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Interactive E-Modules Based on Inquiry-Based Learning on Pressure for Junior High School Students

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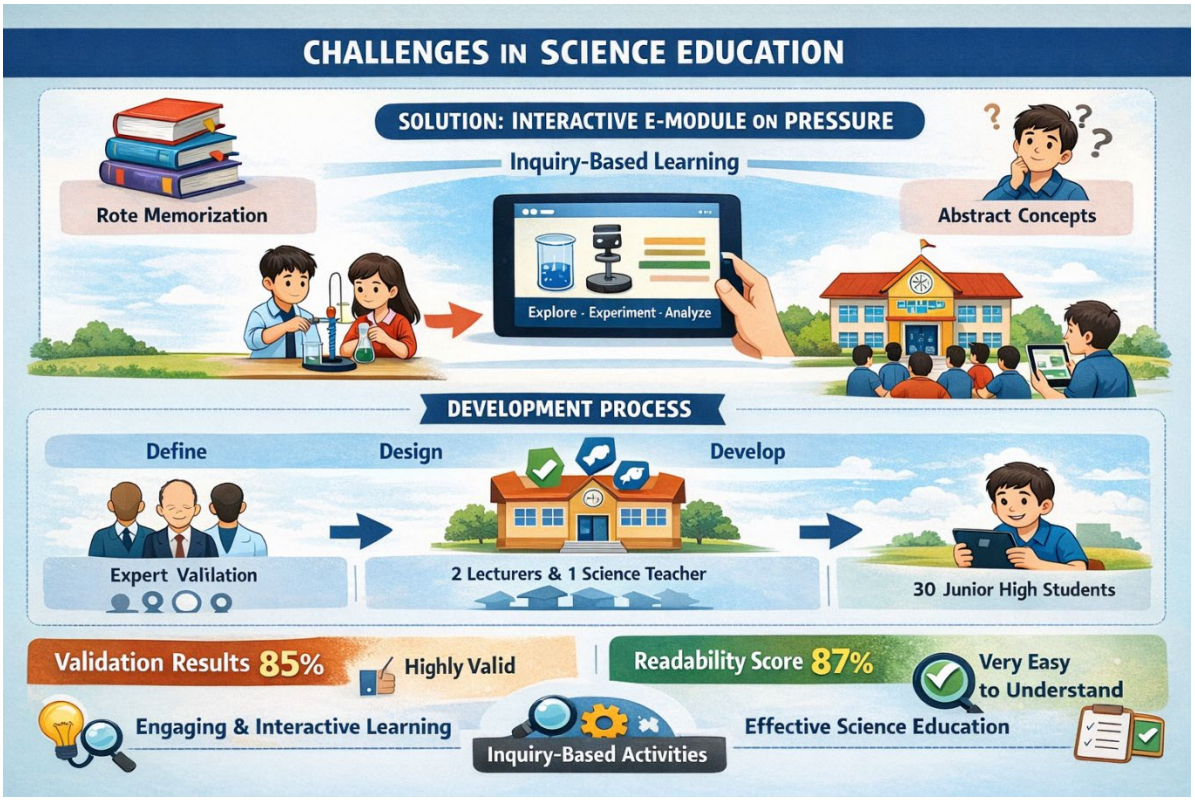
Abstract: Many teaching materials still emphasise memorisation of concepts rather than actively involving students in the knowledge construction process. Learning approaches aligned with the characteristics of science are still rarely incorporated into teaching materials. Furthermore, students often struggle to understand abstract scientific concepts due to a lack of appropriate visual aids. In line with this, the purpose of this research is to develop an interactive e-module that integrates an inquiry-based learning model on pressure materials that is not only valid but also easy for students to understand. Research and Development (R&D) with a 4D model approach that has been simplified into 3D, namely define, design, and develop, was implemented as a method. Two lecturers and one science teacher, all competent in science, serve as validation subjects in the development of interactive e-module products in this study. Thirty students from class IX at a public junior high school in Malang who have studied pressure material were selected as subjects in the field trial of this research. A literature review and a questionnaire were used to collect data. Quantitative and qualitative analysis was conducted on the collected data. The validation results show an inter-rater agreement rate of 85%, which falls within the almost-perfect and consistent range, indicating uniform assessment and supporting the feasibility of e-modules for science learning. In addition, the e-module readability test scored 87%, placing it in the very good category, indicating that the e-module is easy for students to understand thanks to simple language, clear sentences, an attractive appearance, and content presented in a structured, independently accessible manner. Although it has not been directly implemented to assess concept understanding, this e-module is designed to facilitate learners' active involvement through various inquiry activities aligned with the inquiry-based learning model.

