



Preliminary Study: Analysis of the Need for Physics E-Modules as Guided Inquiry-Based Teaching Materials at MAN 1 Mandailing Natal

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Abstract: This research was carried out to develop a learning resource type of learning media in the form of guided inquiry-based teaching materials. So, preliminary study research is needed which consists of literature study and field study. The type of research carried out was qualitative descriptive research. The data collection instruments for this research are interview sheets, teacher needs analysis questionnaires, and student needs analysis questionnaires. The teaching materials developed are in the form of (e-modules) electronic modules that can contain text, images and learning videos, as an independent learning effort that is arranged systematically. To create an e-module using the Canva application. A needs analysis is carried out to determine the learning resources used by teachers, obstacles when learning takes place, and the learning resources needed by students. The results of the analysis of teacher needs show that religious analysis is 83% in the good category, attitude analysis is 94% in the very good category, knowledge analysis is 65% in the sufficient category, performance analysis is 83% in the good category, analysis of learning difficulties is 58% in the poor category, material analysis teaching 50% in the poor category and model analysis 67% in the sufficient category. Furthermore, the results of the analysis of students' needs show that motivation analysis is 70% in the sufficient category, interest analysis is 50% in the poor category, attitude analysis is 81% in the good category, creative thinking analysis is 49% in the poor category and material analysis is 48% in the poor category. These results indicate the need to develop teaching materials in the form of e-modules based on guided inquiry on global warming.

Keywords: Electronic module; Inquiry-based; Preliminary study

Introduction

According to Law of the Republic of Indonesia Number 20 of 2003 Chapter 1 Article 1 concerning the National Education system where education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and skills needed by himself, society, nation and state (Depdiknas, 2003). National education functions to develop abilities and shape the character

and civilization of a dignified nation in order to make the nation's life more intelligent, aimed at developing the potential of students to become human beings who have faith and are devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens.

Education is one of the benchmarks for the nation's progress and is seen as an instrument for planned human resource development (Soraya, 2020). According to Utami et al. (2020), education is an effort to develop the potential of students. The potential developed by students includes the potential for themselves to have

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religious spiritual strength, self-control, personality, intelligence, noble morals, as well as the skills needed for them, society and the country. Developing students' potential can be done through learning resources because the use of learning resources can be a component that influences the learning process and outcomes. One of the learning resources that can be used by teachers is teaching materials (Depdiknas, 2008).

Globalization is a process in which all aspects of human life will develop both directly and indirectly. The practical impact of this development is in the field of education (Purwoko et al., 2020). In the era of globalization, education with science and technology (IPTEK) has a very close relationship and influences the development and innovation of teaching materials. Innovation in the development of educational materials is electronic modules (e-modules) (Yuliawati et al., 2020). E-Modules are books in the form of software files that can be opened and read anywhere and anytime (Seamardi, 2016; Hidayatullah & Rakhmawati, 2016; Sugianto et al., 2017; Andani & Yulian, 2018). One of the lessons that require teaching materials in the form of electronic modules (e-modules) is physics.

Physics is a branch of science that has a significant influence on various developments. This is because physics provides space for humans to study and understand various natural phenomena that have, are and will occur around us. So, through understanding these concepts, students are expected to be able to overcome existing physics problems (Abbas & Hidayat, 2018). One of the problems or natural phenomena related to physics that is currently occurring is Global Warming. Global Warming in physics is one of the basic concepts that students need to understand and is closely related to the environment. Global warming is an event that continues to increase every year and repeats itself in human life, where sunlight that enters the layers of the earth is partly absorbed by the earth and partly reflected and trapped in the earth (Lestari, 2019; Pratama, 2019; Kurniarahma et al., 2020; Mukono, 2020; Leu, 2021; Bunyamin et al., 2023).

One way to create e-modules is by using the Canva application. Canva is an application that can be used to create various visual content designs for websites or modules, books and in which online practicums can be carried out (Rosmalinda & Pamela, 2023). Apart from that, Canva also has a page editing function which can create interactive book pages by inserting multimedia such as images, video, audio, hyperlinks, etc. The Canva application has many advantages, namely because of its pleasant appearance.

