

# Development of E-Module Learning Model Based on 21st Century Skills and Socio-Scientific Issues: Efforts to Strengthen the Pedagogical Competence of Prospective Economics Teacher Students

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**Abstract.** Lecturers can essentially use engaging information technology to develop innovative instructional materials that are portable and readable at any time. Furthermore, pupils today are the same as the devices (smartphones) that they frequently carry. Teaching resources that may provide pupils a deeper knowledge are also required, in addition to creative ones that make use of information technology. Technology integration, the development of important abilities including critical thinking, creativity, communication, and collaboration (4C), as well as contextual and problem-oriented learning, are all key components of 21st century education. The importance of developing 21st century skills for students in facing complex challenges in the modern world. Education must be able to produce individuals who are not only academically skilled but also able to adapt, solve problems and innovate. Therefore, there needs to be a learning model that can integrate skills effectively in learning, especially for prospective teacher students who will have an impact on their students later. In addition, socio-scientific issues related to the social context and sustainability will be integrated into the learning materials to provide a deeper understanding to students. Thus, it is hoped that prospective teacher students can prepare their students to become individuals who are not only competent in academics, but also have broad skills and understanding of global issues. The goal of this study is to create an e-module learning model that can integrate socio-scientific concepts and 21st century skills in a legitimate and useful economic learning environment. The five phases of the ADDIE model analysis, design, development, implementation, and evaluation are used in this research, which is development research (Research and Development). implementation of development research, which comprises (a) product needs analysis, (b) product design planning, and (c) the implementation and assessment of e-module learning models based on socio-scientific concerns and 21st century abilities. Students in the sixth semester of the Economics Education study program served as the research's subjects. Validity and practicality are the data analysis methods employed in this study. Two expert validators, a material expert and a design expert validated this module. According to the research findings, the practicality test based on response data from students and colleagues (team lecturers) obtained a highly practical category, while the feasibility test received a very feasible category.

**Keywords:** E-Module; 21st Century Learning Model; Socio-Scientific Issues

## 1 Introduction

The advancement of education in the modern era of 5.0 has created its own challenges. To handle the current developments, human resources with 21st-century life skills are needed. This cannot be accomplished if all educational levels are designed to prepare the country's future workforce for the twenty-first century. In 21st-century learning, learning does not only rely on knowledge but also skills. In many aspects of life, skills are essential. 21st-century skills include knowledge of technology and information media, learning and creativity, and life and career skills [1]. Therefore, as a means of enhancing people's lives, education is a component of national development. For students to succeed in 21st-century education, they need to be aware of their own abilities.

A teacher needs to be competent in four areas: pedagogy, professionalism, personality, and social skills. The way the learning process is carried out both inside and outside of the classroom is one example of pedagogical competency. To keep students' attention and make the learning process engaging, an instructor must be competent. A basic competency or ability to teach an educator will certainly not be enough if it is not accompanied by a strategy in terms of planning and implementing these competencies according to the conditions of students, the surrounding environment, and all things that might affect the learning process, both directly and indirectly.

Education is the primary foundation for developing a superior and adaptive next generation. Amidst the rapid development of technology and social dynamics, teachers are expected to transform traditional educational paradigms into models that are adaptive and relevant to today's realities. As they enter the age of 21st-century abilities, the obstacles become more complicated, especially for aspiring economics professors. 21st-century education places a high priority on the development of critical thinking, creativity, communication, and teamwork (4Cs), as well as contextual and problem-oriented learning. Students must acquire 21st-century skills including critical thinking, creativity, communication, and teamwork in order to be ready to deal with the complex challenges of the modern world. In this modern world, information is widely available and changes occur rapidly. Education must be able to produce individuals who are not only academically skilled but also able to adapt, solve problems, and innovate. Therefore, a learning model is needed that can effectively integrate skills in economics learning, especially for prospective economics teachers, which will have an impact on their future students.

Learning that presents socio-scientific issues includes social, environmental, and ethical aspects within the context of science. Socio-scientific issues are important in educating future generations. Prospective economics teacher students must be able to integrate these issues into their learning so that students can understand the impact of science on society and the environment. With socio-scientific-based learning, students will be stimulated to discuss and argue, which can improve their critical thinking skills [2]. Good learning requires good teaching materials. Books or printed modules are frequently utilized as instructional resources. So far, student teaching materials have not addressed socio-scientific challenges or 21st-century skills-based economic learning methods.

Based on these issues, researchers attempted to develop an e-module learning model that could integrate 21st-century skills and socio-scientific issues in the context of economics learning. Furthermore, there is a lack of literature for prospective teacher students regarding teaching materials for economics learning models based on 21st-century skills and socio-scientific issues. It is anticipated that this e-module would significantly contribute to the modernization of the economics curriculum and provide aspiring teachers with pertinent information and skills. This understanding is expected to provide a foundation for developing a more adaptive, relevant, and empowering economics curriculum for prospective teacher students to create learning experiences that motivate and prepare students for the ever-evolving world.