Keywords: Learning media, digital media, teaching instrument, content validity, technology-enhanced learning

Graphical Abstract



INTRODUCTION

Educational development is closely aligned with technological advances (Lailia, 2025). In education, technology plays a crucial role in improving the quality of learning to meet the demands of the industrial world. Therefore, to adapt to changes in the work system in the digital era, efforts are needed to optimise the quality of teaching materials used in learning (Munawar et al., 2020). One way to optimise teaching materials in the technological era is to digitise them. Digitisation of teaching materials refers to the process of converting them from a printed to an electronic format, so that they can be accessed without time or place restrictions (Asaniyah & Bachtiar, 2021). To introduce information technology-based teaching materials, it is important to develop materials that are easy for students to understand (Munawar et al., 2020). However, many teaching materials still make it difficult for students to understand. Some teaching materials emphasise only memorisable concepts, without involving students in the process of constructing knowledge independently or connecting these concepts to everyday life (Widiastuti, 2020).

To overcome this, it is necessary to create teaching materials that support students' learning. Interactive e-modules are one type of teaching material that can effectively support learning. As explained by Rahmi (2018), e-modules are digital teaching materials designed to help achieve learning competency objectives while encouraging active and interactive student participation. Asri & Dwiningsih (2022) describe e-modules as teaching media that contain systematically organised material within a

single unit and are designed to facilitate students' independent learning. According to Lastri (2023), the use of e-modules can increase students' involvement and motivation during learning activities.

Science learning should combine three main characteristics of science: the nature of science as a scientific product, the scientific process, and scientific attitudes, namely using scientific methods that include various activities such as formulating problems, preparing a framework for submitting hypotheses, formulating hypotheses, testing hypotheses, and drawing conclusions (Mariana & Praginda, 2009). However, science learning practices that only emphasise the content aspect are still widely found. In fact, increasing students' understanding both conceptually and procedurally is the goal of designing a science curriculum (Sayekti et al., 2019). Developing teaching materials in the form of e-modules alone is not enough to overcome this problem. Thus, it is very important to integrate learning models aligned with the characteristics of science learning into e-modules. Implementation of appropriate learning models can increase student participation, build independent learning skills, and improve student achievement (Wahyuni, 2021).

The learning model that is appropriate to the characteristics of science is inquiry-based learning. This model aligns with the characteristics of science because its learning steps mirror those of the scientific method. This learning approach is designed to maximise students' skills in conducting structured searches and investigations by utilising critical, logical, and analytical thinking, enabling them to independently find and conclude their findings with confidence (Gulo, 2002). Inquiry-based learning emphasises students' active involvement in observing and analysing phenomena whose answers they do not yet understand, and is therefore often known as process learning (Rahmawati & Fauziah, 2021). The main objective of this model is to build students' skills so they can play an active role in independently finding material concepts through the problems presented (Siregar & Yunitasari, 2018). Implementing e-modules based on inquiry-based learning can improve students' conceptual understanding. Learning approaches that integrate inquiry steps provide a more interactive and enjoyable learning experience (Faisal et al., 2025).

One of the main topics in the science subject at the junior high school level is pressure. Based on data from a pretest conducted with 32 students in class IX at a public junior high school in Malang, the average initial knowledge of the material on pressure remains relatively low, at around 57.69. This shows that students' understanding of pressure is not optimal, making this material very important to master, as it serves as the basis for learning at the next level (Sari et al., 2022). This material is conceptual, so supporting media are needed to help students visualise the concept in everyday life (Indasari & Budiyanto, 2019). The application of appropriate visualisation methods can facilitate students' understanding of concepts, especially when describing abstract concepts (Andoro, 2015).