The research that will be carried out is developing learning media in the form of teaching materials intended to be online-based. Therefore, preliminary

study research is needed consisting of literature studies and field studies. Literature studies aim to collect information and determine what is done in learning activities, while field studies aim to determine learning conditions in schools. This is in line with Imaningtyas et al. (2016), Miswati et al. (2020), and Malina et al. (2021) that field studies are carried out by collecting various information such as analyzing the needs of teachers and students for teaching materials or learning media to determine field conditions. The aim of this research is to find out the learning resources used by teachers, the obstacles when learning takes place, and the learning resources needed by students.

Method

The type of research carried out was descriptive qualitative research which was carried out on August 21, 2023. In this research, the initial method was observation of the theories supporting this development research. The theories and previous research being sought are related to the development of physics e-modules as Guided Inquiry-based teaching materials, as well as supporting theories for physics material, namely global warming material which will be discussed in the development product. In carrying out field studies, the samples used were saturated samples. The research subjects were students of class XI MAN 1 Mandailing Natal, totaling 30 students and 1 teacher. Data analysis uses Interactive Analysis from Miles et al. (2007), analysis consists of three activity flows that occur simultaneously, namely: data collection, data presentation, drawing conclusions as seen in Figure 1.

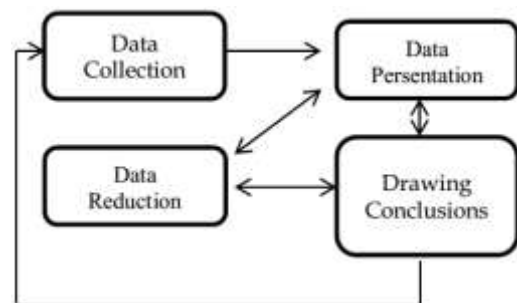


Figure 1. Interactive analysis

Based on Figure 1, the stages of data analysis in this research are as follows; (1) record all phenomena findings through observation, interviews and giving questionnaires to a class X MIA 1 physics teacher at MAN 1 Mandailing Natal. This was done to determine the analysis of the need for teaching materials that will be developed in the form of guided inquiry-based e-modules on global warming mitigation, (2) after collecting the data, the data is then reduced with

analysis that sharpens, categorizes, directs, removes what is not necessary, and organizes data in such a way that final conclusions can be drawn and verified, (3) describing data that has been classified taking into account the focus and objectives of the research, (4) making a final analysis in the form of a research results report. Where in processing the questionnaire results using the Likert scale formula, using the following equation:

$$\text{Score} = \frac{\text{Score gained}}{\text{Maximum score}} \times 100\% \quad (1)$$

Then the results obtained are entered according to the criteria below:

Table 1. Criteria for Needs Analysis Results (Kemendikbud, 2014)

Mark	Criteria
90 < Score ≤ 100	Very good
80 < Score ≤ 90	Good
70 < Score ≤ 80	Enough
Score ≤ 60	Not enough

Results and Discussion

Based on the analysis of teachers' needs during observations at the time of the interview, it was obtained