## **2 Theoretical Review**

### **2.1 E-Module**

A module is a type of written and printed instructional material that is intended for students to learn on their own since it contains instructions for self-study. In this situation, pupils can complete their own learning tasks without a teacher present [3]. E-modules are a way to present independent learning materials that are organized in a systematic way into distinct learning units. They are presented in an electronic format, and each learning activity is linked to the program as a navigation tool to increase student interaction. Additionally, they include audio, animations, and video tutorials to enhance the learning experience and increase student interaction [4].

The use of computers, particularly the internet, to support learning activities is interactive in character and is expected to support the development of interactive communication processes between instructors, students, and instructional materials in tandem with technical improvements [5]. Therefore, it can be said that e-modules are digitally structured, self-learning resources. These e-modules not only present material but also integrate various interactive elements such as navigation links, video tutorials, animations, and audio, all of which aim to enrich the student learning experience. Thus, e-modules strive to increase student interactivity and engagement in the learning process, similar to printed modules but with the added advantages offered by digital technology. Therefore, the development and use of e-modules are crucial in creating a more dynamic and effective learning environment.

E-modules can be created using the Canva application. Canva is an application used for graphic design. Using this application can increase creativity in creating posters, presentations, and other visual content [6]. Canva supports the process of creating electronic learning media by providing various tools such as presentations, resumes, posters, brochures, infographics, banners, bookmarks, bulletin boards, as well as graphic design that includes posters, invitations, image editing, video creation, and more [7]. Canva has the following capabilities in addition to a variety of user-friendly templates:

- a. Millions of pictures, including drawings, vectors, and photographs  
Additionally, individuals are able to post images from their own devices.

- b. Photo filters that make it easy to modify images
- c. A wide variety of icons and shapes that are easy to use; there are thousands of choices as well as the option to upload your own elements.
- d. Availability of hundreds of ready-to-use fonts for a wide range of projects.
- e. Various backgrounds that can beautify the design
- f. Audio features that are easy to search and use.

Canva offers six download options for the finished product after the design process is over: PNG, JPG, regular or print PDF, video (MP4), and animation (MP4/GIF).

## 2.2 21st Century Skills-Based Learning Model

Teachers are highly urged to use e-modules in their lesson plans because they help boost students' enthusiasm in learning. Since the technique in a series of learning systems plays a very essential role, a method is required in the learning process when creating e-module teaching materials [8]. How instructors use a learning model in the classroom has a big impact on how well it works. Skills-based learning for the twenty-first century is one learning model that may be utilized to create e-modules.

A set of abilities necessary to deal with the current world are known as 21st-century skills. These abilities include critical and creative thinking, communication, effectiveness, teamwork, and reading and numeracy, according to P21 (Partnership for 21st Century Learning). Problem-solving, adaptability, and technological literacy are also considered integral to 21st-century skills.

In addition to imparting knowledge, education in the twenty-first century seeks to build practical skills. Social systems and information technology advancements have changed how we communicate, work, and learn. Educational systems must adapt by adding 21st-century skills to the curriculum in order to prepare students for the more complex and modern times.

In the twenty-first century, learning requires both knowledge and abilities. Skills are crucial in many facets of life. 21st-century skills include life and career skills, learning and innovation skills, and information media and technology skills [1]. Therefore, education is part of national development as a way to improve people's lives. For students to succeed in 21st-century learning, educators must understand the skills they possess.

If we recall the learning process over the past ten years, we likely still remember sitting in a classroom using conventional methods, facing a blackboard, where the teacher explained the material, while we, as students, listened. Virtual or online classes, whether synchronous or asynchronous, were still unfamiliar to us. Several years later, we have become accustomed to using online learning, blended learning, and hybrid learning. As a result, we have begun to actively engage in discussions in online classes using e-learning, learning management systems, Google Classroom, WhatsApp, and so on.

Teachers and students can learn anywhere and anytime using a variety of approaches, methods, models, strategies, and techniques tailored to their needs. In fact, we can often engage in multiple learning activities simultaneously. This phenomenon allows us to see and feel the shift from conventional learning to a more modern approach. This is what we know as 21st-century

learning, popularly known as the disruption phenomenon or futuristic learning.

