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The Effectiveness of Merdeka Curriculum Teaching Modules in Terms of Students Self-Reliance on Learn Chemistry

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Abstract

The research on the development of the Merdeka Curriculum teaching module on student self-reliance aims to measure validity, practicality, and effectiveness. The type of research used is Research and Development (R&D) with the ADDIE model. The sample of this study were students of class XI MIA MAN 2 Palu. The instruments used in this study were validation sheets, questionnaires, and multiple-choice tests. Data were analyzed using quantitative descriptive techniques. The results showed that the validity of the teaching module in the media aspect was in the valid category with a score of 79% and the media aspect was in the valid category with a score of 77%. The practicality of the teaching module was in the very practical category with a score of 81% and the student response obtained a score of 91% in the very good category. The effectiveness of teaching modules using Effect size d Cohen's with a value of 4.15 for the High category and a value of 3.88 for the Low category in a very large effect. Student self-reliance increased with an average percentage of 76% in the good category. Based on the research results, the Merdeka Curriculum teaching module is eligible for use.

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Introduction

The Merdeka Curriculum is a new design created by the government to improve the quality of education to produce graduates who are ready to face future challenges. The development of the Merdeka Curriculum is the first step in restoring learning in Indonesia after the Covid-19 pandemic (Zahir et al., 2022). The Merdeka Curriculum is a program that is expected to restore learning, which offers three characteristics including project-based learning to develop soft skills and character in accordance with the Pancasila learner profile, learning on essential material, and a more flexible curriculum structure (BSKAP., 2021). Merdeka curriculum is a curriculum with diverse learning that focuses on essential content so that students have enough time to explore concepts and strengthen competencies (Hanifah, 2023).

The Merdeka Curriculum is a curriculum concept that assumes independence. Every learner has the freedom to access knowledge obtained from formal and non-formal education (Manalu et al., 2022). This is in line with the opinion of Ainia (2020), the Merdeka Curriculum emphasizes the freedom of independent and creative learning which contributes to building independent character. One of the important components of the Merdeka Curriculum to achieve learning objectives is the teaching module.

Teaching modules are documents that contain learning objectives, steps, and media, as well as assessments needed in one topic based on the flow of learning objectives (Kepmendikbudristek, 2022). There are two types of teaching modules in the Merdeka Curriculum, namely general teaching modules for the learning process which are required for all subject teachers and special teaching modules for the Pancasila student profile project which are only prepared by teachers who get additional assignments as project coordinators (Hanifah, 2023).

Students have different knowledge and preparation when receiving learning materials in class. The existence of differences in each student certainly needs appropriate efforts, one of the efforts is through the preparation and implementation of learning that can facilitate student learning needs in accordance with their characteristics, namely with differentiated learning. Differentiated learning is an effort to adjust the learning process in the classroom to meet the learning needs of students as individuals, it can also be said that learning that provides flexibility and is able to accommodate the needs of students to increase their potential according to the learning readiness, interests, and learning profiles of different students (Tomlinson, 2001).

Character values come from religion, Pancasila, culture and national education goals. Character education is developed with the Mental Revolution program with the Strengthening Character Education policy followed by the Pancasila Student Program (Sukriyatun, 2022). The literature study conducted by Hamzah et al. (2022)

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revealed that the Merdeka Curriculum focuses on developing students' personalities based on the Pancasila learner profile. The Pancasila learner profile program focuses on overall student learning outcomes such as competence, literacy, and character development. Project learning is very useful because it allows students to gain hands-on experience and learn through experience, integrates basic skills and competencies that students learn from various disciplines, and creates a more independent and flexible learning structure (Suryadien et al., 2022).