However, in the context of pressure learning, not all concepts can be easily or safely practised in class. In addition, limited time, resources, and laboratory facilities in schools often become obstacles in implementing direct practice. Therefore, the use of interactive e-modules with multimedia such as text, graphics, audio, video, and

animation, equipped with interactive features, is a practical and efficient alternative to help students visualise the concept of pressure clearly and dynamically (Prastowo, 2015). The e-module is also equipped with illustrations that can support understanding of the material (Depdiknas, 2008). E-modules allow students to learn independently anytime, anywhere, while providing a more detailed and repetitive view without being limited by tools or time, thus supporting the understanding of abstract concepts.

Several previous studies have shown that inquiry-based e-modules effectively improve learning quality. These studies provide a strong foundation for the importance of developing e-modules in the context of inquiry-based learning. Violadini and Mustika (2021) developed e-modules for thematic subjects at the elementary school level, and the results indicate that these e-modules are suitable for use and have received positive responses from educators and students. At the junior high school level, Amelia et al (2021) developed an e-module on liquid pressure to remediate student misconceptions, which has been shown to significantly reduce misconceptions. Other research by Aulia et al. (2022) also demonstrates that the inquiry-based science e-module on environmental pollution is valid and suitable for use.

This research is a follow-up study, developing an interactive e-module that integrates inquiry-based learning on pressure for Class IX. This research has three main objectives: 1) Producing a product in the form of an interactive e-module based on inquiry-based learning on the pressure material for Grade IX junior high school students, 2) determining the validity of interactive e-modules based on inquiry-based learning on the pressure material that have been developed, and 3) determining the level of readability of interactive e-modules based on inquiry-based learning on the developed pressure material.

METHOD

This research applies the Research and Development method (R&D). This research applies the 4D model proposed by Thiagarajan et al (1974). This model comprises four main stages, namely define, design, develop, and disseminate. It was chosen because the 4D model is a simple approach for researchers to design alternative teaching materials and does not require much time because the steps are relatively straightforward (Maydiantoro, 2021). In this study, the 4D model was simplified to 3d. This simplification was undertaken because the research objectives could already be achieved at the development stage, and the dissemination stage was not implemented. Simplifying the 4D model to 3D for e-module development has also been carried out in several studies, namely Arifin et al. (2024), Mursidan (2025), and Nasution & Yerimadesi (2025). The following is a description of the stages in the e-module development process that have been carried out:

Define

At the define stage, data is collected from relevant sources to obtain the information needed to define the product development requirements. This process is carried out through a literature review, which serves as the theoretical basis for developing e-modules that meet needs. The literature study carried out includes searching for and

analysing various written sources, such as books, scientific journals, articles, and other relevant documents, related to e-module development. This process begins by identifying appropriate keywords and then by looking for references from trusted sources. Furthermore, the information obtained is selected and summarised to understand the concepts, theories, and previous findings that support the development of e-modules. The results of this study become the basis for formulating needs, user characteristics, and criteria for effective e-module design.

The results of the literature review indicate that the quality of teaching materials used in science learning at the junior high school level still faces various obstacles. Many teaching materials continue to emphasise memorisation of concepts without actively involving students in the process of knowledge construction. In addition, learning approaches that align with the characteristics of science are still rarely incorporated into teaching materials. Students also often struggle to understand abstract science material due to a lack of appropriate visual aids. Therefore, it is necessary to develop interactive e-modules that can help students understand concepts independently, practise scientific thinking skills, and relate the material to everyday life. This interactive e-module is designed based on inquiry-based learning, with pressure material as the main focus, and the learning objectives are arranged according to the Learning Outcomes (CP) for Natural Sciences, phase D, class IX, in the Independent Curriculum.

Design

Level design is a stage in the product development process. This stage consists of two steps, namely designing the product to be developed and designing the product evaluation instrument. The stage begins by determining the product to be developed. The product is an interactive e-module on pressure materials, based on inquiry-based learning, with a design process that utilises the Canva application and packaging on the Heeyzine platform as a flipbook. The Heeyzine platform makes it easier for students to access e-modules, enabling them to learn independently. The next step is to determine the e-module format, which serves as the basis for product design. The e-module is designed in the standard A4 paper format (21 cm x 29.7 cm) and consists of three main parts: introduction, content, and conclusion.

