BIO-INOVED
Jurnal Biologi-Inovasi Pendidikan
Volume 5, Issue 3, October 2023 page. 412-418

P-ISSN : 2684-9062 | E-ISSN : 2714-9803
https://ppjp.ulm.ac.id/journal/index.php/bino
DOI: 10.20527/bino.v5i3.17614

Implementation of differentiated learning in supporting Merdeka Belajar to improve senior high school student's learning outcomes

Rezky Nefianti *, Rabiatul Adawiyah, Fujianor Maulana

Study Program of Biology Education, STKIP PGRI Banjarmasin, Banjarmasin City, South Kalimantan, Indonesia

**Corresponding Author Email:* Kikiwahab@gmail.com

Article Information

Keyword:
Differentiated learning, Independent learning, Learning outcomes, Biology, Senior high school

Kata Kunci:
Pembelajaran berdiferensiasi, Merdeka belajar, Hasil belajar, Biologi, Sekolah menengah atas

History:
Received : 06/09/2023
Accepted : 19/10/2023

Abstract

Differentiated learning has advantages, which include being able to improve student learning outcomes, optimize student needs, and increase student enthusiasm for learning. Besides that, students, when learning the concept of food digestion, appear passive and unenthusiastic, and this results in low learning outcomes. The research aim is to determine the improvement in learning outcomes of class XI students in the biology subject, the concept of food digestion. This research was the Classroom Action Research (CAR) method, which consists of planning, implementation, observation and reflection. The subjects of this class action research were XI class students at Anjir Pasar State Senior High School, a total of 28 students, consisting of 17 females and 11 males. This research was divided into two cycles. Based on this research finding, differentiated learning is able to improve the achievement of student learning outcomes. The average learning outcomes of cycle I meeting 1 with a score of 75 and meeting 2 with a score of 79.85. In cycle II, meeting 3, student learning outcomes increased with an average score of 81.25 and in meeting 4, with a score of 82.32. Differentiated learning increases enthusiasm, is able to train independence, improves learning outcomes in each cycle, and obtains positive responses from students. This research needs to be tested for its long-term impact through ongoing research, and teachers can also be given training to support the implementation of this learning method.

Abstrak

Pembelajaran berdiferensiasi memiliki keunggulan yang meliputi dapat meningkatkan hasil belajar siswa, mengoptimalkan kebutuhan siswa, dan meningkatkan antusiasme siswa dalam belajar. Disamping itu, siswa dalam pembelajaran konsep pencernaan makanan tampak pasif, tidak antusias, dan berdampak pada rendahnya hasil belajar. Tujuan penelitian ini adalah untuk mengetahui peningkatan hasil belajar siswa kelas XI pada mata pelajaran biologi konsep pencernaan makanan. Penelitian ini menggunakan metode Penelitian Tindakan Kelas (PTK) yang terdiri dari perencanaan, pelaksanaan, observasi dan refleksi. Subjek penelitian tindakan kelas ini adalah siswa kelas XI SMA Negeri Anjir Pasar yang berjumlah 28, terdiri dari 17 perempuan dan 11 laki-laki. Penelitian ini terbagi menjadi 2 siklus. Berdasarkan temuan penelitian ini, pembelajaran berdiferensiasi mampu meningkatkan pencapaian hasil belajar siswa. Rata-rata hasil belajar siklus I pertemuan 1 dengan skor 75 dan pertemuan 2 dengan skor 79,85. Pada siklus II pertemuan 3 hasil belajar siswa meningkat dengan skor rata-rata 81,25 dan pertemuan 4 dengan skor 82,32. Pembelajaran berdiferensiasi meningkatkan antusiasme, mampu melatih kemandirian, meningkatkan hasil belajar pada setiap siklus, dan memperoleh respon positif dari siswa. Penelitian ini perlu diuji dampak jangka panjangnya melalui penelitian berkelanjutan dan guru juga dapat diberikan pelatihan untuk mendukung implementasi metode pembelajaran ini.