The implementation of Merdeka Curriculum is expected to develop students' characters. One of the suggested strategies is to use project-based learning. According to Sari & Angreni (2018), the project-based learning model provides ample opportunities for students to make decisions in choosing topics, conducting research, and completing a specific project. Project-based learning makes students encouraged to be more active in learning because the teacher is only a facilitator and evaluates students' performance products including products that can be displayed from the results of the project. The Project Based Learning (PjBL) model can involve learners to explore knowledge, apply subject matter to complex problems and be able to prepare practices independently (Chiang & Lee, 2016). Project-based learning is considered suitable by placing students as the center of learning in chemistry subjects.

One of the chemistry materials in phase F that is relevant to the project-based learning model is salt hydrolysis. The subject matter of Salt Hydrolysis in chemistry is a subject matter that mostly contains mathematical calculations which include operations of plus (+), less (-), divide (:), times (x), roots (√) and logarithms (log). This material studies the types of salts and their hydrolysis reactions as well as the pH of Salt Solutions. Therefore, salt hydrolysis material is in accordance with the project-based learning model, so project-based teaching modules will be developed as guidelines in the learning process carried out by teachers as implementers of education. Several factors for the development of teaching materials are carried out due to the availability of teaching materials in accordance with curriculum demands, the availability of teaching materials in accordance with the characteristics of students, and the availability of teaching materials in accordance with the demands of solving learning problems (Thamrin, 2014).

Researchers conducted a needs analysis at MAN 2 Palu regarding the government's decision to implement the Merdeka Curriculum on a limited basis starting in 2021. The results of the analysis obtained that MAN 2 Palu has not implemented the Merdeka Curriculum in the 2022/2023 school year, the Merdeka Curriculum learning system is a new policy which of course has obstacles and obstacles to implementing it. The readiness that must be done is that the teacher must know the components of the teaching module. This teaching module must be made sequentially or systematically and adapted to the school environment and student characters. In line with the demands of the Merdeka Curriculum as a reference, the application of teaching materials such as project-based teaching modules can be developed and applied systematically in schools. With the Project Based Learning teaching module, students can learn independently and not just learn but also understand the real learning objectives through the products produced, namely in the form of project assignments (Yesiati, et al., 2017).

Teaching modules in the Merdeka Curriculum can support students' learning independence because they contain a collection of teaching tools that can be used for educators. Teachers are expected to understand student characters better and the learning process can be maximized according to students' desires and abilities. According to Ariga (2022) the 21st century curriculum concept requires students to be independent in obtaining educational knowledge formally and non-formally. The freedom applied provides opportunities for students who explore as much knowledge as possible. The essence of the teaching module in the Merdeka Curriculum is in the component of the Pancasila student profile and the creation of modules that are made according to the needs of students, teachers, and schools (Salsabilla, et al., 2023). One of the characteristics of the module according to Depdiknas (2008) is that it can stand alone, which does not depend on other teaching materials or does not have to be used together so that students can independently study and do assignments.

Independence (self-supporting) is an attitude and behavior that does not easily depend on others in completing tasks (Lie & Prasasti, 2004). Students tend to learn better to be able to monitor, evaluate and organize their learning effectively, save time efficiently, will be able to direct control themselves in thinking and acting, and not feel dependent on others emotionally. Students who have the ability to learn independence are able to analyze complex problems and are able to work individually or work together with groups.

Based on this, a knowledge gap was found, which refers to the lack of information in the literature or studies that specifically explore the Merdeka Curriculum teaching modules. Limitations can create knowledge gaps that require further research. Therefore, this research is directed at filling the gap by investigating in more depth how the teaching module is needed in the context of the Merdeka Curriculum, producing relevant teaching modules, validating these modules in learning, describing the practicality of their use, and assessing their effectiveness on students' self-reliance in learning.

Materials and Method

This research uses a Research and Development method, because it is in accordance with the objectives to be achieved. According to (Sugiyono, 2009) research and development (R&D) is a basic research activity to obtain information on user needs (needs assessment), then continued development activities (development) to produce products and assess the effectiveness of these products.

