Digitalisation of Education For Sustainable Development (ESD) Learning through Hots Literacy-Based Literature Learning Design in Elementary Schools

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Abstract. The reason for this study is to identify something that in the implementation of learning still not integrated, especially about Hots Literacy dimension and teachers understanding of Hot's concept. The construction of a HOTS-based learning programme is an effort to enhance the quality of learning and improve graduate qualifications. The Programme was initiated by the Ministry of Education and Culturewhichhasbeen integrated with Strengthening Character Education since 2018 that put forward in accomplishing 21stcentury education, i.e. the scientific approach, authentic assessment. Therefore learning should be related to the four 21st century character of learning, that is Critical thinking and problem-solving skills, inventiveness and creativity, teamwork and communication or some called it as 4Cs (critical thinking & ploblem soliving,Creative skill & Innovation,Collaboration,Coommunication). The design of literacy learning in this study is based on the hots literacy, which includes problem-based learning, project-based learning, and the Reading to Learn (R2L) model together with a scientific approach. The study's findings are anticipated to raise high-order thinking skills literacy and enhance learning outcomes for grade VIII students at SMPN 14 Medan.The end product of this study is an e-module that has been validated by media and design professionals and shown 3.91; material experts 3.82; pedagogical experts with a very good category amounted to 3,68 The e-module feasibility assessment from students resulted in a score of 3.78 out of maximum possible for this measure (4). This provides evidence that the e-module is viable as an adjunct to independent teaching material for student use.

Keywords: digitalisasi, e-modul, HOTS, education for sustinable development.

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1 Introduction

Currently, at present the development of science and technology (IPTEK) is increasing so that in time it will continue to grow. Therefore, students as human resources (HR) who will go directly to face these developments, it is not enough if only equipped with knowledge, but also must be equipped with supporting skills. Therefore, the 2030 global education agenda is established by UNESCO through SDGs (Sustainable Development Goals) to realize sustainable knowledge goals which also called Solution for Sustainable Education Objectives of UN 2030. Some of the major underlying goals outlined by UNESCO have to do with achieving quality, equitable, inclusive education and promoting lifelong learning opportunities for all (UNESCO 2017).

Education for Sustainable Development (ESD), as an integral component of the Sustainable Development Goals (SDGs), is characterized as a pedagogical framework that incorporates a multitude of perspectives. To actualize the principles of sustainable development, education serves as a critical mechanism. It acts as a conduit for disseminating this paradigm, aimed at transforming individuals' perceptions and attitudes regarding environmental stewardship. A significant proportion of ecological challenges arise from insufficient environmental education and a lack of understanding concerning sustainable lifestyles. In addressing these challenges, UNESCO advocates for an educational paradigm known as ESD (education for sustainable development), which is perceived as a viable pathway to resolution.

Education for Sustainable Development (ESD) encompasses five fundamental modalities of learning, which are essential for delivering high-quality education and promoting sustainable human advancement; these modalities include the acquisition of knowledge, personal development, collaborative living, practical application of skills, and the capacity for self-transformation as well as societal change (UNESCO, 2019). According to the regional report pertaining to Asia-Pacific, ESD is conceptualized as an educational framework aimed at cultivating values that advocate for sustainable development, with the objective of equipping individuals with knowledge pertinent to these values, fostering healthy practices, and nurturing lifestyles conducive to the overarching goal of sustainable development within society as a whole.

Kemendiknas (2010) articulates that the notion of Education for Sustainable Development (ESD) encompasses education that is significant, pragmatic, and directed towards fostering advancement that satisfies the requirements of the current generation without neglecting the necessities of subsequent generations, enhances the quality of human existence while remaining within the ecological carrying capacity, and provides advantages to all living entities on the planet both presently and in the future.

Basically, ESD is already implied in Curriculum 2013. Particularly in Indonesian language lessons, which is also a conduit of knowledge, Indonesian language learning in primary schools listed in the 2013 curriculum, specifically, text-based learning endeavors to align learners with their cognitive development and address real-world challenges through the application of high order thinking skills.

This implicitly necessitates emergence about paradigm of sustainable development, which encompasses the integration of scientific principles into quotidian life and the resolution of environmental concerns, thereby fostering an educational experience within schools that is more profound and conducive to cultivating students' capacity for critical thought and their awareness of sustainability principles (sustainability consciousness).