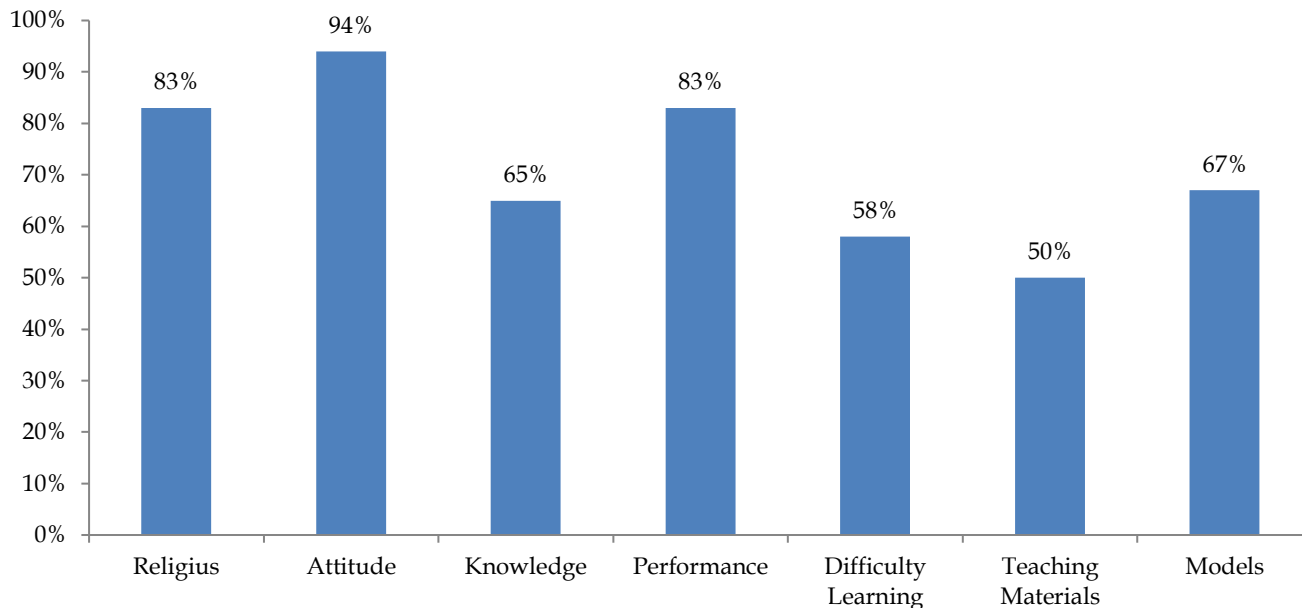


Figure 2. Teachers' needs during observations at the time of the interview

The sixth analysis is the analysis of student characteristics, where there are four parts. The first is the analysis of student motivation with an average score of 70% in the sufficient category. The second is an analysis of student interest with an average score of 50% in the poor category. Next, the third is attitude analysis with

that the first analysis of Graduate Competency Standards (SKL) was carried out. In the SKL analysis there were three sections, namely the religious competency section with an average score of 83% in the good category, attitudinal competency with an average score of 94 % in the very good category, knowledge competency with an average value of 65% in the poor category. The second analysis is performance analysis with an average value of 83% in the good category. The third analysis is an analysis of students' learning difficulties with an average score of 58% in the poor category. According to Putri (2019), to overcome students' learning difficulties, it is necessary to apply models to the learning process. The fourth analysis is the analysis of teaching materials with an average score of 50% in the poor category. Where it only uses textbooks that come from publishers, apart from that, the scientific approach process is not well described, where the book only consists of material descriptions, example questions, and practice questions at the end of the chapter. If seen from the form of presentation of teaching materials, it is still not in accordance with the scientific approach. The fifth analysis is the analysis of learning models with an average score of 67% in the sufficient category.

an average score of 81% in the sufficient category. Then the fourth analysis is an analysis of student skills, where students' creative thinking skills are at an average value of 49% in the poor category. The fifth analysis is material analysis with an average value of 48% in the poor category.