The research place is at MAN 2 Palu. Subjects of this study were students in class XI MIA 1 as many as 20 people consisting of 6 male and 14 female with an average age of 16 to 17 years. The instruments in this study used three main instruments used, first, a validation instrument in the form of a validation sheet for the project-based Merdeka curriculum teaching module filled out by expert lecturers. The validation sheet aims to assess the feasibility of product design which consists of media validation and material validation. Media expert validation includes the physical appearance of the teaching module, book organization writing, as well as sentence clarity and the level of readability of the teaching module which is accumulated into 7 statements. Material expert validation includes the feasibility of content, language, presentation, independent learning which is summarized into 15 statements. The validation sheet was prepared using a Likert scale.

The second instrument is a teaching module practicality assessment instrument. The aspects of the observation sheet assessment are divided into three, namely the initial activities, core activities, and final activities. The assessment scale uses the criteria of very good, good, less good, and very less with a total of 13 statements. This project-based teaching module has six learning stages divided into four meetings on salt hydrolysis material. Implementation sheet filled by observers who observe the implementation of learning.

The third instrument is the teaching module effectiveness instrument. According to Sugiyono (2012) a questionnaire is a data collection technique that is done by giving a set of questions or written statements to respondents to answer. The effectiveness assessment instrument used in this study is a salt hydrolysis material comprehension test and a student learning independence questionnaire. The understanding test instrument is in the form of multiple-choice questions containing salt hydrolysis material given to students before and after learning. The test questions were validated first by experts before use. The learning independence questionnaire consists of 5 aspects, namely initiative, discipline, motivation, confidence, and responsibility which are summarized in 25 statements.

This research procedure uses a learning design developed by Branch (2009), namely ADDIE which consists of five stages, Analysis, Design, Development, Implementation and Evaluation. This is divided into several stages, namely:

Analysis

The analysis stage in this study is divided into two analyses, namely needs analysis and material analysis.

1. Needs analysis

Needs analysis is the initial stage in development. This stage was carried out by interviewing the chemistry teacher at the school. The interview consisted of 6 main questions which were then developed by the researcher to obtain information about a problem, find out the causes, and finally find a solution to the problem.

2. Material analysis

Material analysis was carried out by observing the learning outcomes in the Merdeka curriculum. Salt hydrolysis material which includes the concept of salt hydrolysis, reactions and pH calculations is one of the high school chemistry materials where in the learning process students have difficulty understanding the material if in the delivery of the teacher using a conventional learning model only. Therefore, researchers are interested in introducing project-based teaching modules to help the teaching and learning process and increase student independence.

Design

The next stage is design, which is the initial design of the module in accordance with learning needs. This module consists of a cover, general information (learning achievement domain, keywords, Pancasila learner profile, knowledge), core components (learning objectives, trigger questions, learning activities, assessments, enrichment & remedial, teacher & learner reading materials, glossary, bibliography), attachments in the form of assessments, evaluation questions, and practicum guides.

Development

This stage is an advanced stage of the design stage. The initial design is validated by experts so that suggestions from validators are revised again and then enter the teaching module development stage to improve by measuring the validity of the feasibility that will be validated by expert validators (media and material) with the assessment instrument provided.

Implementation

The Merdeka curriculum teaching modules that have been validated by media experts and material experts then enter the next stage, namely implementation. Students carry out learning activities from the developed teaching module and then undergo a series of tests, where this test is to test effectiveness. There are observers who assess the practicality of the use of the development teaching module using an observation sheet.

Evaluation

The next stage after the teaching module is declared feasible, then it enters the fifth stage,

namely evaluation, at this stage revisions and improvements are made again based on suggestions and input from various parties including media experts and material experts and students. The measure of the success of the development of this teaching module is seen from the feedback of students who have filled out the questionnaire given.