A. Introduction

Student-centred education emphasizes the process aspect of how students learn and the effects of the learning process on the development of the students themselves, especially in science biology learning (Syarifuddin & Nurmi, 2022; Mulyawati et al., 2022). Science/Biology learning involves student activeness, both physical activity and mental activity, and focuses on students, which is based on daily experiences. Science of Natural Education (IPA) emphasizes direct experience to find out and do so as to be able to explore and understand nature in the surrounding environment scientifically (Suwartiningsih, 2021; Salar & Turgut, 2021). During learning, students will have a meaningful learning experience so that at this stage, students are able to develop the values of science/biology learning. Student-centred learning is very effective when applied in students' learning environments (Sutarto & Syarifuddin, 2013). Biology learning is learning that emphasizes the provision of direct experience. Therefore, students need to be helped to develop a number of process skills so that they are able to explore and understand the natural environment around them (Putri & Prafitasari, 2023).

Based on information from interviews with the Teacher of Biology subjects in class XI, SMAN Anjir Pasar, there are still many students who pay less attention and are passive during the learning process, which has an impact on student learning outcomes that is still below KKM 75. On the concept of food digestion, the classical learning completion was only 70% of the 80% classical completion indicator. Many teachers are not used to imagining how to implement a differentiated learning approach (Saraswati et al., 2022). Because they have been accustomed to and have long carried out a one-way learning process and centred only on the teacher (teacher-centred). Guru Penggerak is one of the government programs, in this case, the Ministry of Education and Culture, in an effort to improve teacher competence as a learning leader who is able to implement independent learning and mobilize the entire learning ecosystem to achieve learner-centred education (Kamal, 2021).

Differentiated learning is learning that accommodates students' learning needs. Teachers facilitate students according to their needs because each student has different characteristics, so they cannot be given the same treatment (Halimah, 2023; Amalia et al., 2023; Lanos et al., 2023). In implementing differentiated learning, teachers need to think about reasonable actions that will be taken because differentiated learning does not mean learning by providing different treatment or activities for each student, nor learning that distinguishes between smart and less smart students.

Differentiated learning can improve the students' learning outcomes (Mukhibat, 2023). Based on their research, the classroom that used differentiated learning had more n-gain scores than the other classes that didn't use the same method (Dalila et al., 2022). Differentiated learning has a positive impact that can influence the student's learning outcomes, and they also highly recommended this learning method to other teachers to use it in their classrooms to enhance the student's learning outcomes. Differentiated learning also can enhance the students' conceptual understanding (Nur'aini et al., 2023).

Other studies have found an increase in learning through differentiated learning. The research results of Solehudin & Rochmiyati (2023) and Utami et al. (2023) show that differentiated learning through a problem-based learning model can improve learning outcomes. Research results from Smets et al. (2022) show that differentiated learning is able to facilitate students' needs. The research results of Handiyani & Muhtar (2022) and Meinur et al. (2023) show that differentiated learning can increase student enthusiasm.

Differentiated learning had a big impact on the student's conceptual understanding compared to the other students who didn't use it, and it can be seen from the gained scores that they had. Several studies mentioned above show that there are three advantages of implementing differentiated learning, namely improving learning outcomes, facilitating student needs, and being able to increase student enthusiasm. These advantages are tried to be applied to biology learning, and the concept of food digestion is supported in implementing the Independent Learning Curriculum in the 2022/2023 academic year.

This research aimed to identify the improvement of learning outcomes of Class XI students in the subject of Biology on the subject of Food Digestion in the 2022/2023 academic year and also to know students' responses to the application of differentiated learning in biology subjects on the subject of food digestion. The implementation of differentiated learning will have an impact on schools, classes, and especially on learners. Each learner has different characteristics. Not all learners can be treated the same. If we do not provide services according to the needs of learners, then it can hinder learners' ability to progress and develop their learning.

The expected impacts of classes that implement differentiated learning include everyone feeling welcome, students with various characteristics feeling valued and safe, student development, teachers teaching to achieve success, justice in real action, teachers and students collaborating, and students' learning needs being facilitated and served well. From these impacts, it is hoped that optimal learning outcomes will be achieved.

