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Electronic Science Module in the Merdeka Curriculum: Teacher and Student Perspectives

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Abstract: Education curriculum in Indonesia changed from the revised 2013 Curriculum to the Merdeka Curriculum. It requires the strategic, methods, teaching materials, learning model, media and method used by teachers. One of the teaching materials is an electronic module. The research aimed to explore information from the perspective of teachers and students regarding the electronic science module in the Merdeka Curriculum. The type of research used is descriptive qualitative and quantitative descriptive. The data collection technique was carried out by interviewing three science teachers, and an open questionnaire of students from three schools in Yogyakarta by 115 students. The research results according to the teacher's and student's perspective on electronic science module in the Merdeka Curriculum. Teachers are very interested in using electronic modules to help science learning. Students prefer to study with electronic module because they can be accessed via laptops or smartphones and can add teaching materials other than textbooks to the implementation of the Merdeka Curriculum. Electronic module can be used as an alternative solution to support students' understanding of science material. The results can be used for further research to develop electronic module that are following the characteristics of students and supported by facilities to access it.

Keywords: Electronic Module; Merdeka Curriculum; Science Learning

Introduction

Education is a place for every individual in the process of developing knowledge, skills, and attitudes as well as all the potential that exists within themselves (Firaina, et.al., 2019). Entering the 21st century, the world of education continues to grow, this requires students to master several competencies independently. Competencies that must be developed in 21st century education are 4C abilities including critical thinking, communication, collaboration, and creativity (Trilling & Fadel, 2009).

Science learning requires students to have the basic concepts of science in everyday life (Sutarto, & Wicaksono, 2021). Science learning plays an essential role in education because it can arouse students' interest in developing knowledge. Therefore learning science teaches students to find concepts, principles, and theories (Indrawati, et.al., 2021). The main problem in science is difficult to understand. It occurs due to the lack of linkages in science learning with everyday life (Rizkiyah, et.al., 2020). The learning process is influenced by the curriculum applied.

Education Curriculum in Indonesia have changed from the revised 2013 curriculum to the Merdeka Curriculum. Curriculum changes are aimed at overcoming learning loss during the COVID-19 pandemic (Jojor & Sihotang, 2022)). The changes can be observed through strategic approaches, teaching materials, learning models, and the methods used. The main problem in the 2013 curriculum are the learning

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load borne by students is too much, so many teachers override students due to the completion of the material, teachers are still concentrated on preparing administrative documents, so a curriculum that is easy to implement is needed, and the 2013 curriculum does not provide flexibility for schools to increase creativity and innovation according to the needs of their environment, so a flexible curriculum is needed. The Merdeka Curriculum is a learning design that provides opportunities for students to learn in a relaxed manner. Students become happy, free from stress, and free from pressure to show their natural talents. It focuses on freedom and creative thinking.

The Merdeka Curriculum is one of the curriculum concepts that demands independence from students. Independence is defined as each student being given the freedom to access knowledge from formal and non-formal education. This philosophy is the creation of independent individuals (Abidah, et.al, 2020), including freedom of education in the delivery of ideas (Marope, 2019). Its curriculum does not limit the concept of learning in school or outside of school and demands creativity from teachers and students. The Merdeka Curriculum aims to answer the educational challenges in the era of the industrial revolution 4.0. It must support skills in critical thinking and problem-solving, creativity, and innovative skills in communicating and collaborating with students.

Based on the decision of the Ministry of Education and Culture of Research and Technology Number 56/M/2022 concerning guidelines for implementing curriculum in the context of learning recovery, education units need to develop a curriculum with the principle of diversification following the conditions of the education unit and students. The implementation of the Merdeka curriculum is carried out in stages starting in the 2022/2023 school year. The first year is implemented in 7th grade at the elementary and secondary education levels. As for the implementation of the Merdeka Curriculum in educational units, flexibility is given in implementing according to the choice of each educational unit based on the circular letter of the Ministry of Education and Culture of Research and Technology Number 1919/BI.B5GT.01.03/2022. The implementation of the Merdeka Curriculum is carried out through independent learning, independent change, and independent sharing pathways. In several Yogyakarta City Public Middle Schools, the Merdeka Curriculum is implemented with independent pathways changing by using the teaching tools provided on the Merdeka Mengajar platform according to the level of the educational unit.