The enforcement of the 2013 curriculum has prompted educational analysts, educators, and academicians to engage in a retrospective examination (reorientation) of the educational objectives that have been pursued thus far. The discourse surrounding the 2013 curriculum encompasses several critical themes; 1. the integration of character education in the 2013 curriculum, 2. the enhancement of digital literacy's culture among students, 3. 4. the necessity for educators to cultivate an understanding that the teaching profession the strategies through which educators can foster critical thinking abilities (Ahmad Yani, 2014: 1-3), constitutes a vocation, 5. the imperative for educators to maintain professionalism and charisma, 6) the methods to amplify the creative and innovative capacities of students, 7. the incorporation of TPACK and HOTS-oriented pedagogical approaches into educational resources, 8. the execution of problem-based, case-based, and project-based learning methodologies, 9. authentic assessment practices implementation, 10. the observation that numerous educators are not yet proficient in applying a scientific approach to pedagogy, among other considerations.

The discourse surrounding the aforementioned issues is undeniably crucial, as each of them carries further implications or ramifications, particularly for educators, specifically regarding the implementation of these concepts in the development of lesson plans, execution of learning activities, preparation of teaching materials, selection of media, application of instructional methods, utilization of models, adoption of pedagogical approaches, creation of learning activity sheets (LKPD), conduct of evaluations, and formulation of follow-up strategies. Furthermore, the design of these educational tools must also be aligned with the attainment of both classroom and national Minimum Competency Assessments (MCA). This is of paramount importance for the assessment of the quality of education at the national level.

According to the findings derived from the Program for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS), since their inception in 1999, the standing of Indonesian students has consistently failed to attain a position among the highest ranks.

In 2015, Indonesia ranked 64th out of 72 participating countries with 403 points, a difference of 153 points with the country that ranked first (OECD, 2016). These results show that Indonesia is still far behind other developing countries. The questions used in the PISA study are questions that consist of problems whose solutions demand the use of higher level thinking abilities. Critical and innovative thinking is expected of students. In order to raise the standard of education in schools, it is imperative that students engage in critical thinking exercises and examine current global issues in order to develop an awareness of sustainability.

Then for Sustainability Awareness or student awareness of sustainability according to a study conducted by Arba'at Hasan (2010), Sustainability Awareness consists of 3 categories of practical, attitudinal, and emotional. Practically, the average percentage is 25.34% which indicates that students almost never or do not like to do things that support Sustainability Awareness.

In the attitude category, the average percentage is 63.18%, which means that students' attitudes have begun to grow even though they are still in the moderate category. And emotional ones are already in the "high" category, with an average percentage of 80.43%. Higher order thinking skills (HOTS) and lower order thinking skills (LOTS) are the two categories of thinking skills. The use of the mind is known as higher order thinking. in the broadest sense to find new challenges. This higher order thinking ability requires applying new information or prior knowledge and manipulating information to arrive at possible answers in new situations (Heong et al. 2011). Higher order thinking is capability that allows you to explain new problems, not just memorize facts or tell someone something exactly as it was told to you.

In fact, teachers need to strengthen themselves in order to effectively apply the program. They have to understand and accept that educators—teachers and lecturers—are the most crucial factor in ensuring high standards for both teaching and learning. Students can grow and reach their full potential when they receive instruction from qualified teachers (Suwandi, 2014). According to Law No. 14 of 2005's Article 1, teachers are professionals in education whose major responsibility is to instruct, mentor, train, assess, and guide students from early childhood education through formal education in primary and secondary school.
In fact, in their professional position have the role of enhancing their dignity and role as learning subjects and in order to effectively apply the program. They have to understand and accept that educators—teachers and lecturers—are the most crucial factor in ensuring high standards for both teaching and learning. Students can grow and reach their full potential when they receive instruction from qualified teachers (Suwandi, 2015). According to Law No. 14 of 2005's Article 1, teachers are professionals in education whose major responsibility is to instruct, mentor, train, assess, and guide students from early childhood education through formal education in primary and secondary school, PAB 2 Helvetia, in basic skills 3.5, 3.6, 4.5, and 4.6. This limitation is based on the consideration of the alignment with the literature learning issues described in the beginning of the research proposal entitled "Developing Education for Sustainable Development (ESD) through Hot Literacy-Based Literature Learning Design in Elementary Schools". It is clear from the title that HOTS literacy-oriented literature learning in this study is related to the concept of Education for Sustainable Development (ESD). It's because the idea is a modern concept of literacy is the clearest roadmap that can be used.