B. Method

The research was conducted using the CAR method, which consists of 4 stages: planning, implementation, observation and reflection. The subjects of this class action research were XI class students at Anjir Pasar State Senior High School (SMA) in the odd semester of the 2022/2023 academic year as a total of 28 students, consisting of 17 female students and 11 male students. The research time is planned to last about four months, from proposal preparation and data collection in the field to reporting. The place of this class action research was carried out at Anjir Pasar State Senior High School (SMA) in the odd semester of the 2022/2023 academic year.

The initial steps in the preparation of CAR are four stages, consisting of planning, implementation, observation (observation), and reflection (see Figure 1). The research was carried out in two cycles where each cycle was carried out twice a meeting so that there were four meetings, but if the research success criteria had not been achieved, then the next meeting would be held.

The initial steps in the preparation of CAR are four stages consisting of planning, implementation, observation (observation), and reflection. The research was carried out in two cycles, where each cycle was carried out twice so that there were four meetings, but if the research success criteria had not been achieved, then the next meeting would be held.

Based on the four steps in CAR, the first step is to plan carefully and thoroughly. In CAR planning, there are three basic activities which are problem identification, problem formulation, and problem-solving. In each activity, some sub-activities should be carried out to support the perfection of the planning stage.

Mapping students' learning needs based on three aspects, which are learning readiness, learning interest, and students' learning profile (can be done through interviews, observations, or surveys using questionnaires, etc). Planning differentiated learning based on mapping results (providing a variety of options both from strategies, materials, and ways of knowledge). Designing differentiated learning tools for the concept of Food Digestion in Humans for Class XI students.

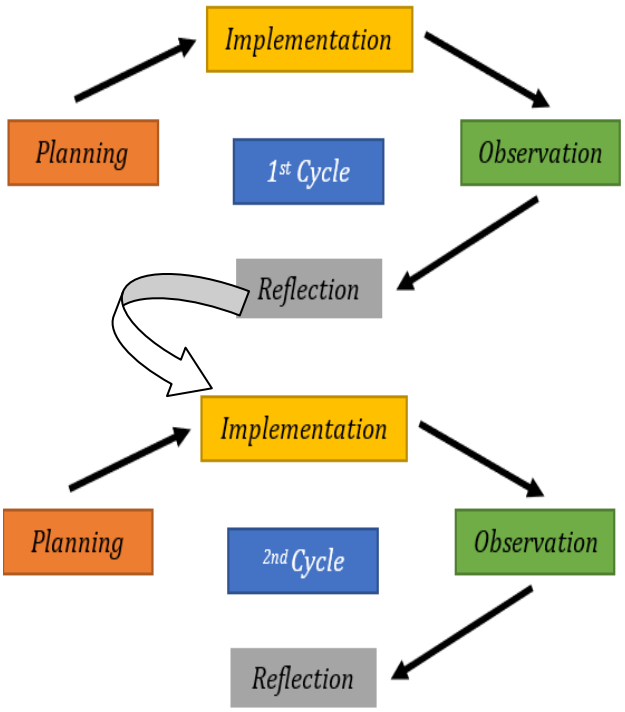

Figure 1
The flow of implementation of the Kemmis and Taggart Model of Classroom Action Research (Trianto,2011)

Implementation is implementing what has been planned in stage one, i.e. acting in the classroom. A tool to record how far the effect of the action has reached the target. In this step, the research must describe the type of data collected, how it is collected, and the data collection tools or instruments (tests, questionnaires, etc.)

Activities to review what has been done. In this case, the research seems to reflect its experience in a mirror so that its vision is clear, both weaknesses and shortcomings (Suyadi, 2015). Arikunto (2009) suggests that at this stage, it is very important to do when the implementing teacher has finished taking action, then hopes with the researcher to discuss the implementation of the action plan, record the results of observations and implementation of learning, evaluate the results of observations, and analyze the results of learning, improve the weaknesses of cycle I in cycle II. The results of reflection in the form of reflection on the planning that has been implemented will be used to improve the learning process in cycle II and so on.

This research used three steps to collect data. The first one is collecting the students' learning outcome test. A learning outcome test is "a test that measures a person's achievement in a field as a result of a typical learning process, which is done intentionally in the form of knowledge, understanding, skills, attitudes and values". Researchers use this learning outcome test to measure the learning outcomes of Biology class XI students with minimum completion criteria (KKM) in Biology subjects, which is 75. The test given is a post-test.

