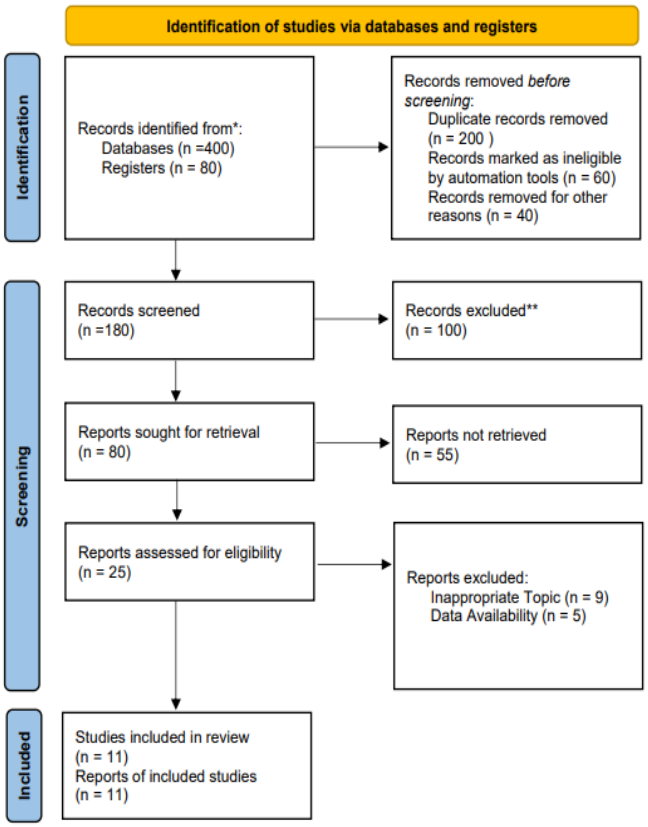

Figure 1: Prisma Flowgram

Source: processed by researchers (2023)

RESULTS AND DISCUSSION

A teacher's effort to meet students' needs and expectations is known as differentiated learning. This is in line with the belief (Tomlinson & McTighe, 2006) that the goal of differentiated learning is to tailor the classroom learning environment to each student's distinct learning requirements. However, the teacher need not instruct 32 students in 32 distinct ways in order to use differentiated learning. Students who work more quickly than others are not required to have their teachers ask them more questions. The teacher's role in determining a lesson's success is crucial for increasing students' motivation to participate in the learning process and improving classroom learning quality (Buchari, 2018). The teacher must choose innovative learning models, strategies, and methods in differentiation learning. Additionally, teachers are not required to group smart students with less intelligent students or vice versa under differentiated learning. It is also not a task that is unique to each child. Also, differentiated learning is not a chaotic learning process in which multiple lessons

must be created simultaneously by the teacher plans and move around to assist Person A, Person B, or Person C with all issues because not every student has access to their teacher's lessons in the same way. Similar to this, students struggle to accept the teacher's explanations because of the teacher's inappropriate use of learning-transfer strategies in the classroom (Alhafiz, 2022). When a teacher meets a student's learning needs, she or he differentiates instruction by adding, extending, or adjusting the amount of time taught in order to maximize learning outcomes (Marlina, 2019). The following are the differentiating factors for the learning objectives:

1. To facilitate learning for all students. So that all students can achieve their learning objectives and teachers can become more aware of students' abilities.
2. To improve student learning outcomes and motivation. So that students are able to learn at levels that correspond to the difficulty of the material taught by the teacher. Students are more motivated to learn when they are taught according to their abilities. To build a relationship that works well for teachers and students. Students' enthusiasm for learning is fueled by the strong relationships between teachers and students that differentiated learning fosters. To assist students in becoming self-sufficient learners. Students become familiar with and appreciate the variety of potentials when they are taught independently. To make teachers more satisfied. If the teacher uses differentiated learning, he or she will be challenged to improve his or her teaching abilities and become more creative.

The instructor in a class that employs differentiation learning must recognize that each student has distinct and diverse learning requirements. In order for teachers to be able to express how their students can learn, they need to take the initiative to find and plan for various approaches. In accordance with previous findings, differential learning studies reported practicing more open skills (Santos, S., D. Coutinho, W. Gonçalves, J. Sampaio, & Leite, 2018). So that students with different characteristics can be used to indicate that learning and the curriculum need to be changed. In addition, in classes that employ differentiation learning, group formation will be adaptable, with students who excel in particular areas joining other friends to collaborate. Students who excel in one area may not necessarily excel equally well in other areas. For instance, the student might be strong at understanding a text but not necessarily at writing; he might be able to write sentences or spell words correctly, or he might have problems counting, for example. Within this adaptable group, the instructor will be aware that some students may be working slowly on new assignments and will be instructed to speed up their work while others may be learning slowly. In differentiation learning, students' needs and learning experiences will always determine which groups are changed. Students can learn about the entire solution space thanks to the assumption that students' internal and external conditions are always changing in differential learning. Based on what students need and how they learn, groups will always change. Students can learn about the entire solution space thanks to the assumption that students' internal and external conditions are always changing in differential learning. Based on what students need and how they learn, groups will always be changed. Students can learn about the entire solution space thanks to the assumption that in differential learning, students' internal and external conditions are always changin (Gray, 2020).

