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DEVELOPMENT OF CHEMISTRY TEACHING MODULE BASED ON DIFFERENTIATION LEARNING TO IMPROVE STUDENT LEARNING OUTCOMES ON ATOMIC STRUCTURE MATERIAL

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DOI: 10.20414/spin.v6i2.11280

History Article
Accepted:
September 13, 2024
reviewed:
December 05, 2024
Published:
December 20, 2024

Keywords:
ADDIE; Atomic Structure; Chemical Teaching Module; Differentiation; Learning Media Development.

ABSTRACT
Atomic structure material is relatively complex and abstract material so it requires in-depth understanding and good visualization so that it is easy for students to understand. Differences in students' initial understanding and learning styles are the trigger for low student learning outcomes in atomic structure material. The solution is to apply differentiated learning. This research aims to develop a chemistry teaching module based on differentiated learning that can improve student learning outcomes in atomic structure material, especially in electron configuration material and the periodic system of elements. This development research uses the ADDIE model. The results of the research show that the chemistry teaching module based on differentiated learning in atomic structure material obtained a very feasible category in the material field with a percentage of 89.76% and obtained a very feasible category in the media field with a percentage of 88.59%. The chemistry teaching module based on differentiated learning is effective in improving student learning outcomes as shown by the acquisition of the Wilcoxon test, namely the Asymp.Sig value. (2-tailed) is 0.000. The results of students' responses to the chemistry teaching module based on differentiated learning on atomic structure material obtained an average percentage of 82.38% in the very good category, so that the chemistry teaching module based on differentiated learning on atomic structure material is suitable for use as a learning medium that can help participants. students to improve their learning outcomes.

ABSTRAK
Materi struktur atom merupakan materi yang tergolong kompleks dan abstrak sehingga membutuhkan pemahaman yang mendalam dan visualisasi yang baik agar mudah dipahami oleh siswa. Perbedaan pemahaman awal dan gaya belajar siswa menjadi pemicu rendahnya hasil belajar siswa pada materi struktur atom, solusinya adalah menerapkan pembelajaran berdiferensiasi. Tujuan penelitian ini adalah mengembangkan modul ajar kimia berbasis pembelajaran berdiferensiasi yang dapat meningkatkan hasil belajar siswa pada materi struktur atom khususnya pada materi konfigurasi elektron dan sistem periodic unsur. Penelitian pengembangan ini menggunakan model ADDIE. Hasil penelitian menunjukan bahwa modul ajar kimia berbasis pembelajaran berdiferensiasi pada materi struktur atom memperoleh kategori sangat layak pada bidang materi dengan persentase 89,76% dan memperoleh kategori sangat layak pada bidang media dengan persentase 88,59%. Modul ajar kimia berbasis pembelajaran berdiferensiasi efektif meningkatkan hasil belajar peserta didik yang ditunjukan dengan perolehan uji Wilcoxon, yaitu nilai Asymp.Sig. (2-tailed) adalah 0,000. Hasil respon peserta didik terhadap modul ajar kimia berbasis pembelajan berdiferensiasi pada materi struktur atom memperoleh rata-rata persentase sebesar 82,38% dengan kategori sangat baik, sehingga modul ajar kimia berbasis pembelajaran berdiferensiasi pada materi struktur atom layak digunakan sebagai media pembelajaran yang dapat membantu peserta didik untuk meningkatkan hasil belajarnya.

How to Cite
Hartati, A., Wijayanti, I. E., & Solfarina. (2024). Development of Chemistry Teaching Module Based on Differentiation Learning to Improve Student Learning Outcomes on Atomic Structure Material. *SPIN-Jurnal Kimia & Pendidikan Kimia*. 6(2). 214-225.

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p-ISSN: 2580-2623
e-ISSN: 2745-685

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INTRODUCTION

Education is a means to produce an intelligent generation with good character. Ki Hajar Dewantara stated that education can develop children's potential and talents fully so that they can live in society and as individuals safely and prosperously (Efendi et al., 2023). The quality of education can be improved by creating an ideal curriculum. The curriculum is a guideline that contains objectives, content, and learning materials used as a guide in the learning process for an educational goal (Ayudia et al., 2023). The curriculum in Indonesia has undergone many changes. Since 1947, Indonesia has changed the curriculum eleven times, starting from the simple curriculum to the 2013 curriculum. These changes are intended to improve the quality of education and improve the previous curriculum (Asrifan et al., 2023). The latest curriculum in Indonesia is known as the Merdeka curriculum which applies nationally starting from the 2024-2025 academic year.