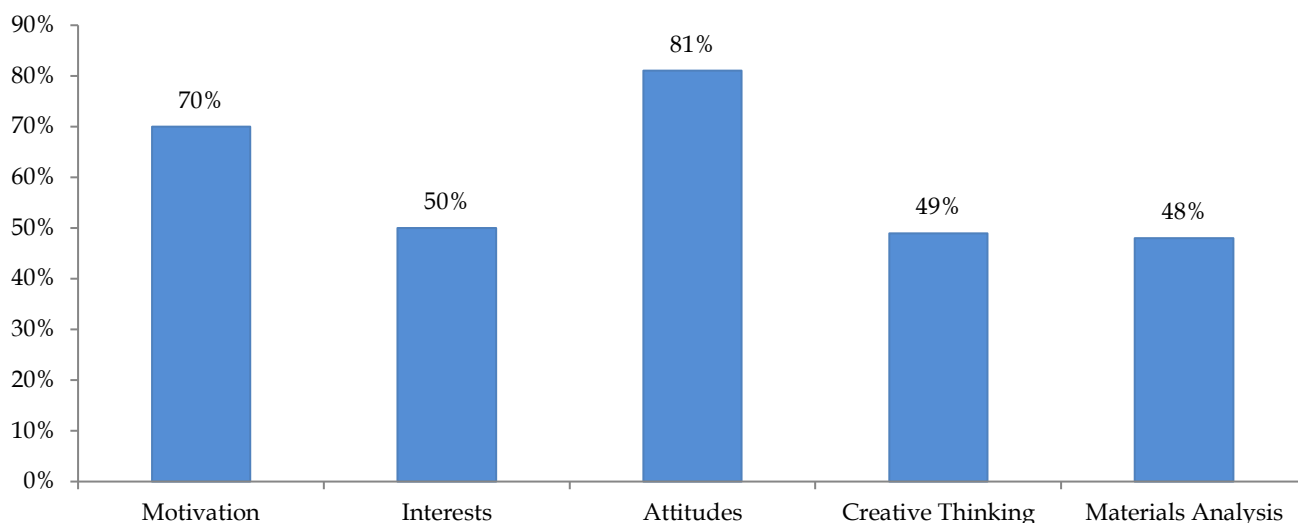


Figure 3. The analysis of student characteristics

Based on the analysis of the needs of educators and students, it is known that there are problems with learning difficulties, teaching materials, interests, creative thinking skills and learning models. Even though the learning model has received a score in the sufficient category, the teacher does not apply this model to the teaching materials. The role of learning models should be very important to apply as a solution to overcome learning difficulties in the learning process. Then increasing students' interest in learning can be done through the application of electronic teaching materials in the learning process such as e-modules, this is in line with research by Putra et al. (2016), Arfianawati et al. (2016), Primadi et al. (2018), Haspen et al. (2020), and Haspen et al. (2021), where the design of e-modules is interesting can increase students' interest in learning it. Therefore, to overcome these problems, it is necessary to develop teaching materials using appropriate models to achieve learning objectives. One learning model that can be used for the learning process in accordance with the independent curriculum is the Guided Inquiry learning model.

Conclusion

The conclusion obtained is that students need a learning resource to be able to strengthen students' understanding of Global Warming material and need learning resources that can be understood independently. So what is suitable to use is Guided Inquiry-based e-module teaching materials which can contain text, images and videos.

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Author Contributions

The researcher's contribution included, among others, Rahmi Habibah: collecting data, analyzing data, processing data, writing original drafts and others. Ahmad Fauzi focuses on methodology and writing reviews.

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Conflicts of Interest

The authors declare no conflict of interest.

References

- Abbas, A., & Hidayat, M. Y. (2018). Faktor-Faktor Kesulitan Belajar Fisika pada Peserta Didik Kelas IPA Sekolah Menengah Atas. *Jurnal Pendidikan Fisika*, 6(1), 45-49. <https://doi.org/10.24252/jpf.v6i1a8>
- Andani, D. T., & Yulian, M. (2018). Pengembangan Bahan Ajar Electronic Book Menggunakan Software Kvisoft Flipbook pada Materi Hukum Dasar Kimia di SMA Negeri 1 Pantou Reu Aceh Barat. *Jurnal IPA dan Pembelajaran IPA*, 2(1), 1-6. <https://doi.org/10.24815/jipi.v2i1.10730>
- Arfianawati, S., Sudarmi, M., & Sumarni, W. (2016). Model Pembelajaran Kimia Berbasis Etnosains untuk Meningkatkan Kemampuan Berikir Kritis siswa. *Jurnal Pengajaran MIPA*, 21(1), 46-51. <https://doi.org/10.18269/jpmipa.v21i1.36256>
- Bunyamin, B., Kurniasari, F. D., Hady, M., Pramanda, H., & Idroes, I. (2023). Peran Masyarakat dalam Rangka Mengatasi Pemanasan Global. *Ikhlas: Jurnal*