Results and Discussion

The research has been conducted using the Research and Development (R&D) method with the ADDIE model with the stages of analysis, design, development, implementation, and evaluation. The explanation of these development stages is further explained as follows:

Analysis

1. Needs analysis

Needs analysis is a systematic process for determining objectives, identifying actual and expected conditions and setting priorities for action (Lee & Owens, 2004). The results of the needs analysis concluded that the project-based learning model has never been done in chemistry studies, especially salt hydrolysis material. Furthermore, the average ability of students is good but there are also some students who are passive, this can be caused by the students' lack of learning self-reliance. In addition to being oriented to the Merdeka curriculum, project-based learning can be used as an effort to practice student learning self-reliance to be more active and the teacher acts as a supervisor or monitors students and the results of projects that have been made can be used as authentic evidence that can be measured by the teacher in his learning. According to Parker (2006), that independence has a broader meaning than self-confidence. Self-confidence relates to what we can do and specific skills. Self-reliance is about a person who is independent, creative and able to stand on their own. Self-learning is an active learning activity, which is driven by the intention or motive to master a competency to solve a problem and build on the knowledge and competencies possessed.

2. Material Analysis

The next procedure is material analysis which is carried out through a literature study process on Learning Outcomes and Flow of Learning Objectives in Phase F of chemistry subjects. According to BSKAP. (2022) there are 2 elements in phase F, namely chemical comprehension and process skills. Learning Outcomes at the end of the phase are expected that students are able to Explain chemical concepts in everyday life; Apply chemical concepts in environmental management including explaining the phenomenon of global warming; Write down chemical reactions and apply basic laws of chemistry; Understand atomic structure and its application in nanotechnology; Apply mathematical operations in chemical calculations; Study the nature, structure and interaction of particles in forming various compounds including their processing and use in daily life; Understand and explain aspects of energy, rate and equilibrium in chemical reactions; Use acid-base concepts in daily life; Use chemical energy transformations in daily life including thermochemistry and electrochemistry; Understand organic chemistry including its application in daily life. Furthermore, learners are able to conduct research starting from observing, questioning and predicting, planning and conducting investigations, processing and analyzing data and information, evaluating and reflecting, communicating results.

One of the material contents in phase F learning outcomes is salt hydrolysis. The salt hydrolysis material was chosen in the study because of students' difficulties in understanding salt hydrolysis material, especially in understanding the properties of acids, bases, salt solutions (Habiddin et al., 2023). Then understanding the concept of salt hydrolysis is very important in understanding chemical reactions and the nature of salt solutions, so the right learning model is needed so that students are actively involved in understanding the concept.

Design

The teaching module design stage is based on a copies of BSKAP. (2022) which consists of a cover, general information (learning outcomes domain, keywords, Pancasila learner profile, knowledge), core components (learning objectives, trigger questions, learning activities, assessments, enrichment & remedial, teacher and learner reading materials, glossary), attachments in the form of assessments, evaluation questions, and practicum guides. The teaching module design uses the Canva application.

Reference sources in module development are obtained from sources that pay attention to the components contained in the module. The developed module pays attention to the principles and steps of writing teaching modules both in terms of module needs analysis, module design, evaluation and validation as a process in testing the suitability of modules with competencies that become learning targets. The steps of preparing this teaching module design include adjusting the project-based learning model with the material to be applied based on the independent curriculum. This module uses A4 paper size, different font sizes are used for the title, subtitle and body of the text, several images are provided to facilitate learning, and module design with colors that attract students' attention.

Development

This stage is an advanced stage of the design stage. The initial design that has been made is continued to the product development stage to determine the feasibility by measuring the validity of product feasibility which will be validated by media expert validators and material experts. The results of expert validation are as follows:

1. Assessment by media experts

Table 1. Comparison of two methods in training.