The change from the 2013 curriculum to the Merdeka curriculum is explained in Permendikbud Number 033/H/KR/2022. The Merdeka curriculum has a variety of intra-curricular learning designs, optimizing learning content so that students can better master concepts and strengthen competencies. The implementation of the Merdeka curriculum covers all school levels and has several phases. There are two phases at the high school level, namely phase E which is intended for class X, and phase F for classes XI and XII (Sa'diyah & Lutfi, 2023). The Merdeka curriculum is a manifestation of the development of technology and science in the field of education (Ayudia et al., 2023). Project-based learning, concentrated on important material, and flexible for teachers to modify their own learning are the main characteristics of the Merdeka curriculum (Shofia Hattarina et al., 2022) The change from the 2013 curriculum to the Merdeka curriculum includes the use of the term teaching module (Sa'diyah & Lutfi, 2023). A teaching module is a learning tool equipped with learning media and assessment tools (Ayudia et al., 2023). Learning objectives, learning procedures, initial and final assessments, and learning media are the minimum components of a teaching module.

Educational modules that are suitable for the current Merdeka curriculum are still limited, so they have not been able to meet learning needs. The implementation of the Merdeka Curriculum, which is still too early, requires a long time to be able to adjust to the changes that occur during the transition period, and until now teachers still do not fully understand how to compile teaching modules.

Chemistry is a science that understands matter and its changes. Various life phenomena can be explained logically in chemistry. Chemistry learning has a fairly complex scope of material so it can trigger learning difficulties for students (Purwandani et al., 2019). The material of atomic structure, electron configuration, and the periodic system of elements are the basic conceptual foundations of studying chemistry. The material on atomic structure is part of the learning achievements in phase E of class X SMA/MA. The material on atomic structure is the basis of chemistry which is classified as complex and abstract. Concepts such as protons, neutrons, electrons, orbitals, and electron configurations require a deep understanding and good visualization to be easily understood by students. The material on atomic structure contains abstract concepts and in general, students tend to know how the atomic structure is through explanations from teachers (Sa'diyah & Lutfi, 2023). So creating interesting and up-to-date alternative teaching materials is a step that can be taken to increase students' enthusiasm for learning (Wijayanti et al., 2024).

The Merdeka Curriculum recommends problem-based and project-based learning that involves students in problem solving. Problem-solving activities require attention to students' prior knowledge. Prior knowledge is a bridge to being able to learn new knowledge (Setyono et al., 2016). Every student always has a different prior understanding, therefore it needs to be addressed in a different way (Madani et al., 2023). Conditions like this give meaning to differentiated learning. Differentiated learning means adjusting the learning process to the abilities, needs, and things that each student likes. This makes the learning process more effective and does not frustrate students (Tomlinson, 2011). Differentiation does not only include learning strategies; it also includes creative approaches to teaching and learning. The Merdeka curriculum uses a differentiated learning approach as one of the best learning approaches (Hapsari et al., 2018).

The implementation of differentiated learning can be supported by modules. In the process of creating a module, there are two minimum requirements that must be considered, namely following the module preparation standards and complying with the principles of learning and assessment. Teaching modules must be sustainable, relevant, contextual, interesting, meaningful, and challenging (Arsyad et al., 2023). Teaching modules must also be adjusted to the talents, interests, and potential of each student to meet their unique needs. Teaching modules are very effective in improving student learning outcomes (Sa'diyah & Lutfi, 2023). Previous research on the creation of differentiated mathematics teaching modules based on understanding by design (UbD) found that the module was suitable for use in the learning process because it was proven to be valid and practical. In addition, the effectiveness test on learning outcomes obtained a completeness value of 97% in the very practical category (Putra et al., 2023). Other research on the creation of differentiated modules for science learning found that the differentiated approach was very suitable for application in learning (Variacion et al., 2021). In addition, other research on the development of differentiated learning modules based on statistical materials has succeeded in improving student learning outcomes (Nogo Tolok et al., 2023). The application of differentiated learning to reaction rate material can improve student learning outcomes by 14.34% (Ashilah, et al, 2016). Based on the description above, it is considered important to develop a chemistry teaching module based on differentiated learning to improve student learning outcomes in atomic structure material.