1.1 Education for Sustainable Development in Learning

ESD is a word that is a translation from English, namely sustainable development. Sustainable development refers to a change and development that includes social, cultural, economic and environmental life. 1 All three are aspects of life that are sustainable. So, if the balance is maintained, it will produce a peaceful, safe, comfortable condition both in present and future. ESD has become a new paradigm in the field of education. This paradigm can give all people, especially the younger generation, the awareness and the ability to contribute significantly to it. It is very important for all countries of the world. It is a personal and collective responsibility to have awareness or make awareness efforts to support sustainability. Education for sustainability (ESD) is a lifelong learning process that is not limited in duration.

The goal of education for sustainability is to inform and engage the community to be creative and have skills in solving problems, both in the scientific field, and social literacy. It does not end there, education for sustainability is the responsibility of individuals and groups. It combines environmental education and development education. Combining these two

educational concepts allows an individual or a community to increase knowledge, values and the ability to participate in decision-making processes.

This allows people to choose their actions, actions that enhance living quality on a local, national, and international level, both individually and collectively in the present without harming or affecting the future. Education is a structured and systematic way of understanding the concept of sustainable development. Through education there is an opportunity to achieve sustainable development. This is based on Article 3 of Chapter II of Law No. 20 of 2003, which said that national education is a forum for developing skills and shaping a valuable character and civilization to contribute to the lives of the educated people. This education aims to develop the potential of the learners and make them individuals who have faith and fear in the Almighty, have noble personalities and healthy bodies, are knowledgeable, competent, creative, independent, democratic and responsible.

1.2 Literacy

In general, literacy is defined as the ability of individuals to use all their potential and skills in life, In the context of the School Literacy Movement (GSL), the definition of literacy is the ability to find, understand and use (apply and reason) information intelligently (MoEC, 2015). The two definitions above are slightly different from the definition put forward by the Department of Education Skills (DES) in the National Strategy to Improve Literacy and Numeracy Among Children and Young People 2011-2020 (DES, 2011), which asserts that literacy includes the ability to read, understand and appreciate various forms of communication, including oral communication, text, mainstream media and digital media (DES, 2011: 8). All of the above definitions indicate as Eithne Kennedy, et al (2012: 10) stated 'literacy definitions should encompass cognitive, affective, aesthetic, socio-cultural, historical and creative dimensions'.

So, it can be concluded that the goal of literacy is to produce people who can use their knowledge in real-world situations. Education is the means by which this objective is attained. Since the government began promoting literacy after the scientific method was adopted in education for example, can be seen in the form of 'Salam Literacy and taking pictures with the L (literacy) symbol, showing that teachers, students, lecturers and the community are familiar with literacy. At school, teachers also start the lesson with a 15-minute literacy activity. However, these literacy activities have not been linked to at least three assessment systems.

These three assessment frameworks emphasize interactive construction through the reading process, where the reader actively constructs the meaning of the text. This makes readers recognize the importance of literacy in enhancing individual abilities in terms of developing skills in reflection, criticism, and empathy, and participation in social activities, schooling, and the development of positive thinking (Zhao & Frank 2003).

1.3 Literature and its Learning

Based on the theory of literary enjoyment, literary ability is the ability to enjoy, understand and take values from literary works. However, the learning of literary skills in schools is prioritized to train language use skills that are integrated together with the learning of Indonesian language rules. In essence, linguistic and literary materials are utilized for learning ability to use language, both verbally and in writing Ability. Language materials are emphasized for the skill of using

good and correct language called language in accordance with grammatical rules, and literary materials are emphasized for learning the ability to appreciate literary works while training skills in using spoken and written language.

The ability to use spoken language, also known as ability to use spoken language, also known as listening and speaking. written comprehension (reading and writing) must receive equal attention in the assessment process. They are the entry point for training literary skills which have a close and strong link to the training of language skills in the reading and writing aspects. This is in accordance with the meaning of the word literature itself which in English, literature, literature, means all forms of writing, written works (Teeuw, 1988: 22). Therefore, literature is synonymous with written communication, the most appropriate way to enjoy it is reading and writing: reading is the activity of understanding and appreciating what is written, while writing is a follow-up activity in the form of a response to the activity of reading written works that manifests in writing the form understood through reading activities, or writing your own literary works based on the model read or a new form that shows the originality of ideas.