The next step is to create an initial design for an e-module-based product using inquiry-based learning on the pressure material. Some of the steps taken in making this e-module include: 1) designing the appearance and layout of the e-module using the application Canva, 2) structuring learning materials and activities in accordance with the inquiry-based learning model, 3) adding interactive features or content such as videos, live worksheets, Wordwall, PhET simulations, QR codes, and hyperlinks, 4) downloading the e-module in PDF format and packaging it as a flipbook using the platform Heyzine. In addition, an evaluation instrument was designed as a validation instrument and an e-module readability instrument, both comprising quantitative and qualitative questionnaires.

Develop

The development stage aims to create a development product. This stage involves a series of steps that begin with validation by expert lecturers and science teachers using

a designed validation questionnaire. The assessment and suggestions from the validation process serve as a basis for revising and refining the e-module. E-module products that have undergone the revision process and received a valid or feasible statement from the validator can proceed to the trial stage. The product was tested with 30 ninth-grade students from SMP Negeri 5 Malang, and data were collected through a readability questionnaire and student responses.

This questionnaire was designed for several purposes, namely to obtain data on the readability of the e-module, to measure the extent to which the e-module is well understood, and to collect students' opinions on the e-module that has been developed. Student input is also considered in perfecting the final product. The final product of this development is an interactive e-module that implements the inquiry-based learning model on the pressure material, intended for Grade IX junior high school students.

Two lecturers and one science teacher, all competent in science, served as validation subjects in the development of interactive e-module products in this study. The first validator (V1) and the second validator (V2) were expert lecturers who provided assessments from academic and scientific perspectives, while the third validator (V3) was a science teacher who provided input based on direct experience of learning in the field. Thirty-ninth-grade students of SMP Negeri 5 Malang who had studied the pressure material were subjects in the field trial of this study. Literature reviews and questionnaires were used to collect data. The research instrument was a questionnaire distributed to three groups of respondents, namely expert lecturers, science teachers, and students. The questionnaire format includes the following components: a checklist to assess specific aspects and a comments and suggestions section for narrative feedback. The answer choices in this questionnaire refer to the 4-level Likert scale. The use of a 4-level Likert scale in research helps avoid neutral responses from respondents. Thus, researchers can obtain clearer, more definitive data on respondents' views regarding certain statements or questions. The 4-level Likert scale can also help avoid central-tendency bias (respondents' tendency to select the middle option), which may occur on odd-numbered Likert scales. The questionnaire in this study collects two types of data. Quantitative data are obtained from respondents' assessments completed using the checklist. Meanwhile, qualitative data are obtained from respondents' comments and suggestions.

Data analysis techniques used in this research and development include quantitative and qualitative analysis. Quantitative analysis is obtained from expert validators' and teachers' assessments of the interactive e-module's validity, as well as from students' assessments of its readability. Validity data analysis is obtained from the percentage of agreement, calculated as the average across the aspects validated by the validator. The percentage value of the validator's agreement can be calculated using the following equation or formula:

$$Agreement = 1 - \frac{Validator\ value\ difference}{The\ highest\ score} \times 100\% \quad \text{..... (1)}$$

Borich (2003) explained that validation by several validators is considered consistent if the percentage agreement among validators exceeds 75% (≥75%). The percentage of agreement indicates the level of consistency between validators. The calculated percentage can serve as a reference for determining the consistency criteria between validators. According to McHugh (2012), consistency criteria, or levels of agreement, can be classified into several categories based on the percentage of data. The lowest level of agreement is categorised as none, with a data percentage of 0–4%. Furthermore, the category minimal covers a 4–15% range, followed by the category weak, which covers a 15–35% range. The moderate category ranges from 35–63%, while the strong category ranges from 64–81%. The highest level of agreement is categorised as almost perfect, with a percentage of reliable data ranging from 82% to 100%. The level of agreement indicates the extent to which the validators provide similar assessments of the validated e-module's aspects.