Learning success is supported by teaching materials. Teaching materials also support the learning process. It can be printed or non-printed (Istiqomah et al., 2019). Non-printed teaching materials mean tangible or visible teaching materials, for example, books, modules, worksheets, magazines, etc. Printed teaching materials are teaching materials that utilize electronic technology, for example, electronic books, electronic module, electronic magazine, and others (Risdianto, 2017).

The use of teaching materials in learning can provide benefits to students. There are several advantages to using teaching materials, namely making students participate creatively and think analytically when they are involved in learning, the concepts learned using teaching materials become clearer to students because these concepts are taught through learning activities, encouraging a systematic integration of a variety of sources in a learning experience, 4) being actively involved in improvisation, working principles are learned, and in this way, students acquire problem-solving skills, attitudes and scientific knowledge needed in solving scientific and technological problems (Akani, 2016).

One of the teaching materials that can be used in science learning is an electronic module. Electronic modules are a practical and effective learning resource compared to printed modules, because electronic module can used on a computer, laptop, or smartphone. In addition, the weakness of the print module is that it cannot be equipped with videos in its presentation so whereas electronic modules can be equipped with videos in their presentation (Juliantini, et.al., 2015). Kimianti & Prasetyo (2019) state that the electronic science module based on Problem Based Learning is a teaching material made online that is practical, flexible, and independent. It can facilitate students' scientific literacy skills so they can solve everyday problems and meet global challenges. Based on the background above, the research aims to explore information from the perspective of teachers and students regarding the electronic science module in the Merdeka Curriculum.

According to Aprima & Sari (2022), one way of learning that is student-centered is by implementing differentiated learning. Differentiated learning is a form of effort in a series of learning that pays attention to the needs of students in terms of learning readiness, student learning profiles, interests, and talents (Tomlinson, 2021). There are three approaches to differentiated learning, namely content, process, and product (Taylor, 2015). Content differentiation refers to what is learned by students related to curriculum and learning materials. Process differentiation is a way for students to process ideas and information that includes how

students have learning styles. Product differentiation, namely students show what they have learned. However, teachers' pay a lot of attention to product differentiation compared to process differentiation and learning content (Ismajli & Imami-Morina, 2018). Although this differentiated learning is not new, teaching and learning activities are still rarely done. Teachers can develop learning module with differentiated teaching in the independent curriculum (Marliana et al., 2022). This proactive approach can contribute to a comprehensive and effective educational experience, ensuring that diverse learning needs are met and fostering a supportive and inclusive learning environment.

Method

The type of research used is descriptive qualitative and quantitative descriptive research. Data collection techniques were carried out by interviewing science teachers and opening questionnaires for students from three schools. Interviews were conducted with science teachers who taught 7th grade as many as three people from SMPN 14 Yogyakarta, SMPN 15 Yogyakarta, and SMPN 16 Yogyakarta. The questionnaire was given to students from the same three schools and represented 115 students.

The indicator questions given include the implementation of the Merdeka Curriculum in schools, the use of learning media and teaching materials, the obstacles encountered when learning science, and the use of electronic modules. Data analysis techniques refer to the Miles, Huberman & Saldana (2014) model, including reducing data, presenting data, and drawing conclusions or verifying data.

Result and Discussion

Teacher Perspectives

Each of the teachers from SMPN 14 Yogyakarta, SMPN 15 Yogyakarta, and SMPN 16 Yogyakarta have implemented the Merdeka Curriculum for 7th grade in the 2022/2023 academic year. By changing the independent choice, the intention is to give schools the flexibility to use the learning tools provided in the Merdeka Curriculum. The reason schools choose to change independently is still in the early stages of implementing the Merdeka Curriculum, so they had to learn a lot from schools that had implemented it, and tools could take examples from the platform. In the Merdeka Curriculum, teachers are given the freedom to determine their learning both from the teaching materials, learning methods, learning models and assessment used. Furthermore, additional research suggests that the incorporation of assessment in the Merdeka Belajar curriculum can involve the integration of various models, including diagnostic assessment, formative assessment, and summative assessment (Yulianto, 2022). On the learning basis directed centered on students and demands the activeness of students in learning process (Hasanah, et.al., 2022).