Good learning is learning that is not disorientated in its implementation. Even though it is not a mainstream phenomenon, if we observe learning practices in the classroom, instead of students being involved in honing their language skills or proficiency and increasing literary appreciation by directly interacting with literary works, we still often find students 'preoccupied' with practicing doing questions in order to face national exams.

Some teachers are still comfortable, in the implementation of learning only armed with 'Student Worksheets' which are more loaded with questions. Teachers don't provide adequate space their students to enrich their learning experiences, teachers do not provide exercises for students to improve their listening, speaking, reading, writing and viewing capability. Likewise, teachers provide less opportunity and facilitate students to engage with literature, such as reading poetry, short stories, novels, and other activities to improve their expressive abilities. Such learning ends up emphasizing only the knowledge aspect (Suwandi, 2014).

Teachers and learners should use common sense during the learning process, because it can show the correct attitudes, skills and knowledge. However, if teachers and learners only use common sense, it can also mislead them in the process and achievement of learning objectives.

Attitudes, skills and knowledge acquired solely on the basis of common sense are generally very strongly guided by the interests of the person (teacher, learner, and the like) who is the perpetrator. When common sense is too strongly guided by the interests of the person, they often generalize specific things too broadly. This is what causes the use of common sense to turn into prejudice or skeptical thinking. skeptical thinking or prejudice is indeed important, if processed properly. On the other hand, it will turn into prejudice or distrust if it is colored by the subjective interests of teachers and learners.

A scientific approach to learning involves the exploration of information through observation, questioning, experimentation, processing of information, presentation by analysis, inference, reasoning and creation.

In the observation method, the meaning of the learning process (meaningful learning) is prioritized. This method has the following advantages: B. Real object media presentation, fun and challenging for students, and ease of implementation. Of course, observation activities in this learning framework usually require long and thorough preparation time, relatively large

amounts of funds and energy, and if not managed, the meaning and purpose of learning become ambiguous.

Competent teachers can encourage learners to improve and develop their attitudes, skills and knowledge. When teachers ask questions, they guide students to learn well. When teachers answer students' questions, they encourage students to be good listeners and learners.

During these learning process, teachers and learners often find analogous or similar phenomena. Thus, teachers and learners sometimes reason analogically. Analogy is a process of reasoning in learning by comparing essential properties that have similarities or similarities. Analogical thinking is very important in learning because it sharpens learners' reasoning power.

As with reasoning and analogy, the ability to connect between phenomena or symptoms is big deal in the learning process. Teachers and learners are required to be able to interpret relationships between phenomena or symptoms, especially cause-and-effect relationships. The cause-and-effect relationship is taken by connecting one or more facts with one or more other facts. A conclusion that is the cause of one or more facts or can also be the result of one or more facts.

There are several learning models that aim to shape scientific and social behavior and stimulate curiosity. These models are Discovery/Inquiry Learning, Problem-Based Learning, and Project-Based Learning. In addition, teachers can also use other learning models to facilitate learning in the classroom, such as: B. Collaborative Learning. This includes a variety of methods.

2 Method

This study is a type of research and development (R&D). The method is a research methodology used to develop a specific product and test the effectiveness of that product. (Sugiyono, 2017). The procedure of the DBR research method is based on Reeves: 2006 (in Intendia, 2016) suggests that there are 4 stages of division with the DBR method, namely the first identification and analysis of problems, the second to develop solutions by making applications, the third to conduct trials, and the fourth to reflect. In line with that, this study aims to develop products in the form of electronic modules based on ESD in primary schools that are valid and practical.

Focus group discussions (FGD), interviews, and observation were the methods employed for gathering data.Focus group discussions (FGDs) were employed in this study to gather qualitative information in order to meet the anticipated goals based on the discussion outcomes. To achieve the expected objectives, this study was carried out according to the research procedure according to Sugiyono (2017) by modifying the stages to suit the research conducted, namely up to the implementation or trial stage. (Figure 1).