The student's readability score can be calculated using the following equation (Sarip et al., 2022), where PK represents the percentage of readability:

$$PK = \frac{Total\ score\ of\ data\ collection\ results}{Criteria\ score} \times 100\% \quad \text{..... (2)}$$

According to Riduwan (2018), readability can be classified into several categories based on the readability percentage. The very poor category accounts for 0–20%, followed by the poor category at 21–40%. Furthermore, the fairly good category covers 41–60%, while the good category ranges from 61–80%. The highest level of readability is categorised as very good, with a percentage between 81% and 100%.

Qualitative analysis in this study is based on validator comments and suggestions, as well as student feedback on the interactive e-module developed. These comments and suggestions cover aspects of the e-module's content, language, appearance, and interactive features. In addition, student input includes ease of use, readability, and level of interest in the content presented. All of these inputs and criticisms are analysed to identify the product's strengths and weaknesses. The results of the qualitative analysis are then used to inform revisions and improvements to the e-module, ensuring it meets user needs and effective learning standards.

RESULTS AND DISCUSSION

This research and development produces an interactive e-module on inquiry-based learning about pressure materials for grade IX junior high school students. The e-module was developed in Canva and packaged as a flipbook on the platform Heyzine. The e-module focuses on pressure, drawing on the CP Natural Sciences phase D of the class IX independent curriculum. The designed e-module includes four sub-materials, consisting of: 1) solid pressure, 2) liquid pressure, 3) gas pressure, and 4) application of pressure in everyday life. The e-module consists of three parts, namely introduction, content, and closing. The introduction includes the cover page, foreword, table of contents, list of images, concept map, identity and description of the e-module, CP and TP learning, instructions for using the e-module, and instructions for completing the learning inquiry-based learning. The content section includes four learning activities that integrate the steps of the inquiry-based learning model: summary,

evaluation test, answer key, and scoring guidelines. The closing section includes a glossary, a list of references, and an author profile. The e-module includes illustrations and images, as well as several interactive features, such as videos, live worksheets, word walls, PhET simulations, QR Codes, and hyperlinks, to help students understand the material.

Figure 1. Screenshot of learning activity in the module

The interactive e-module was then tested for validity and readability. The validity test was conducted by three validators: two expert lecturers and one science teacher. The validation assessment was considered consistent if the agreement between validators reached or exceeded 75% (≥ 75%). This agreement percentage indicates the level of consistency among validators. The results for the percentage of agreement are shown in Table 1.

Table 1. Validator Agreement Percentage Results

Assessment Indicators	**V1/V2**	**V1/V3**	**V2/V3**
Content/material Linguistics Appearance Access	81%	84%	90%
Final average/percentage of agreement of the three validators	85% (*Almost perfect*)		

Based on the results in Table 2, the interactive e-module developed achieved an agreement value of 85%, with the criteria nearly perfect. The agreement percentage is considered consistent because it exceeds 75%. The level of agreement indicates the extent to which the validators provide similar assessments of the validated e-module's aspects. Meanwhile, the almost-perfect category indicates that the assessment between validators is highly consistent, yielding validation results that are very strong and supporting the e-module's eligibility for use in science learning. In addition, the interactive e-module developed was also tested for readability. The readability test was conducted by thirty-ninth-grade students of a Public Junior High School in Malang. The results of the readability test are shown in Table 2.

Table 2. Student Readability Test Results

Assessment Indicators	Percentage (%)	Criteria
Attraction	88%	Very good
Linguistics	88%	Very good
Material	86%	Very good
Rat rat	**87%**	**Very good**

Based on the results of the student readability test on Table 3, indicating that the developed interactive e-module obtained a score of 87% with a very good readability level. Readability in this context refers to the extent to which the e-module content's text, display, and structure are easily understood, followed, and used by students independently. The high readability score indicates that students find the e-module easy to understand due to simple language, non-convoluted sentences, an attractive display, and content presented in a structured, easily accessible format. Although it has not been implemented directly to measure conceptual understanding, this e-module is designed using an inquiry-based learning model to facilitate students' active involvement in the learning process through various investigative activities.