Table column subhead	Subhead
Teaching module layout	7
Book writing and organization	6
Sentence clarity and readability	9
Total Score	22
Maximum Score	28
Presentage	79%

Based on the results of the analysis of the media expert's assessment of this project-based teaching module, the overall average score is 79% with a valid category or can be used with revision. The first assessment aspect is the physical appearance of the teaching module which discusses book design with text and images. Project-based teaching modules use A4 size paper so that text and images can be read well. The size of the letters, the title of the teaching material is more dominant and proportional than the size of the teaching module, the color of the teaching material title contrasts with the back color, and does not use too many letter combinations. The cover design of the teaching module contains illustrations that can describe the content of the material well. The second aspect is the writing and organization of the book which consists of sub-indicators regarding the completeness of the teaching module identity on the cover page and the suitability of the concept organization sequence with the syllabus which is assessed well by media experts. The third aspect is the clarity of sentences and the level of readability with sub-indicators, namely the clarity of the sentences used, the correctness and accuracy of the chemical terms used, then the language used is interesting and in accordance with refined spelling.

2. Assessment by material experts

Table 2. Content expert validation results

Aspect of Assesment	**Score**
Aspects of content feasibility	15
Aspects of linguistic feasibility	16
Presentation aspect	9
Self-Learning Aspect	6
Total Score	46
Maximum Score	60
Presentage	77%

Based on the results of the analysis of the content expert assessment, the overall average of each aspect of the assessment is 77% with a valid category. The first aspect is the content feasibility aspect which contains the suitability of the material with the learning achievement domain, the completeness of the learning material with a systematic sequence, the material in the module is understood by students and can motivate student learning, the material in the teaching module on salt hydrolysis material is in accordance with the level of student ability. Teaching modules pay attention to the content, material by adjusting the content of the material in the development of science and choosing topics or examples of cases through project work or activities that are in accordance with everyday life. This is in accordance with the statement that one of the characteristics of teaching modules has a high adaptive power to the development of science and technology (Daryanto, 2013). The second aspect is the aspect of linguistic feasibility which includes the language used is easy for students to understand, the sentences used to explain the material are easy to understand, the sentences used do not cause double meaning, conformity with good and correct Indonesian language rules, and the materials used are in accordance with the level of development of students' thinking. The linguistic aspects are adjusted to the language rules that discuss the accuracy of grammar and spelling. This project-based teaching module has a systematic language arrangement that is easy to understand and adapted to the level of high school students. Furthermore, the presentation aspect regarding sample problems in each learning activity is in accordance with the material and learning objectives. The last aspect is the aspect of independent learning regarding teaching modules that attract students to have interest and can learn independently with the designed project.

Implementation

1. Practicality of teaching modules

The practicality of the teaching module through the observation of the implementation of the teaching module by the observer during the learning process. The learning process in the limited trial of 20 students. The results of the practicality of project-based teaching modules are presented in Table 3.

Table 3. Results of Observation of Implementation Teaching Module

Sessions	Learning Activities	Avarage Assesment
1	Project Assesment	75%
2	Schedule Preparation	79%
3	Monitoring	85%
4	Testimg results & Preparation	87%
	Percentage	81%

The average rating of the learning activities as a whole is 81% with a very practical category, indicating that the teaching modules developed can be used in chemistry learning. The same results were obtained in the research on the development of IPAS project-based learning teaching modules conducted by Nurmiati et al. (2023) that the analysis of teacher response data obtained an average score of 94% in the very practical category. The project-based Merdeka curriculum teaching module has several advantages based on practicality, namely 1) simplifying learning administration including teaching modules, making it easier for teachers to compile and select tools that are suitable for the context, characteristics, and needs of students; 2) increasing student independence because students are actively involved in project activities that allow them to explore actual issues.

2. Effectiveness of Teaching Modules

Before entering into learning activities, students are first given pretest questions to measure the extent of the students' ability level on salt hydrolysis material. Then after project-based learning, students are given a posttest to see the effectiveness of using the teaching module used. This test question consists of 20 numbers of reasoned multiple-choice questions. The results of the effectiveness of the teaching module can be presented in Table 4.