Fig 1. Research Procedures

a) Data Collection

This stage aims for preliminary study materials through observations and interviews. Observation activities were carried out by observing the shortcomings and advantages of teaching materials developed, especially ESD-based e-modules by previous studies. Then, interviews were conducted with several grade IV elementary school teachers regarding the materials used, availability and the need for ESD-based teaching materials for students.

b) Product Design

In this product design stage, it is carried out through the Focus Group Discussion (FGD) process. The aim of FGD is discussing the results of the preliminary and designing product. The FGD was conducted by the ESD-based learning tool development group in elementary school, which consisted of 4 researchers and 1 person from the expert team. The FGD participants were determined for the purpose of the research project. FGD participants were limited so that the implementation of the discussion could run optimally. FGDs were conducted through Google Meet, Zoom Meeting and WhatsApp Group applications. Discussion activities lasted ± 120 minutes over several meetings. The duration was agreed upon based on mutual consideration, because if the duration of the discussion is too long the concentration level of the members decreases, but if the duration is too short, it is likely to get little data from the discussion (Sudaryono, 2018).

c) Product Validation

After the product has been developed, the next stage is to validate the product by experts. The product validation process is given to media and design experts, material experts and pedagogical experts. The following are aspects of indicators for each product validation:

Aspects and indicators of product validation by media and design experts, including (1) Graphics aspects: use of font shape and size, use of colour, module cover illustration and illustration of module content, (2) Consistency aspects: accuracy of layout, (3) Module organisation aspects: module systematics, module readability and (4) Module characteristics completeness aspects: self instructional, self controlled, stand alone, adaptive and user friendly.

Aspects and indicators of product validation by material experts, including (1) Feasibility of content, (2) Compatibility with the theme, (3) Containing ESD pillars, (4) Ability to know and understand relationships, (5) Ability to analyse something complex. As for the aspects and indicators of product validation by pedagogical experts, including (1) Display aspects: clarity of writing, image display, (2) Language aspects: readability, conformity with Indonesian Language Rules, and language use, (3) Presentation aspects of e-module teaching materials: systematic presentation and (4) Aspects of e-module use.

As according to (Mardapi, 2008) the steps to determine the feasibility of e-modules from teaching material experts, pedagogic experts, material experts and student responses are using a 4 scale, described as follows:

Table 1. Guidelines for Converting Average Scores into Qualitative Data Scale 4.

No	Interval Skor	Interval	Qualitative Category

1.	$X \geq (\bar{X} + 1.SBi)$	$X \geq 3$	Very good
2.	$\bar{X} + 1.SBi) > X \geq \bar{X}$	$3 > X \geq 2,5$	Good
3.	$\bar{X} > X \geq (\bar{X} - 1.SBi)$	$2,5 > X \geq 2$	Less Good
4.	$X < (\bar{X} - 1.SBi)$	$X < 2$	Not good

experts' validation sheet and student responses analysed with the following formula:

$$X = \frac{\sum X}{n}$$

Keterangan:

X = average score

$\sum X$ = sum of rater scores

n = number of raters

d) Implementation

After the product has been verified by experts and declared viable, the next step is to test the product on elementary school students. In this study, the product was tested on 20 students. Data analysis in this study refers to Miles and Huberman's qualitative. The steps used to conduct data analysis are data reduction, data presentation, conclusion and validation (Miles & Hubberman, 1992).

3 Results and Discussion

3.1 Results

Data Collection Stage

Based on the results of data collection through observations and teacher interviews, all teachers claim that the use of instructional materials to support the learning process is very important. It was found that teachers use thematic books of the 2013 curriculum of the Ministry of Education and Culture and authentic assessment books (Bupena) during their studies. The books available are teacher books and student books.

The purpose of the teacher books is to serve as a basic framework for teachers to implement the curriculum based on the 2013 standards, whilst the student books are meant to assist students in acquiring the necessary skills and knowledge. The examination of textbooks used by teachers and students reveals a deficiency in the coverage of 21st century competencies.