Based on the data analysis, the interactive e-modules are inquiry-based, and the developed pressure material is highly suitable for science learning. This is evidenced by the 85% agreement rate among validators. According to McHugh (2012), the results fall into the almost-perfect category. The agreement percentage is considered consistent because it exceeds 75%. Borich (2003) explains that validation by several validators is considered consistent if the percentage agreement between validators exceeds 75% (≥ 75%). The level of agreement indicates the extent to which the validators provide similar assessments of the validated e-module's aspects. Meanwhile, the almost-perfect category indicates that the assessment between validators is highly consistent, yielding validation results that are very strong and supporting the e-module's eligibility for use in science learning.

The interactive e-module has a very good readability level, indicating that students find it easy to understand due to simple language, non-convoluted sentences, an attractive appearance, and content presented in a structured manner and in a way that is easily accessible independently. This is supported by the readability test results, which showed an overall score of 87%, with breakdowns by indicator: interestingness (88%), language (88%), and material (86%). According to Riduwan (2018), the results fall into the very good category. The three indicators align with the advantages of e-modules, according to Lastri (2023), namely: increasing appeal and stimulating students' thinking; using language that is easy to understand and supports two-way communication; and helping students understand the material being studied more easily.

The developed e-module combines various multimedia components, including text, images, audio, and video, and is equipped with interactive features that enable two-way communication between the user and the e-module (Prastowo, 2015). Interactive communication is two-way communication that involves interrelated actions and reciprocal relationships between parties (Warsita, 2008). This definition also includes two-way or more communication involving several interconnected communication

components (Arsyad & Fatmawati, 2018). In addition, interactivity refers to a system or medium's ability to receive and accommodate user responses (Wulandari, 2020). Interactive is also understood as a process involving interconnected, mutually influencing actions among the parties or components involved (Abdullah et al., 2021). Based on several of these definitions, it can be concluded that interactive communication is two-way, involving reciprocal actions and responses between related components, enabling dynamic relationships and accommodating user responses.

Interactive in the development of this e-module means that users do not only read or view content passively, but can also participate actively through various activities such as answering questions in text or audio form, clicking buttons, exploring simulations, playing interactive question games, accessing external links that direct users to additional learning resources outside the e-module, watching videos with inserted questions, and getting direct feedback from the system. Some of the interactive features added to the developed e-module include: a live worksheet, a word wall, a PhET simulation, a QR Code, and a hyperlink. The developed e-module is presented in digital form via a platform or software accessible on a computer, laptop, smartphone, and the internet (Priyanthi et al., 2017). The development of interactive e-modules in this study aligns with current digital learning trends that increasingly emphasise integrating multimedia technology and interactive features to enhance students' learning experience. According to Avianti (2025), interactive e-modules developed for school learning have been proven to increase student engagement through attractive visual displays, reflective activities, and features that stimulate exploration of the material.

In this development, the e-module was designed using the application Canva. Canva is an online design application that can be accessed for free and is designed to be easy for users to use (Wulandari & Mudinillah, 2022). The planned e-module is then packaged into a flipbook digital using the Heyzine platform. Platform Heyzine allows conversion of PDF documents into digital flipbooks, such as books, brochures, catalogues, or magazines, that can be accessed online without downloading an application (Daniyah & Yuni, 2024). The presentation of e-modules in digital form aims to make them easier for students to access, enabling them to learn independently. This aligns with Lastri's (2023) statement that the advantage of e-modules lies in their ability to support independent learning and provide flexibility in accessing materials anytime, anywhere.

The developed e-modules are compiled by paying attention to the characteristics of the e-modules according to Putra & Tambunan (2023), which includes: 1) Self instruction, e-modules are designed so that students are able to learn independently without assistance from other parties, 2) Self contained, e-modules cover all the material needed to understand a topic or competency, 3) Stand alone, e-modules can be used without having to rely on or be combined with other media, 4) Adaptive, e-modules are able to adapt or adjust to developments in science and technology, 5) User friendly, e-modules meet the rules of being friendly to their users so that they can be easily understood and used by their users. The developed e-modules include several key components that support the learning process. These components are

arranged based on research conducted by Lastri (2023) and Yelvita (2022), which includes the front page (cover), foreword, table of contents, list of figures, introduction, instructions for using the e-module, learning activities, exercises, summary, formative test, answer key for formative test, glossary, and list of references.