In the learning process there are various obstacles, including learning science. The obstacles encountered were inadequate facilities and infrastructure, teaching materials, obstacles in implementing learning models and classroom management (Ilma, et.al., 2022). It was also found in the implementation of science learning in the Merdeka Curriculum.

The teacher of SMPN 14 Yogyakarta stated:

> "*Children's enthusiasm for learning is still lacking, because they studied online for a long time during the pandemic*".

The teacher of SMPN 15 Yogyakarta stated:

> "*Sometimes the internet network is trouble, so it hinders the process learning*".

The teacher of SMPN 16 Yogyakarta stated:

> "*There are some students who lack motivation in learning, and limited Wi-Fi in class. The teacher need to improve skills in managing classes and various learning using teaching material*".

The obstacles exist in science learning when implementing the Merdeka Curriculum include the need for teacher skills to manage classes and the need for varied teaching materials that apply differentiated learning. An essential component in the learning process is the existence of teaching materials for students (Mulyasa, 2009). In order to improve their competence, teachers need a variety of good teaching materials in textbooks, modules, and worksheets that can help the learning process properly.

The purpose of a learning module for students is to make them easily understand the subject matter. Each module provides a context for understanding and applying a particular concept (Zulhaini, et.al., 2016). The developed module has two functions, namely as an independent learning tool for students at home and can be used by the teacher as a teaching aid or supplementary tool in class. There are two types of modules (electronic module and printed module). Each of these types of module has advantages and disadvantages. Electronic module can use in independent learning (Asrial, et.al., 2021; Hadiyanti, et.al., 2021), which is arranged systematically into learning units and can input the animations, audio, and navigation to make users more interactive with the program (Sugianto, et.al., 2017). If viewed from the benefits of electronic media, it can make the interactive

learning process and can be used anytime and anywhere to improve the quality of learning (Wiyoko, et.al., 2014). The teacher of SMPN 14 Yogyakarta teacher stated:

> "*Never before made electronic modules and used them in class. With electronic modules children are more interested and can help learning*."

The teacher of SMPN 15 Yogyakarta teacher stated:

> "*Have made and used it on atomic, ionic and molecular matter. Electronic modules can help learning because they are more interesting*."

The teacher of SMPN 16 Yogyakarta teacher stated:

> "*Never made electronic modules and used them in class, electronic modules make them more interested and help learning*."

Based on interviews, it was found that teachers still rarely use electronic module in science learning, but they believe that the use of electronic modules can make learning more interesting for students.

Student's Perspective

The survey results show that 83.60% of students prefer to study with a Merdeka Curriculum, while 16.40% of students do not study with a Merdeka Curriculum (see Figure 1).

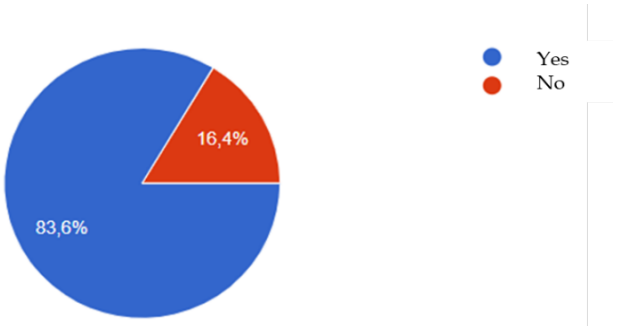

Figure 1. Questionnaire results about feeling of students in learning with the merdeka curriculum

Students choose enjoy learning with a Merdeka Curriculum for several reasons, including fun, and lots of project activities, apart from learning in class they also learn outside the classroom, there are other experiences and can practice directly. A small number of students stated that they did not like learning with a Merdeka Curriculum, because there were many project assignments, so they had to be extra and there were also those who stated that group work felt like doing individual assignments because their group mates did not want to work.

Most of the students (69.80%) agreed with supporting teaching materials because at the beginning of this Merdeka Curriculum, teachers only used textbooks published by the Ministry of Education and Culture of Research and Technology. Meanwhile, around 30.20% of students stated that they did not need other supporting teaching materials in learning science.