The second one is collecting data about students' responses using the questionnaire. The response used in this research is to find out the feelings of students towards the learning process directly in order to complement quantitative data through notes on the emotions or responses of students on the questionnaire sheet.

The last one is collecting the data through documentation. Documentation is "a method used to obtain data from written sources or documents, both in the form of books, magazines, regulations, meeting minutes, diaries and so on". Based on this opinion, it is clear that what is meant by documentation is a method of data collection used in research by recording several problems that the teacher has documented.

The data analysis method used in this research is through qualitative and quantitative data. The quantitative analysis was used to find out the learning outcomes and the student's responses. Meanwhile, qualitative analysis was used to find out the percentage of students' learning activities. The formulas used to analyze the students' learning outcomes are Formula 1 and Formula 2. Then, to analyze the students' responses, which can be seen from the percentage of answers that they are given, using Formula 3. To interprete the data about the students's responses, the researchers used the criteria as in the Table 1 based on Arikunto (2010).

$$IC = \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\% \quad \text{.....Formula 1}$$

$$CC = \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\% \quad \text{.....Formula 2}$$

$$P = \frac{\text{Total score obtained}}{\text{Maximum score}} \times 100\% \quad \text{.....Formula 3}$$

Description:
IC = Individual Completion: If students achieve completions ≥ 75.
CC = Classical Completion: If ≥ 80 % of all students achieved completion ≥ 75.
P = Percentage

Table 1 Percentage Interpretation of Response Questionnaire

Value	Percentage (%)	Criteria
5	81 – 100	Very Good
4	61 – 80	Good
3	41 – 60	Enough
2	21 – 40	Poor
1	< 20	Very Poor

C. Result & Discussion

Based on the results of research in class XI at SMAN Anjir Pasar during two learning cycles and four meetings, data was obtained regarding the objectives to be achieved from implementing differentiated learning. The results of the analysis of learning media needs are shown in Table 2. Based on this data, it is known that the types of media that are most desired from the highest are visual, kinesthetic and auditory media.

Data on the Learning Outcomes of Cycle I students meeting 1 is presented in Table 3. Data on students who took the test amounted to 28, the number of students who completed 20 people (71%) and students who did not complete eight people (29%). The exposure of the scores obtained by students shows that the highest score obtained by students is 100, and the lowest score is 45, while the average score achieved is 75.

The data for meeting 2 of cycle 1 shows that students who are complete in learning are 28 people or 100%. In contrast, students who are not complete in achieving learning outcomes are none or 0%, with an average value of success in achieving learning outcomes of 79.82 (see Table 3).

Data on students' mastery of the subject matter after the differentiated learning process is carried out (post-test), there is one learner who obtained the maximum score of 100 as the highest score, while the lowest was 75, furthermore, for data on students' mastery of learning materials in the third and fourth meetings as described in the next section.

Data on students' mastery of the material discussed in learning in Cycle 2 Meeting 3 was obtained data as in Table 3. All students reach the level of completion of learning outcomes with an average score of 81.25, where the highest score is 100, The lowest score is 75, while the data on learning outcomes on mastery of the learning material discussed before and after the learning process as presented in Table 3 is the result of the learning process carried out for cycle 2 meeting 4. It can be seen that all students are individually complete and also meet classical completion with an average score of 82.32.

Table 2 Learning Needs Mapping Data based on Learners' Learning Profile

Interest	Visual	Auditory	Kinesthetic
Student Total	12	7	9
Product	Students are allowed to choose how to demonstrate their understanding of the human digestive system. It can be in the form of pictures, recorded interviews, or performances		
Process	When explaining the teacher used a lot of pictures and more visual aids	The teacher also prepared to give more chances for the students to access learning sources that can be heard orally	The teacher created a few learning corners that can be hung in a different place to give a chance to students to access the information

Table 3 Students' Mastery Level of Learning Material Before and After the Learning Process

Assessment	Percentage (%)							
	Meeting 1		Meeting 2		Meeting 3		Meeting 4	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Average score	56,64	75,00	62,25	79,82	65,55	81,25	66,07	82,32
Classical completion	21,40	71,42	21,40	100,00	50,00	100,00	42,85	100,00