The e-modules developed in this study were designed to integrate learning models and inquiry-based learning. The developed e-module is compiled with attention to the inquiry learning steps outlined by Sanjay (2017), including: orientation, formulating problems, proposing hypotheses, collecting data, testing hypotheses, and formulating conclusions. The selection of this model is based on the characteristics of inquiry-based learning, which is in accordance with the characteristics of science learning, namely in the scientific process, it is necessary to use scientific methods, starting from formulating problems, compiling a framework for thinking in proposing hypotheses, formulating hypotheses, testing hypotheses, and drawing conclusions (Mariana & Praginda, 2009). In addition, inquiry learning helps students gain a better understanding of the basic concepts being studied, encourages them to formulate their own hypotheses, and fosters a learning environment that stimulates curiosity (Anwar, 2015). In line with research by Faisal et al. (2025), which shows that the implementation of e-modules based on inquiry-based learning can improve students' conceptual understanding. The learning approach that integrates inquiry steps provides a more interactive and enjoyable learning experience. This makes the learning process more meaningful and effective because students not only receive information passively but also participate in the scientific process, fostering critical thinking and problem-solving skills. By integrating inquiry-based learning into e-modules, it is hoped that students can be more active in the learning process and gain a deeper understanding of the concepts being studied.

The development of this e-module focuses on pressure because it is closely related to phenomena encountered in everyday life. Pressure is a skill students need to master because it serves as the foundation for learning at the next level (Sari et al., 2022). Pressure and its material explain the pressure of substances and their everyday applications. Pressure on substances is divided into three types: solids, liquids, and gases (Arjuna et al., 2017). E-modules are designed systematically and aligned with the current curriculum (Fausih & Danang, 2015). In line with Depdiknas (2008), a good e-module focuses on a particular subject. The stress material is found in the CP Natural Sciences phase D of class IX, independent curriculum. The material in the e-module is prepared by analysing several reference books used by teachers in their teaching and supported by various other relevant sources.

This study contributes an e-module that can be used as teaching material and additional learning resources in science, especially for topics related to pressure. This study can also serve as a reference for the use of digital technology-based learning media. However, this study has several limitations. First, the scope of development is limited to interactive e-modules based on inquiry learning for junior high school science subjects, specifically pressure material, to provide an opportunity for future research to develop similar e-modules for other materials. Second, the e-module development process in this study only includes three initial stages of the development model, namely definition, design, and development, without continuing to the

dissemination stage. Thus, further research is expected to complete the process through the implementation stage and conduct effectiveness testing to assess the product's development.

CONCLUSIONS

This research has succeeded in producing an interactive e-module based on inquiry-based learning, designed for pressure material for grade IX junior high school students. This e-module presents various interactive features, such as text and audio questions, simulations, educational games, external links, and direct system feedback, integrated into learning activities arranged according to the inquiry-based learning model. Based on the analysis of expert lecturers' and science teachers' assessments, the developed interactive e-module demonstrated validity, with an agreement percentage of 85%, which was categorised as almost perfect and described as consistent. The level of agreement indicates the extent to which the validators gave similar assessments of the aspects of the validated e-module. Meanwhile, the almost-perfect category indicates that the assessment between validators is highly consistent, so the validation results are very strong and support the e-module's suitability for use in science learning. In addition, analysis of student responses showed that the e-module's readability was very good, with a score of 87%. This high readability score indicates that students find the e-module easy to understand, thanks to simple language, straightforward sentences, an attractive appearance, and content presented in a structured, easily accessible manner. Although it has not been implemented directly to measure conceptual understanding, this e-module is designed using an inquiry-based learning model to facilitate students' active involvement in the learning process through various investigative activities.

AI-ASSISTED TECHNOLOGY STATEMENT

While preparing this work, the authors used Grammarly to check for grammatical errors and ChatGPT to create the Graphical Abstract. After utilising these tools, the authors reviewed and edited the content as needed and took full responsibility for the publication's content.

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