METHOD

The research and development (R&D) method is used together with the ADDIE (Analysis, Design, Development, Implementation, and Evaluate) development model. The analysis stage is carried out by analyzing the problem through literature review, analyzing student needs, analyzing the curriculum, and interviewing teachers and students. The results of this stage are the high needs of teachers and students related to chemistry teaching modules based on differentiated learning.

The Design stage is carried out by designing the layout of the teaching module components including the cover, general information, core components, and attachment components using the Canva application. The Development stage is carried out by printing the chemistry teaching module and validating it against material and media experts. The implementation stage is carried out by implementing the chemistry teaching module into the learning process to determine its effectiveness. The Evaluation stage is carried out by perfecting the chemistry teaching module. The research instruments used are interview sheets, validation sheets, student response questionnaires and pretest-posttest questions. This study uses two data analysis techniques, namely qualitative descriptive analysis for data obtained from interviews and observations and quantitative data analysis for data obtained from validation results, student response questionnaires and student understanding tests through pretest-posttest.

RESULT AND DISCUSSION

Result

The result of this study is a chemistry teaching module based on differentiated learning developed using the problem based learning (PBL) model. The development steps starting from the needs analysis show that the needs of teachers and students for chemistry teaching modules based on differentiated learning are quite high. The design stage produces a product in the form of a layout and design of the teaching module which includes a cover, general information, core components, and attachment components. The following is a display of the chemistry teaching module cover.

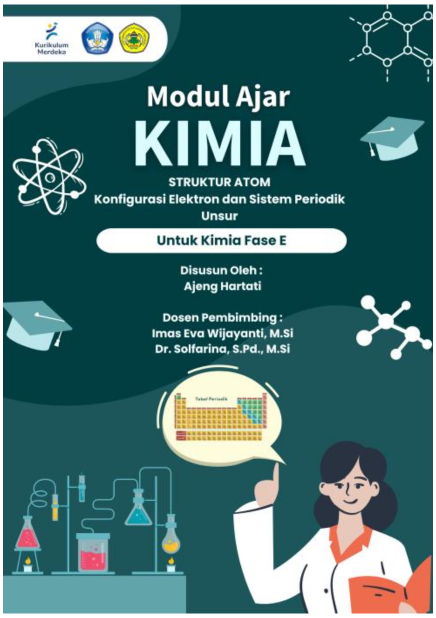
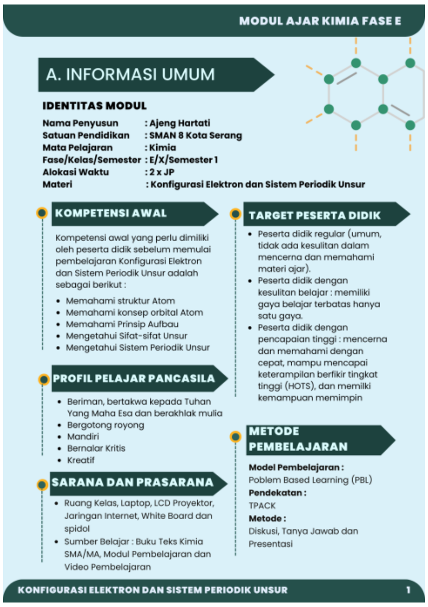


Figure 1. Module cover view

On the cover of the module, there is information in the form of the module title and the name of the compiler. The illustrations displayed on the module cover are made as attractive as possible to attract the attention of students. The appearance of the first page of the module is as follows.