Table 4 Questionaire Result on Students' Response to the Implementation of Differentiated Learning

No	Student Response	Percentage (%)	
		Yes	No
1	Express your opinion if differentiated learning is applied in classroom learning?	100	0
2	Do you prefer science/biology learning to use differentiated learning?	100	0
3	Is it the application of differentiated learning useful for you in studying science/biology?	100	0
4	Is it science/biology learning with differentiated learning interesting to you?	100	0
5	With differentiated learning helps me to understand the material more easily?	100	0
6	Are you motivated to study science/biology using differentiated learning?	100	0
7	Do you think that with differentiated learning teachers divide students into groups according to their level of intelligence?	100	0
8	With differentiated learning, can you apply knowledge about the digestive system in everyday life?	100	0
9	Do you use time more efficiently with differentiated learning?	100	0
10	Are there any difficulties in understanding the Science/Biology learning if using differentiated learning?	0	100

Based on Table 4, it can be said that it is positive towards differentiated learning because the percentage of student answers in each aspect of the question is > 65%. Thus, differentiated learning can be categorized as helping students to understand the digestive system material. With differentiated learning, students can be more eager to learn science/biology. However, even though differentiated learning is learning that divides students according to their learning style, which helps students be more enthusiastic in learning science/biology, students do not think that teachers distinguish them according to their intelligence in every lesson. The role of the teacher is very important in the learning process. Besides being able to provide direction and guide students, teachers can also help students to solve problems or problems that students find difficult to solve.

As research results from Solehudin & Rochmiyati (2023); Utami et al. (2023), the results of this research also show that differentiated learning is able to improve student learning outcomes, which are characterized by increasing classical learning completeness. Apart from that, it is in line with the research results of Handiyani & Muhtar (2022); Meinur et al. (2023), which also received a positive response from students. Students become interested and easily understand the concepts they learn. Finally, in line with the research results of Smets et al. (2022); Mukhibat (2023), this research also facilitates students' learning needs. These three characteristics are the advantages of differentiated learning so that the

results obtained from learning activities are in line with expectations, namely answering student learning problems, which include lack of attention, passivity, and low learning outcomes.

Based on the results of this research, it is concluded that all students benefit from differentiated learning. However, greater mastery of concepts, media and energy is needed to be able to implement this differentiated learning well. Therefore, according to Ria & Kurniati (2023), providing training to teachers will help eliminate confusion about differentiated learning and provide a clearer understanding of this method.

In the future, differentiated learning can help teachers design new, more effective learning plans, which include different teaching strategies (Fitra, 2022; Elviya & Sukartiningsih, 2023; Mahfudz, 2023). This approach allows classes to focus on the needs and differences of each student, such as their readiness, interests and learning styles (Purnawanto, 2023). Through proper training, teachers will have additional tools to increase the success of their students (Ria & Kurniati, 2023).

As a recommendation for future research, it would be useful to understand how teachers and students view the implementation of differentiated learning on an ongoing basis. Although there is already a lot of literature about teacher and student perceptions, it is also important to look at the long-term impact of implementing this method in the future.

D. Conclusion

Differentiated learning is able to improve the achievement of student learning outcomes. The average learning outcomes of cycle I meeting 1 with a score of 75 and meeting 2 with a score of 79.85. In cycle II, meeting 3, student learning outcomes increased with an average score of 81.25 and meeting 4 with a score of 82.32. Differentiated learning is very fun and can train independence and not depend on others. Differentiated learning makes students always improve their learning outcomes at each meeting or each cycle, and student responses to the learning process using differentiated learning are very positive. Further research is needed to reveal the effectiveness of differentiated learning for learners with physical and non-physical learning disabilities on a wider scope.

E. References

Amalia, K., Rasyad, I., & Gunawan, A. (2023). Pembelajaran berdiferensiasi sebagai inovasi pembelajaran. *Journal of Education And Teaching Learning (JETL), 5*(2), 185-193. DOI: https://doi.org/10.51178/jetl.v5i2.1351

Arikunto, S. (2009). *Penelitian tindakan kelas*. Jakarta: Bumi Aksara.