Tabel 4. Students' Pretest and Posttest Results

Description	High Category	Low Category
Sample	14	6
Average of Pretest	30,71	27,50
Average of Posttest	75,36	74,17
Effect Size	4,15	3,88
Interpretation	Very Large	Very Large

The pretest and posttest data were analyzed using Cohen's Effect size d Test. Based on this test, it can be seen that the calculation results show a value of 4.15 or have a very large effect for the High category and get a value of 3.88 or have a very large effect for the Low category. This is in line with the results of research conducted by Suharyat et al, (2023) that the project-based learning model integrated with the Merdeka curriculum has a very significant effect on student learning outcomes, it can be seen from the effect size value obtained of 2.67 or has a very large effect. The foundations that can affect the effectiveness of the Merdeka curriculum teaching module are 1) Teaching modules in the Merdeka curriculum give teachers freedom in the process of creating varied learning; 2) The Merdeka curriculum is more relevant and interactive through project-based learning; 3) The Merdeka curriculum focuses on essential material so that learning is more in-depth. Setiawan et al. (2022) stated that adjusting learning to the characteristics of students and the level of achievement is very crucial. In other words, educators should only formulate one teaching module in learner activities equipped with appropriate instructions or directions.

Furthermore, to find out the increase in student learning self-reliance before and after learning using the independent curriculum teaching module, it can be seen from Figure 1.

Measuring student learning self-reliance by distributing initial and final questionnaires, there are 25 questionnaire statements consisting of 5 indicators of independence, namely initiative, discipline, motivation, confidence, and responsibility. The results of the student learning independence questionnaire obtained a value on the initiative indicator obtained an initial score of 55% in the "less" category and a final score of 73% in the " enough" category, students have high curiosity in the learning process by asking the teacher for guidance on things that have not been understood, then students are active in finding learning resources to complete the project being worked on. The lack of students' learning initiative attitude will affect the learning process, this is because the initiative attitude possessed by students can provide encouragement to find solutions to every problem. According to Lovez et al. (2023), learning independence is a way of learning where students have an initiative attitude, can choose learning needs, make difficulties a challenge, students can use various sources, determine learning tactics, evaluate learning outcomes, and have a self-concept. When students have independence, they are expected to be able to face the challenges of competitive times. Student learning independence has an impact on the ability to analyze and develop critical thinking.

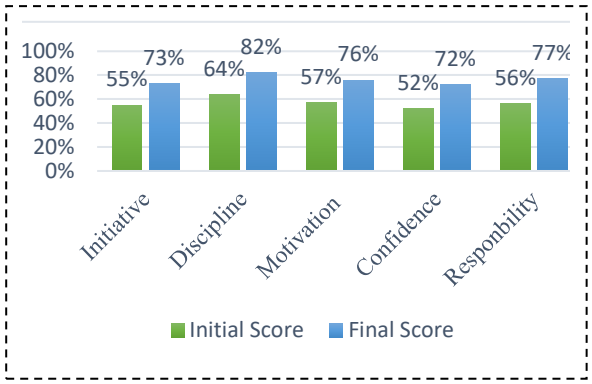


Figure 1. Students' self-reliance results

The discipline indicator gets an initial score of 64% with the " enough " category and a final score of 82% with the " Good " category, students carry out the learning process on time and follow the learning until the end including students collecting project assignments according to the specified time. Disciplinary character is one of the determining factors for student success because disciplinary character is related to self-control over forms of rules. Disciplined behavior is shown by obeying the law such as arriving on time, using applicable norms, not making noise in class, and always obeying existing rules (Abbas, et al., 2023). According to Halek & Suaema (2023) Teachers can influence discipline because teachers are one of the factors that influence student discipline in learning and improve learning outcomes. Teachers always try to create a learning atmosphere that allows students to remain disciplined in learning. Every teacher is often faced with student discipline problems, therefore discipline has many factors, including: student circumstances, school environment, and student personal characteristics.