MODUL AJAR KIMIA FASE E

A. INFORMASI UMUM

IDENTITAS MODUL

Nama Penyusun : Ajeng Hartati
Satuan Pendidikan : SMAN 8 Kota Serang
Mata Pelajaran : Kimia
Fase/Kelas/Semester : E/X/Semester 1
Alokasi Waktu : 2 x JP
Materi : Konfigurasi Elektron dan Sistem Periodik Unsur

KOMPETENSI AWAL

Kompetensi awal yang perlu dimiliki oleh peserta didik sebelum memulai pembelajaran Konfigurasi Elektron dan Sistem Periodik Unsur adalah sebagai berikut :

- Memahami struktur Atom
- Memahami konsep orbital Atom
- Memahami Prinsip Aufbau
- Mengetahui Sifat-sifat Unsur
- Mengetahui Sistem Periodik Unsur

PROFIL PELAJAR PANCASILA

- Beriman, bertakwa kepada Tuhan Yang Maha Esa dan berakhlak mulia
- Bergotong royong
- Mandiri
- Bernalar Kritis
- Kreatif

SARANA DAN PRASARANA

- Ruang Kelas, Laptop, LCD Proyektor, Jaringan Internet, White Board dan spidol
- Sumber Belajar : Buku Teks Kimia SMA/MA, Modul Pembelajaran dan Video Pembelajaran

TARGET PESERTA DIDIK

- Peserta didik regular (umum, tidak ada kesulitan dalam mencerna dan memahami materi ajar).
- Peserta didik dengan kesulitan belajar : memiliki gaya belajar terbatas hanya satu gaya.
- Peserta didik dengan pencapaian tinggi : mencerna dan memahami dengan cepat, mampu mencapai keterampilan berfikir tingkat tinggi (HOTS), dan memilki kemampuan memimpin

METODE PEMBELAJARAN

Model Pembelajaran :
Poblem Based Learning (PBL)
Pendekatan :
TPACK
Metode :
Diskusi, Tanya Jawab dan Presentasi

KONFIGURASI ELEKTRON DAN SISTEM PERIODIK UNSUR 1

Figure 2. First page view of the module

On the first page of the module, it contains general information including module identity, initial competencies, Pancasila student profiles and others. The learning outcomes and other information are listed on the second page and so on. The following is a display of the second page of the teaching module.

MODUL AJAR KIMIA FASE E

B. KOMPONEN INTI

CAPAIAN PEMBELAJARAN

Pada akhir fase E, peserta didik memliki kemampuan untuk merespon isu-isu global dan berperan aktif dalam memberikan penyelesaian masalah. Kemampuan tersebut antara lain mengidentifikasi, mengajukan gagasan, merancang solusi, mengambil keputusan, dan mengkomunikasikan dalam bentuk projek sederhana atau simulasi visual menggunakan aplikasi teknologi yang tersedia terkait dengan energi alternatif, pemanasan global, pencemaran lingkungan, nanoteknologi, bioteknologi, kimia dalam kehidupan sehari-hari, pemanfaatan limbah dan bahan alam, pandemi akibat infeksi virus. Semua upaya tersebut diarahkan pada pencapaian tujuan pembangunan yang berkelanjutan (*Sustainable Development Goals*/SDGs). Melalui pengembangan sejumlah pengetahuan tersebut dibangun pula akhlak mulia dan sikap ilmiah seperti jujur, objektif, bernalar kritis, kreatif, mandiri, inovatif, bergotong royong, dan berkebhinekaan global.

ELEMEN PEMAHAMAN KIMIA

- Peserta didik mampu mengamati, menyelidiki dan menjelaskan fenomena sesuai kaidah kerja ilmiah dalam menjelaskan konsep kimia dalam kehidupan sehari hari
- Menerapkan konsep kimia dalam pengelolaan lingkungan termasuk menjelaskan fenomena pemanasan global
- Menuliskan reaksi kimia dan menerapkan hukum-hukum dasar kimia
- Memahami struktur atom dan aplikasinya dalam nanoteknologi.

ELEMEN KETERAMPILAN PROSES

- Mengamati
- Mempertanyakan dan memprediksi
- Merencanakan, dan melakukan penyelidikan
- Memproses, menganalisis data
- Mengevaluasi dan refleksi
- Mengomunikasikan hasil penyelidikan

KONFIGURASI ELEKTRON DAN SISTEM PERIODIK UNSUR 2

Figure 3. Display of the second page of the teaching module

On this page, the core components of the chemistry teaching module that is developed are displayed. These core components include learning outcomes, elements of chemical understanding, and elements of process skills. Other core components are described on the following pages. The description of learning activities can be seen in the following picture.