Arikunto, S. (2010). *Penelitian tindakan untuk guru, kepala sekolah & pengawas.* Yogyakarta: Aditya Media.

Dalila, A.A., Rahmah, S., Liliawati, W., & Kaniawati, I. (2022). The effect of differentiated learning in problem based learning on cognitive learning outcomes of high school students. *Jurnal Penelitian Pendidikan IPA (JPPIPA), 8*(4), 1820-1826 DOI: https://doi.org/10.29303/jppipa.v8i4.1839

Elviya, D. D., & Sukartiningsih, W. (2023). Penerapan pembelajaran berdiferensiasi dalam kurikulum merdeka pada pembelajaran Bahasa Indonesia kelas IV sekolah dasar di SDN Lakarsantri I/472 Surabaya. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar, 11*(8), 1780-1793. Retrieved from https://ejournal.unesa.ac.id/index.php/jurnal-penelitian-pgsd/article/view/54127

Fitra, D. K. (2022). Pembelajaran berdiferensiasi dalam perspektif progresivisme pada mata pelajaran IPA. *Jurnal Filsafat Indonesia, 5*(3), 250-258. DOI: https://doi.org/10.23887/jfi.v5i3.41249

Halimah, N. (2023). Analisis pembelajaran berdiferensiasi sebagai bentuk implementasi kebijakan kurikulum merdeka. *Pendas: Jurnal Ilmiah Pendidikan Dasar, 8*(1), 5019-5019. DOI: https://doi.org/10.23969/jp.v8i1.7552

Handiyani, M., & Muhtar, T. (2022). Mengembangkan motivasi belajar siswa melalui strategi pembelajaran berdiferensiasi: sebuah kajian pembelajaran dalam perspektif pedagogik-filosofis*. Jurnal Basicedu, 6*(4), 5817-5826. DOI: https://doi.org/10.31004/basicedu.v6i4.3116

Kamal, S. (2021). Implementasi pembelajaran berdeferensiasi dalam upaya meningkatkan aktivitas dan hasil belajar matematika siswa kelas XI MIPA SMA Negeri 8 Barabai. *Jurnal Pembelajaran dan Pendidik (JULAK*), *1*(1), 89-100. Retrieved from https://www.julak.online/index.php/Jurnal/article/view/46

Lanos, M. E. C., Lestari, H., Mahendra, A., Sari, P. S., Putri, S. A. R., Handayani, W., & Manullang, J. G. (2023). Pelatihan pembuatan modul ajar pembelajaran berdiferensiasi pada guru SMAN 1 SS III dan SMA YP Yaqli Oku Timur. *Wahana Dedikasi: Jurnal PkM Ilmu Kependidikan, 6*(1), 228-232. Retrieved from https://jurnal.univpgri-palembang.ac.id/index.php/dedikasi/article/view/11597/

Mahfudz, M. S. (2023). Pembelajaran berdiferesiasi dan penerapannya. *SENTRI: Jurnal Riset Ilmiah, 2*(2), 533-543. DOI: https://doi.org/10.55681/sentri.v2i2.534

Meinur, M. M., Yunita, N., & Gunawan, H. (2023, October). Implementation of differentiate learning in efforts to improve activities and mathematics learning outcomes of class VII A students of SMPN 2 Taman. In *Proceeding International Conference on Lesson Study* (Vol. 1, No. 1, pp. 10-18). Retrieved from http://journal.umg.ac.id/index.php/icls/article/view/6497

Mukhibat, M. (2023). Differentiate learning management to optimize student needs and learning outcomes in an independent curriculum. *QALAMUNA: Jurnal Pendidikan, Sosial, dan Agama, 15*(1), 73-82. DOI: https://doi.org/10.37680/qalamuna.v15i1.2386

Mulyawati, Y., Zulela, M. S., & Edwita, E. (2022). Differentiation learning to improve students potential in elementary school. *Pedagonal: Jurnal Ilmiah Pendidikan*, *6*(1), 68-78. DOI: https://doi.org/10.55215/pedagonal.v6i1.4485