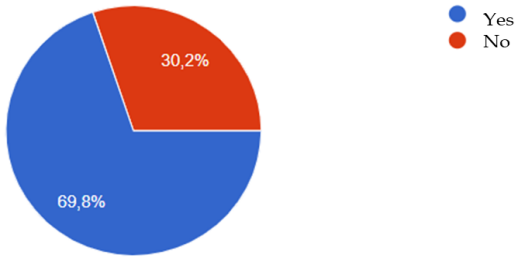

Figure 2. Questionnaire results about the need for teaching materials to support science learning

From the question of interesting teaching materials to study, students prefer electronic module that can be accessed via smartphone, which is around 83 student (71.60%), 56 students chose tutorial video (48.30%), 52 students chose books (44.80%) and 38 students chose printed module (32.80%).

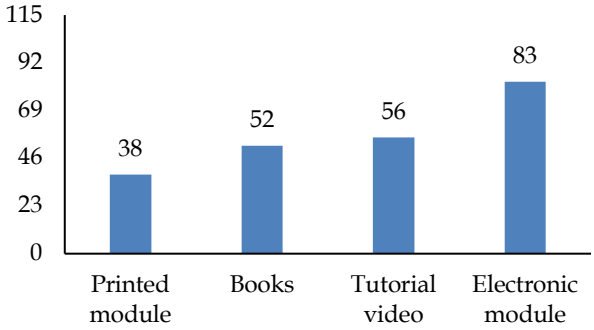

Figure 3. Questionnaire results about the interesting teaching materials

Based on the results of the questionnaire (see Figure 3), the electronic module gets the largest percentage. According to students, they can better understand science material using electronic module around 93.10% (see Figure 4).

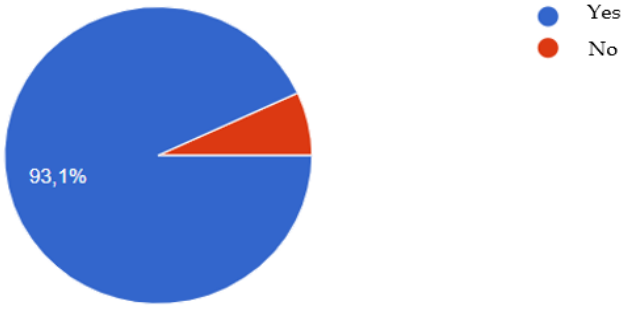

Figure 4. Questionnaire results about the electronic module to understand the science material in curriculum merdeka

Electronic science module can be developed by integrating learning approaches and models, such as SETS (Science, Environment, Technology and Society) (Enawaty, 2023; Muniroh et al., 2023; Yani et al., 2022), problem based learning (Adhelacahya et al., 2023), STEM (Science, Technology, Engineering and Mathematics) (Hendri et al., 2021; Indriana & Kamaludin, 2023), and inquiry (Andriani et al., 2021). The implementation of electronic science module can improve students' critical thinking abilities (Liana et al., 2022; Nurmasyitah et al., 2023; Prabasari & Wahyuningsih, 2021), high level thinking abilities (Rusni et al., 2023), and the abilities of 21st century students (Susilawati et al., 2023). Thus, using the holistic approach or learning model to the development of electronic science module is not only relevant to the development of educational curricula, but also supports the formation of a generation of students who are ready to face the demands of ever-changing times.

Conclusion

Based on the results and discussion, several conclusions can be drawn according to the teacher's and student's perspectives on electronic science module in the Merdeka Curriculum. Teaching materials are needed to complement the science package books and facilitate differentiated learning. Teachers are very interested in using electronic modules to help science learning. Students prefer to study with electronic modules because they can be accessed via laptops or smartphones and can add teaching materials other than textbooks to the implementation of the Merdeka Curriculum. Electronic module can be used as an alternative solution to support students' understanding of science material when implementing the Merdeka Curriculum. The results can be used for further research to develop electronic module that are following the characteristics of seven students and supported by facilities to access electronic module.

Authors Contribution

Data collection and analysis, A.S.; methodology, A.Z.I.; validation, M. and I.W.; original draft preparation, A.S. and A.Z.I; writing—review and editing, A.S., A.Z.I., M. and I.W.

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Conflicts of Interests

The authors declare no conflict of interests.

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