- Pengabdian Kepada Masyarakat*, 1(1), 1-7. <https://doi.org/10.55616/ikhlas.v1i1.410>
- Depdiknas. (2003). *Undang-undang RI No.20 Tahun 2003 Tentang Sistem Pendidikan Nasional*. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah.
- Depdiknas. (2008). *Panduan Pengembangan Bahan Ajar*. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah.
- Haspen, C. D. T., & Syafriani. 2020. The Preliminary Study in the Development of E-Physics Module Integrated Ethnoscience. *Journal of Physics Conference Series*, 1481(1), 012056. <https://doi.org/10.1088/1742-6596/1481/1/012056>
- Haspen, C. D. T., Syafriani, S., & Ramli, R. (2021). Validitas E-Modul Fisika SMA Berbasis Inkuiri Terbimbing Terintegrasi Etnosains untuk Meningkatkan Kemampuan Berpikir Kreatif Peserta Didik. *Jurnal Eksakta Pendidikan (Jep)*, 5(1), 95-101. <https://doi.org/10.24036/jep/vol5-iss1/548>
- Hidayatullah, M. S., & Rakhmawati, L. (2016). Mengembangkan Media Pembelajaran Berbasis Flip Book Maker pada Mata Pelajaran Elektronika Dasar di SMK Negeri 1 Sampang. *Jurnal Pendidikan Teknik Elektro*, 5(1), 53-88. <https://doi.org/10.26740/jpte.v5n1.p%25p>
- Imaningtyas, C. D., Karyanto, P., Nurmiyati, N., Asriani, L. (2016). Penerapan E-modul Berbasis Problem Based Learning untuk Meningkatkan Literasi Sains dan Mengurangi Miskonsepsi pada Materi Ekologi Siswa Kelas X MIA 6 SMAN 1 Karanganyar Tahun Pelajaran 2014/2015. *BIOEDUKASI*, 9(1), 4-10. <https://doi.org/10.20961/bioedukasi-uns.v9i1.2004>
- Kemendikbud. (2014). *Panduan Teknis Pembelajaran dan Penilaian*. Jakarta: Kementerian Pendidikan dan Kebudayaan.
- Kurniarahma, L., Laut, L. T., & Prasetyanto, P. K. (2020). Analisis Faktor-Faktor yang Mempengaruhi Emisi CO₂ di Indonesia. *DINAMIC: Directory Journal of Economic*, 2(2), 368-385. <https://doi.org/10.31002/dinamic.v2i2.1429>
- Lestari, E. A. P. (2019). Efektivitas Ruang Terbuka Hijau dalam Mereduksi Emisi Gas Karbon di Kota Banjarmasin, Kalimantan Selatan. *Seminar Nasional Geomatika*, 3, 397-404. <https://doi.org/10.24895/SNG.2018.3-0.979>
- Leu, B. (2021). Dampak Pemanasan Global dan Upaya Pengen-Daliannya Melalui Pendidikan Lingkungan Hidup dan Pendidikan Islam. *AT-TADBIR*, 1(2), 1-15. <https://doi.org/10.51700/attadbir.v1i2.207>
- Malina, I., Yuliani, H., & Syar, N. I. (2021). Analisis Kebutuhan E-Modul Fisika sebagai Bahan Ajar Berbasis PBL di MA Muslimat NU. *Silampari Jurnal Pendidikan Ilmu Fisika*, 3(1), 70-80. <https://doi.org/10.31540/sjpif.v3i1.1240>
- Miles, M. B., & Huberman, A. M. (2007). *Analisis Data Kualitatif* (Terj. Tjetjep Rohendi Rihidi). Jakarta: UI Press.
- Miswati, M., Amin, A., & Lovisia, E. (2020). Pengembangan Media Pembelajaran Power Point Macro Berbasis Problem Based Learning Materi Besaran dan Pengukuran Sebagai Sumber Belajar Siswa Kelas X. *Silampari Jurnal Pendidikan Ilmu Fisika (SJPIF)*, 2(2), 77-91. <https://doi.org/10.31540/sjpif.v2i2.984>
- Mukono, H. J. (2020). *Analisis Kesehatan Lingkungan Akibat Pemanasan Global*. Surabaya: Airlangga University Press.
- Pratama, R. (2019). Efek Rumah Kaca terhadap Bumi. *Buletin Utama Teknik*, 14(2), 120-126. Retrieved from <https://jurnal.uisu.ac.id/index.php/but/article/view/1096>
- Primadi, M. R., Sarwanto, S., & Suparmi, S. (2018). Pengembangan Modul Fisika Berbasis Inkuiri Terbimbing untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa pada Materi Listrik Dinamis. *M JRPKPF UAP*, 5(1), 1-9. <http://dx.doi.org/10.12928/jrpkpf.v5i1.8392>
- Purwoko, P., Riawan, Y., Nugraheni, P., & Nadhilah, S. (2020). Analisis Kebutuhan Pengembangan E-Modul Berbasis Etnomatematika Produk Budaya Jawa Tengah. *Jurnal Mercumatika: Jurnal Penelitian Matematika dan Pendidikan Matematika*, 5(1), 1-8. Retrieved from <http://ejournal.mercubuana-yogya.ac.id/index.php/mercumatika/article/view/1165>
- Putra, R. D., Rinanto, Y., Dwiastuti, S., & Irfa'i I. (2016). Peningkatan Kemampuan Berpikir Kreatif Siswa Melalui Model Pembelajaran Inkuiri Terbimbing pada Siswa Kelas XI MIA 1 SMA Negeri Colomadu Karanganyar Tahun Pelajaran 2015/2016. *Proceeding Biology Education Conference*, 13(1), 330-334. Retrieved from <https://jurnal.uns.ac.id/prosbi/article/view/5738>
- Putri, E. S. (2019). *Pengaruh Edukasi Gizi Menggunakan Media Leaflet, Lembar Balik dan Video terhadap Pengetahuan dan Praktik MP-ASI pada Ibu Anak Usia 6-24 Bulan di Wilayah Kabupaten Kampar, Riau Tahun 2019* (Thesis). Universitas Andalas. Retrieved from <http://scholar.unand.ac.id/49785/>
- Rosmalinda, D., & Pamela, I. S. (2023). Pengembangan Modul Elektronik Praktikum IPA Menggunakan Aplikasi Canva dan Flip Builder. *Pendas: Jurnal*