Nur'aini, D.A., Liliawati, W., & Novia, H. (2023). The effect of differentiated approach in inquiry-based learning on senior high school students' conceptual understanding of work and energy topic. *Jurnal Penelitian Pendidikan IPA (JPPIPA), 9*(1), 117-125. DOI: https://doi.org/10.29303/jppipa.v9i1.2374

Purnawanto, A. T. (2023). Pembelajaran berdiferensiasi. *Jurnal Pedagogy, 16*(1), 34-54. Retrieved from http://www.jurnal.staimuhblora.ac.id/index.php/pedagogy/article/view/152

Putri, S. A., & Prafitasari, A. N. (2023). Analisis implementasi konsep pembelajaran diferensiasi dalam mata pelajaran biologi pada era digital 4.0 di kelas X. *ScienceEdu: Jurnal Pendidikan IPA, 4*(1), 16-22. DOI: https://doi.org/10.19184/se.v6i1.39701

Ria, T. N., & Kurniati, L. (2023). Pelatihan pembelajaran berdiferensiasi bagi guru-guru SMPN 4 Demak. *Jurnal Awam, 3*(1), 13-18. Retrieved from http://www.ejurnal.universitaskarimun.ac.id/index.php/awam/article/view/963

Salar, R., & Turgut, U. (2021). Effect of differentiated instruction and 5e learning cycle on academic achievement and self-efficacy of students in physics lesson. *Science Education International, 32*(1), 4-13. DOI: https://doi.org/10.33828/sei.v32.i1.1

Saraswati et al. (2022). Analisis kegiatan P5 di SMA Negeri 4 Kota Tangerang sebagai penerapan pembelajaran terdiferensiasi pada kurikulum merdeka. *Jurnal Pendidikan MIPA, 12*(2), 185-191. DOI: https://doi.org/10.37630/jpm.v12i2.578

Smets, W., De Neve, D., & Struyven, K. (2022). Responding to students' learning needs: how secondary education teachers learn to implement differentiated instruction. *Educational Action Research, 30*(2), 243-260. DOI: https://doi.org/10.1080/09650792.2020.1848604

Solehudin, S., & Rochmiyati, S. (2023). Differentiated learning through the PBL model to improve Indonesian language learning outcomes for elementary school students. *Jurnal Bidang Pendidikan Dasar, 7*(2), 99-105. DOI: https://doi.org/10.21067/jbpd.v7i2.8637

Sutarto, S., & Syarifuddin, S. (2013). *Desain pembelajaran matematika*. Yogyakarta: Samudra Biru.

Suwartiningsih, S. (2021). Penerapan pembelajaran berdiferensiasi untuk meningkatkan hasil belajar siswa pada mata pelajaran IPA pokok bahasan tanah dan keberlangsungan kehidupan di Kelas IXb semester genap SMPN 4 Monta tahun pelajaran 2020/2021. *Jurnal Pendidikan Dan Pembelajaran Indonesia (JPPI), 1*(2), 80-94. DOI: https://doi.org/10.53299/jppi.v1i2.39

Suyadi, S. (2015). *Desain kurikulum perguruan tinggi mengacu kerangka kualifikasi nasional Indonesia.* Yogyakarta: Samudra Biru.

Syarifuddin, S., & Nurmi, N. (2022). Pembelajaran berdiferensiasi dalam meningkatkan hasil belajar matematika siswa kelas IX semester genap SMP Negeri 1 Wera tahun pelajaran 2021/2022. *JagoMIPA: Jurnal Pendidikan Matematika dan IPA, 2*(2), 93-102. DOI: https://doi.org/10.53299/jagomipa.v2i2.184

Trianto, T. (2011). *Model pembelajaran terpadu konsep, strategi dan implementasinya dalam kurikulum tingkat satuan pendidikan (KTSP*), Jakarta: Bumi Aksara.

Utami, A. A., Prastiningsih, D., & Toyyibah, T. (2023). Profile of student learning outcomes on learning differentiated on virus concepts. *Biodidaktika: Jurnal Biologi dan Pembelajarannya, 18*(2), 65-71. DOI: http://dx.doi.org/10.30870/biodidaktika.v18i2.19721