Figure 4. Display of the fourth page of the teaching module

On this page, the learning activities are described, starting with opening activities, namely praying and taking attendance through the QR Code provided. Students only need to scan the QR Code to confirm their presence during the learning process. Then students are asked to access the learning style link listed in the module. The link contains several specific questions that can direct students to find out their respective learning styles. That way, teachers can group students according to their learning styles. This is the first step in differentiated learning. The contents of the learning activities can be seen in the following picture.

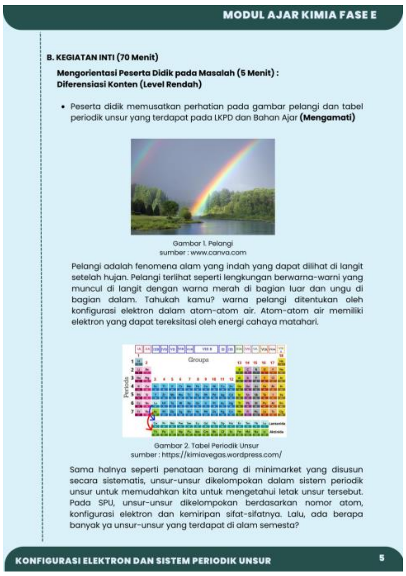
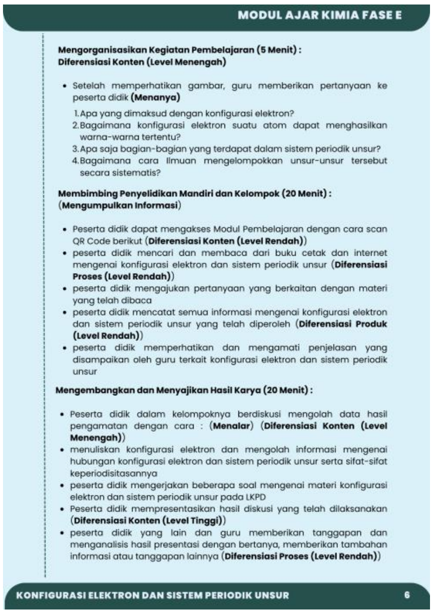


Figure 5. Display of learning activity content

This page and the following pages contain core learning activities. The problem-based learning (PBL) process involves analysis and evaluation of the problem-solving process, organizing students, guiding Merdeka and group investigations, developing and presenting work results, and guiding investigations. Several components of the developed module can demonstrate differentiated learning; namely differentiation in content, process, and product. Differentiated learning is also used at various levels, from low to intermediate. This is an example of differentiated learning.


MODUL AJAR KIMIA FASE E

Mengorganisasikan Kegiatan Pembelajaran (5 Menit) :
Diferensiasi Konten (Level Menengah)

- Setelah memperhatikan gambar, guru memberikan pertanyaan ke peserta didik **(Menanya)**
  1. Apa yang dimaksud dengan konfigurasi elektron?
  2. Bagaimana konfigurasi elektron suatu atom dapat menghasilkan warna-warna tertentu?
  3. Apa saja bagian-bagian yang terdapat dalam sistem periodik unsur?
  4. Bagaimana cara Ilmuan mengelompokkan unsur-unsur tersebut secara sistematis?

Membimbing Penyelidikan Mandiri dan Kelompok (20 Menit) :
(**Mengumpulkan Informasi**)

- Peserta didik dapat mengakses Modul Pembelajaran dengan cara scan QR Code berikut (**Diferensiasi Konten (Level Rendah)**)
- peserta didik mencari dan membaca dari buku cetak dan internet mengenai konfigurasi elektron dan sistem periodik unsur (**Diferensiasi Proses (Level Rendah)**)
- peserta didik mengajukan pertanyaan yang berkaitan dengan materi yang telah dibaca
- peserta didik mencatat semua informasi mengenai konfigurasi elektron dan sistem periodik unsur yang telah diperoleh (**Diferensiasi Produk (Level Rendah)**)
- peserta didik memperhatikan dan mengamati penjelasan yang disampaikan oleh guru terkait konfigurasi elektron dan sistem periodik unsur

Mengembangkan dan Menyajikan Hasil Karya (20 Menit) :