- Ilmiah Pendidikan Dasar*, 8(1), 778-789. Retrieved from <https://journal.unpas.ac.id/index.php/pendas/article/view/7476>
- Samidjo, J., & Suharso, Y. (2017). Memahami Pemanasan Global dan Perubahan Iklim. *Pawiyatan*, 24(2), 36-46. Retrieved from <https://e-journal.ivet.ac.id/index.php/pawiyatan/article/view/549>
- Seamardi, B. P. H. (2016). Penerapan Inovasi Flipbook sebagai Media Pembelajaran untuk Meningkatkan Hasil Belajar Pengenalan Php Kelas XI RPL di SMK Negeri 2 Mojokerto. *Jurnal IT-Edu*, 1(2), 42-48. Retrieved from <https://ejournal.unesa.ac.id/index.php/it-edu/article/view/17547>
- Soraya, Z. (2020). Penguatan Pendidikan Karakter untuk Membangun Peradaban Bangsa. *Southeast Asian Journal of Islamic Education Management*, 1(1), 74-81. <https://doi.org/10.21154/sajiem.v1i1.10>
- Sugianto, D., Abdullah, A. G., Elvyanti, S., & Muladi, Y. (2017). Modul Virtual: Multimedia Flipbook Dasar Teknik Digital. *Innovation of Vocational Technology Education*, 9(2), 101-116. <https://doi.org/10.17509/invotec.v9i2.4860>
- Utami, W. T., & Yuwaningsih, D. A. (2020). Analisis Kebutuhan Pengembangan E-Modul pada Pokok Bahasan Turunan Menggunakan Kvisoft Flipbook Maker Pro untuk Siswa SMA Kelas XI. *Prosiding Konferensi Ilmiah Pendidikan*, 1, 149-152. Retrieved from <https://proceeding.unikal.ac.id/index.php/kip/article/view/486>
- Yuliawati, L., Aribowo, D., & Hamid, M. A. (2020). Analisis Kebutuhan Pengembangan Media Pembelajaran E-Modul Berbasis Adobe Flash pada Mata Pelajaran Pekerjaan Dasar Elektromekanik. *Jupiter (Jurnal Pendidikan Teknik Elektro)*, 5(1), 35-42. <https://doi.org/10.24036/jpte.v1i1.53>