The teachers said that the availability of student books was still limited, so that in using them students had to take turns so that the delivery of the material was not optimal. According to the opinions of teachers from the four schools, the teachers said that the Student Book in printed form also has limitations in presenting the material. In the teaching materials used there is material that is repeated so that students feel bored and not excited in the learning process, so it can be said that these teaching materials have not met the needs of students. Meanwhile, additional teaching materials for self-study or for student handbooks are still not available. In line with research conducted (Rosilia et al., 2020) revealed that student books have shortcomings in the coverage of material and practice questions. Therefore, considering that the teaching materials used today contain less extensive material, other teaching materials are needed to explore the material and provide independent assignments.

Product Design Stage

Qualitative data from interviews and observations were developed into a solution. In this process, data was obtained based on the results of FGDs. So that a solution was found from the results of the FGD to developing a learning module. This learning module is packaged in the form of an electronic module based on Education for Sustinable Development by taking the topic of plant cultivation. From the FGD results, the final result is the development of electronic modules with stages:

1. Designing E-Modules

The process carried out after identifying and analyzing problems, namely the stage of developing solutions. The solution offered is a learning product of an ESD-based e-module on the topic of narrative text based on Literacy HOTS in Junior High School. In the process of developing the designed learning module, the researcher first determines the Base Competencies, determines indicators, learning objectives, materials to be developed, makes design templates, and module outlines.

Fig 2. E-module Cover

2. Characteristics of a good and attractive module:

a) Self-Instructional. The developed module is able to attract students to explore the material without relying on other parties. It is intended that this learning module can be used in learning independently.

b) Self-Contained. In this module, learning materials from competency units or sub-competencies are presented in accordance with the KD developed.

c) Stand-Alone. This developed module can stand alone not bound and dependent on other media nor does it have to be used together with other learning media. Learners can explore the material without having to depend on each other.

d) Adative. Able to adjust to the developing science and technology, it is also flexible in its use.

e) User Friendly. This learning module aims to make books developed for the characteristics of secondary school students more accessible and user-friendly process.

3. Module Structure

The module structure aims to make it easier to explore the material. One module is made to teach three concepts of learning material that are specifically combined so that students can learn well from the competencies that have been determined Where the delivery of material in a module needs to be linked between core competencies and basic competencies with examples of material that is closely related to real life (Asfiah, N., Mosik, M., & Purwantoyo, 2013).

4. Learning Module Outline

The model developed from the module made by the researcher refers to the learning module used as teaching material that can be used by both. The process of making outline and electronic design of this module refers to a book by A. Arleen (2018). It contains procedures for making a book into an interesting story by adding illustrations and audio visuals to explain the material.

The next phase of the product feasibility validation test by several experts including media and design experts, material experts, and pedadogic experts using a scale of 4. The results obtained:

Table 2. Media and Design Expert Validation

Aspect	Average	Category
Graphics	3,61	Very Good
Consistency	3,95	Very Good
Organization	3,91	Very Good
Karakteristik E-Modul	4	Very Good
Average	3,91	Very Good

An E-module evaluation of the E-module developed by media and design experts resulted in a product category of "very good" with an average overall rating of 3.91 out of a maximum of 4 points.

Table 3. Material Expert Validation

Aspect	Average	Category
Content Appropriateness	3,80	Very Good
Appropriateness of themes with subthemes	3,65	Very Good
Basic ESD integration	3,97	Very Good
Average	3,82	Very Good

An E-modulus evaluation of the E-module developed by material experts resulted in a product category of "very good" with an average overall rating of 3.82 out of a maximum of 4 points.

Table 4. Pedagogical Expert Validation

Aspect	Average	Category
Language Display	3,83	Very Good
Presentation of E-Module	3,63	Very Good
Use of E- Module	3,25	Very Good
average	3,68	Very Good

An evaluation of the E-module carried out by education experts resulted in a product category of "very good" with an average overall rating of 3.68 out of a maximum of 4 points. A validation of the feasibility for plant cultivation by media and design experts resulted in an average overall rating of 3 or more, with a category of "very good", meaning that the E-module can be used without modification.

Implementation Phase

Implementation Phase After the e-module was verified by experts, it was then tried on students, in this trial process the researcher took a sample of 20 class XI students with the criteria of having high, medium, and low ability levels. The trial was conducted directly at SMPN 14 Medan. The trial process was fun and acceptable to students. Learners can also easily access the e-module on their respective smartphones. After the testing procedure, students were given a questionnaire about growing plants using the e-module. Data was obtained from the criticism and suggestions section of the questionnaire. The results are shown in Table 5.