- Peserta didik dalam kelompoknya berdiskusi mengolah data hasil pengamatan dengan cara : (**Menalar**) (**Diferensiasi Konten (Level Menengah)**)
- menuliskan konfigurasi elektron dan mengolah informasi mengenai hubungan konfigurasi elektron dan sistem periodik unsur serta sifat-sifat keperiodisitasannya
- peserta didik mengerjakan beberapa soal mengenai materi konfigurasi elektron dan sistem periodik unsur pada LKPD
- Peserta didik mempresentasikan hasil diskusi yang telah dilaksanakan (**Diferensiasi Konten (Level Tinggi)**)
- peserta didik yang lain dan guru memberikan tanggapan dan menganalisis hasil presentasi dengan bertanya, memberikan tambahan informasi atau tanggapan lainnya (**Diferensiasi Proses (Level Rendah)**)

KONFIGURASI ELEKTRON DAN SISTEM PERIODIK UNSUR 6

Figure 6. Differentiated learning display

In this section, students will pay attention to the images listed in the teaching materials. The teaching materials can be accessed via the QR Code provided. On the QR Code, there is also a Student Worksheet that students can use to fill in the results of problem-solving activities. In the teaching materials created, interesting images related to the learning topic are also inserted as well as QR Codes containing several learning videos, digital periodic tables, and songs used to memorize chemical elements. So that students can learn by applying their own learning style. The appearance of the teaching materials and student worksheets is as follows

(a) (b)

Figure 7. (a) Cover view of teaching materials (b) cover display of student worksheets

After developing the teaching module, the next stage is the validation test of the media material. This validation was carried out on 5 (five) expert validators. The determination of the validator is based on the basic competencies of each validator. The results of the validation that has been carried out are as follows.

Table 1. Data from the results of the validation test of materials and media

No	Component	%
Material expert assessment		
1.	Content feasibility aspect	90
2.	Language aspect	89,77
3.	Presentation aspect	89,33
Mean		89,76
Media expert assessment		
1.	Model size	94
2.	Content cover design	89,71
3.	Content body design	87,55
Mean		88,59

Based on the table above, it can be seen that the chemistry teaching module developed is included in the very feasible category in the range of 80-100%. In addition, the researcher also conducted a validation test on the pretest and posttest questions that will be used to measure student learning outcomes. The results of the validation test of the pretest and posttest questions are as follows.

Table 2. Data from the results of the question validation test

No.	Component	%
1.	Content validation aspects	92
2.	Language aspects and question components	86
Mean		89

Based on the data obtained from the results of the question validation, it can be seen that the pretest and posttest questions are included in the very feasible category in the range of 80-100%. After conducting the validation test, the next step is the implementation stage, namely by testing the effectiveness of the developed chemistry teaching module on increasing learning outcomes. In this case, the researcher used a pretest and posttest to measure the increase in student learning outcomes at the cognitive level. The pretest was used before students used the chemistry teaching module and the posttest was used after students used the chemistry teaching module. The pretest and posttest values obtained are as follows.

Table 3. Pretest and posttest scores

Item No.	Pretest Score	Posttest Value	Item No.	Pretest Score	Posttest Value	Item No.	Pretest Score	Posttest Value
1.	100	90	13.	100	100	25.	50	90
2.	100	100	14.	60	100	26.	70	100
3.	20	50	15.	30	90	27.	70	90
4.	90	80	16.	60	90	28.	70	100
5.	70	90	17.	20	70	29.	70	80
6.	30	90	18.	30	100	30.	30	90
7.	50	100	19.	50	100	31.	30	90
8.	50	90	20.	90	100	32.	100	90
9.	90	100	21.	100	100	33.	100	100
10.	100	100	22.	70	80	34.	40	90
11.	100	100	23.	70	90			
12.	70	90	24.	40	90			

After the implementation stage, then the students' response numbers were distributed to determine the feasibility of using the developed chemistry teaching module. The following are the results of the students' responses. After the implementation stage, then the students' response numbers were distributed to determine the feasibility of using the developed chemistry teaching module. The Table 4 below shows the results of the students' responses.

Table 4. Results of student responses

No.	Assessment Aspects	%
1.	Ease of understanding the material	77,34
2.	Learning independence	79,99
3.	Learning activeness	79,21
4.	Learning interest	80,43
5.	Module presentation	87,44
6.	Module use	87,44
7.	PBL learning model	84,85
Mean		82,38

Based on the data obtained from student responses, it can be seen that the chemistry teaching module developed is categorized as very feasible.