The study titled "Who has slipped behind?" In the Korean education system, which has become more individualistic and uses differentiation learning, the educational reform toward differentiated learning opportunities and the growing educational inequality in South Korea are discussed since the early 2000s. The goal of the study is to find out how educational reforms affected students' math performance. OLS regressions indicate that, compared to their pre-reform counterparts, Grade 10 students educated in the reform system have lower overall math performance levels. After reform, performance gaps based on family SES got worse. The use of quantile regression analysis provides additional information: Family SES had a greater impact on students who scored below the median, while students who scored higher than the median had worse outcomes following the reform. The study also states that the situation regarding education reform in Korea is becoming clearer, given that the majority of existing studies in the field of sociology of education primarily address education reform in the opposite direction: shifting from a differentiated system of education to one that is more all-encompassing. A number of studies, particularly in Europe, have looked into how student learning outcomes would be affected by switching from education systems that are very different and have multiple inter-school tracking systems to systems that are all-encompassing (or at least age delays in where inter-school tracking happens). While students who scored at or above the median

showed a stronger influence of family SES (Pekkala Kerr et al., 2013) (2019 van de Werfhorst). Education reform toward a more standardized curriculum or de-tracking will affect student performance, according to studies on curriculum differentiation in schools. (Gamoran & Weinstein, 1998). In summary, very little research has looked at what might happen if educational reform moved away from standardized and uniform systems and instead toward them. As a result, studies that have focused solely on educational reforms intended to decrease rather than increase learning differentiation between and within schools should draw on the Korean case. In addition, this study reveals that there are a number of divergent viewpoints regarding differentiation learning from other studies. Differentiating Teaching and Learning is the title of another study: The Benefits and the Challenges, which talks about how teachers can learn in a way that is different.

The teacher can differentiate in numerous ways when implementing differentiation in the classroom. First, students' individual needs can be met by tailoring the content. According to the ELIS Research Digest (2018), the materials or content's level of difficulty may vary to accommodate students' varying abilities or to cover a variety of student interests or backgrounds.

Even though a teacher might be aware of the various skills and interests of the students in a class, the teacher still wants to make sure that all of the students learn the same skills or information at the end of the lesson. The materials used by various groups of students, which may be differentiated according to content or difficulty, can be an area in which educators differ. For instance, content differentiation may occur when some individuals perceive the material to be focused on soccer and others to be focused on swimming.

Second, learning can take many different forms. Learning can be recognized by various understudy learning styles. Some people might prefer to work independently and at their own pace. In groups of varying sizes, some individuals might be happier and more responsive. To ensure that students become proficient users, teachers must also practice a variety of strategies on a regular basis, like comparing new and old thing (Watts-Taffe et al., 2012). Different students can have different follow-up activities for their homework, which results in process differentiation. The instructor differentiates the learning process in this manner. Thirdly, students may select various environments. Because teachers care about each child, the most important thing is that each child's learning environment is different (Deckman, 2015). Fourth, students' methods of demonstrating their knowledge may vary. Some may be asked to write a brief match report, while others may be asked to create an entire news story. (Deckman, 2015) suggested that allowing students to select from a list of potential outcomes that they could develop and use to evaluate their own learning could encourage students to take responsibility for their own education. All of them are necessary for developing reporting skills, but their content and complexity vary. The result will be a product that reflects not only their education but also their style and personality. It is possible to persuade them to enter into a contract with the instructor regarding the product that they will produce. As a result, they become more accountable for their own education. Product differentiation makes learning more relevant to students in this way.

CONCLUSION

Learning that takes into account student needs and individual differences is called differentiated learning. The goal of differentiated learning is to tailor the classroom learning environment to each student's unique learning needs. In addition, in order to improve learning outcomes, differentiated learning involves adjusting students' interests, learning profiles, and readiness. All students' learning requirements are met in accordance with their interests or learning profiles through differentiated learning activities. The instructor in a class that employs differentiation learning must recognize that each student has distinct and diverse learning requirements. There are four (4) components of differentiated learning: content, interaction, item, and learning climate. Because the products that students will produce are based on their interests, differentiated learning can assist students in achieving the best possible learning outcomes. As a result, students must have ample opportunity to demonstrate what they have learned in the differentiated learning process. Students' products can be presented in an article, song, poem, info-graphic, poster, performance video, animation video, or another format depending on the skills and interests of each group. Additionally, differential learning is a method that is highly recommended for use in learning to facilitate the achievement of the learning objective because creativity will continue to expand. In the 21st century. As a result, students

must have ample opportunity to demonstrate what they have learned in the differentiated learning process. Students' products can be presented in an article, song, poem, infographic, poster, performance video, animation video, or another format depending on the skills and interests of each group. Additionally, differential learning is a method that is highly recommended for use in learning in order to facilitate the achievement of learning goals because creativity will continue to expand in the 21st century.

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