The motivation indicator gets an initial score of 57% with the category "less" and a final score of 76% with the category "Good", students are serious in working on projects and evaluations given despite difficulties. The confidence indicator received an initial score of 52% in the "less" category and a final score of 72% in the " enough" category, this indicator includes students daring to answer questions given by presenters and daring to express opinions during learning. Students also complete tasks or projects with their own abilities.

Changes in students are not only in learning outcomes but also in the behavior and attitudes of students who are brave, active, and self-actualization of students during the teaching and learning process. Maesaroh (2022), concluded that learning motivation is an encouragement that exists in individuals, both from within and from outside the student. By going through the educational process in changing behavior in the form of knowledge, skills and attitudes through learning activities carried out by each individual, learning motivation is also able to foster enthusiasm in students to take part in learning and provide direction to learning activities so that the expected goals can be achieved.

The responsibility indicator gets an initial score of 56% in the "less" category and a final score of 77% in the "good" category. There is an increase in the attitude of responsibility in the aspect of doing the tasks that have been given. This is because the project carried out is tailored to the interests and abilities of students, so that students can work on the project until it is completed properly. Agree with Moeslichatoen (2004) who suggests the benefits of the project method for students' attitudes of responsibility, among others; (a) students learn to be responsible for their part of the work by mutual agreement, (b) as a medium for providing learning experiences to students by exploring the abilities, interests, and needs of children, (c) providing opportunities for students to use physical and intellectual freedom to complete the work that is their responsibility.

Evaluation

The final stage of developing this teaching module is an evaluation conducted by students. After the implementation stage and the teaching module is declared feasible, then enter the fifth stage, namely evaluation, at this stage revisions and improvements are made again based on suggestions and input from various parties including media experts and material experts and students. The evaluation results can be described in Table 5.

The measure of the success of the development of this teaching module is seen from the feedback of students who have filled out the questionnaire given. Based on the student response questionnaire filled out by students and the results of the analysis of each aspect, the score is 91% with a very good category. The overall assessment shows that this project-based teaching module is effective in learning because it is able to increase students' learning independence in salt hydrolysis material and provide a positive response to the teaching module. In the ADDIE model research and development method, the evaluation and revision stages have been carried out at all stages. Some studies also obtained positive responses to the use of project-based learning models, such as research conducted by Gultom & Muchtar, (2022); Hadi & Ramadhana, (2022); Indrajatmoko, (2022) thus it can be concluded that students show a positive or good response in the learning process that takes place in the classroom. This shows that the project-based learning model is good to use in the teaching and learning process.

Tabel 5. Students' Response Results

Assessed Aspects	Average
Learning using project-based teaching modules is very interesting	3,8
The images presented in the project-based teaching module are appropriate and interesting.	3,65
The colors presented in the project-based teaching module are appropriate and contrasting.	3,65
The font used is appropriate and easy to read	3,65
Sentences/grammar in the project-based teaching module are easy to understand	3,6
The material in the project-based teaching module is presented systematically	3,65
The material in the project-based teaching module can be remembered easily	3,4
The instructions for filling in the project-based teaching module are easy to understand and implement.	3,75
Learning chemistry using project-based teaching modules can motivate you in the learning process.	3,65
Learning chemistry using project-based teaching modules can increase your learning independence in the learning process.	3,6
Total	3,64
Percentage Response (%)	91%
Category	Very Good

Conclusion

The development of teaching modules obtained a validity value from media experts of 79% in the "valid" category and material experts of 77% in the "valid" category. The teaching module obtained a practical value of 81% in the "very practical" category. Furthermore, the value for student responses to project-based teaching modules is 91% in the "very good" category. The teaching module obtained an Effect size d Cohen's value of 4.15 for the High category and obtained a value of 3.88 for the Low category. Student learning independence increased in each indicator with an average percentage of 76% in the "good" category.

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