Table 5. E-Module Feasibility Results Based on Learner Response

Aspect	Average	Category

E-Module Content	3,76	Very Good
Presentation of E-Module	3,81	Very Good
Benefits of E- Module	3,75	Very Good
Average	3,78	Very Good

The results of the students' assessment are; the overall average score is 3.78 from the maximum score of 4. Content of material gets an average score of 3.76, it means that the material provided is very interesting so that it adds to the knowledge of students, then in the aspect of presentation getting an average score of 3.81 e-modules provide new learning experiences for students because there are practice questions, games and videos explaining the material. For the benefit aspect, the average score is 3.75, this shows that with the e-module, students can study independently at home without the help of adults or parents because there are clear instructions for use and the e-module can motivate students.

3 Discussion

The goal of using the notion of sustainable development is to strike a balance between social, environmental, and economic factors. Based on this statement, this study focuses on the 15th goal of the SDGs. namely Life on Land. The main goal is to improve the climate and stop the extinction of biodiversity which focuses on sustainable forest management, rehabilitation of land degradation (Bappenas, 2016).

The implementation of learning activities based on Education for Sustainable Development requires learning device components, one of which is module teaching materials. This E-Module is designed for asynchronous learning, can be used for independent learning according to the needs of students (Logan et al., 2021).

Learning in the modern era is planned to keep up with advances in science and technology. Therefore, many e-learning-based learning tools are developed. E-learning can be defined as a learning process is mediated by use of online technology. There are a number of benefits obtained from the online learning process, such as not requiring costs in the process of traveling from home to school; can adjust the schedule easily; learn at your own pace (Al- adwan & Smedley, 2012).

Developing electronic modules has several advantages compared to printed modules including; providing wider opportunities for children to explore their knowledge and learn more (Sulisworo, 2016) by using gadgets, smartphones, tablets, computers or laptops. Users only need to install the product after which the material can be studied.

Electronic modules are also easy to carry anywhere, can be used as reading material for learning without space and time limits (flexible). The development of e-modules is particularly useful, as they can be installed on a mobile device, a website or a desktop computer. The existence of e-modules can take advantage of technology for education, so that it can use this teaching

material to convey and attract learning content, to determine the effectiveness of learning (Kim et al., 2021).

The product validity results, when seen in the context of the material expert validation, are outstanding, meaning that the e-modules are deemed to be valid and appropriate for usage. This is predicated on an evaluation of criteria and indicators showing that the electronic module's content is easily comprehensible and aligned with the needs of students. This means that the content meets the requirements for fundamental and competencies as well as indicators of competency attainment with well-defined learning.The statement is in line that the suitability of material content with learning objectives in electronic modules needs to pay attention to competencies and indicators, because clear objectives will be a reference in every learning process (Hastari et al., 2019).

Furthermore, the results of product validity from media and learning design are also in the excellent category, thus indicating that the electronic modules in this study are classified as valid. From the assessment of aspects and indicators, conveyed e-module developed is equipped with multimedia such as images, animations, audio, and video, so that it can make the delivery of material more concrete. Of course, this triggers student interest and involvement in learning and does not only rely on text aspects. Multimedia provides many options to learn creatively and also facilitates learning through more interactive delivery of material (Shilpa & Sunita, 2016).

The pedagogical expert validation results are also get ‘‘very good‘‘ category, so it is suitable for use. The material presented is needed by students and integrated with ESD. The importance of ESD-based modules at the elementary school level is because it presents real examples in everyday life to help students master the newly learned concepts.

4 Conclusion

Based on the results of the study, the ESD e-module for Primary Schools is proven to show the feasibility of the e-module based on the results of expert validation, namely media and design experts with 3.91, material experts with 3.82, and education experts with 3.68, which was in the very good category. The result of evaluating the feasibility of the E-module based on the students' answers reached 3.78 points, proving that the E-module can be used as a complement to independent teaching materials. Based on the researcher's reflections on the conducted research, some limitations have been identified, one of which is related to the developed materials. Therefore, this can be used as a factor that future researchers can pay more attention to in completing their research. In addition, other researchers are expected to develop complementary ESD-based independent e-modules as teaching materials that focus on the achievement of other SDGs protection of natural resources to further develop research results ESD-based independent secondary school teaching materials. Enrich.

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