Discussion

The chemistry teaching module based on differentiated learning is a teaching material that is specifically designed and adapted to various learning styles and levels of student understanding in chemistry subjects, especially in the atomic structure material, sub-chapter of electron configuration and the periodic system of elements. This module is made by considering the different learning needs of each student, so it is expected to improve overall student learning outcomes and achievements. According to the results of the validation of material and media experts, the chemistry teaching module based on differentiated learning developed is categorized as very feasible for use during the learning process, has a very high student response and can improve student learning outcomes, as shown by the difference in pretest and posttest values. The paired sample t-test test was conducted after knowing the results of the pretest and posttest. However, before the paired sample t-test test, a normality test needs to be conducted to ensure that the pre-test and post-test data are normally distributed. If the results are normally distributed, then the main requirements before the paired sample t-test test are met. If not, then the paired sample t-test should be replaced with a non-parametric test, namely the Wilcoxon test. If the Sig value is greater than 0.05, the data is considered to be normally distributed. Table 5 shows the results of the normality test with SPSS.

Table 5. Results of the normality test of pretest and posttest values

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre Test	.142	34	.078	.902	34	.005
Pos Test	.297	34	.000	.720	34	.000

a. Lilliefors Significance Correction

Based on the output results of "Tests of Normality" the Sig. value on Shapiro-Wilk for the pretest value is 0.005 and the Sig. value for the posttest value is 0.000, each less than 0.05, so it can be concluded that the pretest and posttest values are not normally distributed. This is because some students' posttest values decreased, which resulted in negative values. The Wilcoxon test is used as a substitute for the paired sample t-test if the data is not normally distributed. Table 6 shows the results of the Wilcoxon test.

Table 6. Wilcoxon test results 1

Ranks				
		N	Mean Rank	Sum of Ranks
Pos Test - Pre Test	Negative Ranks	3[a]	4.00	12.00
	Positive Ranks	25[b]	15.76	394.00
	Ties	6[c]		
	Total	34		

a. Pos Test < Pre Test
b. Pos Test > Pre Test
c. Pos Test = Pre Test

Based on the output results of "Ranks", it is known that the Negative Ranks or negative differences in chemistry learning outcomes for the pretest and posttest are 3 with a Mean Rank value of 4.00 and a Sum of Ranks value of 12.00, which indicates that there are 3 students who experienced a decrease in scores between the pretest and posttest. Table 6 also shows that the Positive Rank value is 25 with a Mean Rank value of 15.76 and a Sum of Ranks value of 394.00, which indicates that there are 25 students whose learning outcomes have increased. It is also known that the Ties value is 6, which means that there are 6 students whose pretest and posttest scores are the same. In the Wilcoxon Test, the basis for decision making is that the Asymp.Sig value (2-tailed) is less than 0.05, meaning that student learning outcomes have increased after using the chemistry teaching module based on differentiated learning. Conversely, the Asymp.Sig value (2-tailed) is greater than 0.05, meaning that student learning outcomes have not increased. Table 7 shows the Wilcoxon test results data used as a reference for decision making.

Table 7. Results of the Wilcoxon 2 test

Test Statistics[a]	
	Pos Test - Pre Test
Z	-4.365[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Based on the output results of "Test Statistics" it is known that the Asymp.Sig. (2-tailed) value is 0.000. This value is smaller than 0.05. This shows a difference in student learning outcomes in the pretest and posttest. In conclusion, the use of chemistry teaching modules based on differentiated learning on atomic structure material can effectively improve student learning outcomes.

CONCLUSION

The chemistry teaching module based on differentiated learning on atomic structure material developed using the ADDIE model obtained a very feasible category in the material field with a percentage of 89.76% and obtained a very feasible category in the media field with a percentage of 88.59% and obtained a very feasible category in the question field with a percentage of 89.6%. The results of the chemistry teaching module based on differentiated learning are also effective in improving student learning outcomes with the Wilcoxon test results, namely the Asymp.Sig. (2-tailed) value is 0.000 where the value is less than 0.05. The results of student responses to the chemistry teaching module based on differentiated learning on atomic structure material obtained an average percentage of 82.38% with a very good category. So that the chemistry teaching module based on differentiated learning on atomic structure material is feasible to be used as a learning medium that can help students improve their learning outcomes.

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