Thus, it can be concluded that the characteristics of 21st-century learning are actually learning that utilizes various learning methods where access is easy anywhere and anytime, interactions can be done online, whether learning is based on e-learning, autonomous learning, blended learning, and hybrid learning. The characteristics of an educator in the 21st century include: 1). Educators must have a high interest in reading. 2). The ability to write scientific papers is very important for educators. In addition to having a high interest in reading, educators must also be able to write scientific papers because educators always give different assignments to their students as part of their responsibilities. Reviewing books, writing short essays, and other assignments are some of the tasks given by educators to their students. Educators must be proficient writers for all of these. 3). In implementing learning models, educators must be able to be creative and innovative. To fulfill the challenges of the twenty-first century, educators must use learning models that help pupils acquire knowledge. Students will be more creative and innovative when learning models and digital technology are used simultaneously. 4). Educators can change socially. The previous learning culture must shift from an "educator-centered" to a "student-centered" perspective, making students the focus of learning, enabling them to develop and construct their knowledge holistically.

### **3 Research Methods**

The research and development approach, also known as research and development (R&D), was employed in this investigation. Products are developed and validated through research and development. A broader definition of product development includes both the creation of new goods and the updating of current ones to make them more useful, efficient, and effective [9]. The ADDIE model (Analysis, Design, Production, Implementation, and Evaluation) was used in this study since the researcher looked at the creation of e-modules, which are educational materials. The approach is therefore suitable for application in the creation of educational media products. In order to improve the pedagogical competency of prospective economics teacher students, the ADDIE model was utilized in this study to create an e-module learning model based on 21st century abilities.

The following picture illustrates the steps involved in development:

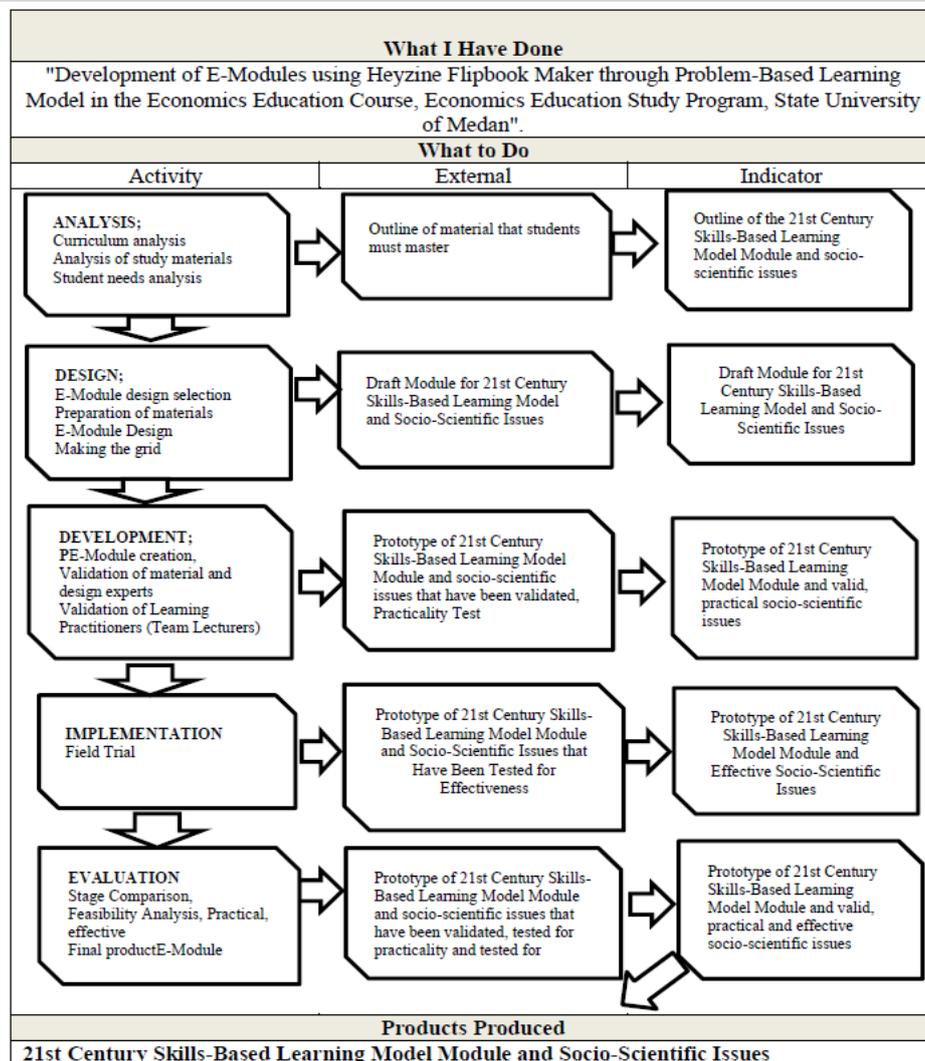


Figure 1. Development Steps

This study was carried out in Economics Education Study Program, Faculty of Economics, State University of Medan. Students in the Economics Education program who created an e-module for acquiring skills relevant to the twenty-first century were the study's subjects. The criteria used to select the location and class were student conditions that met the researcher's needs, and the class had never used an e-module for 21st-century skills-based learning.

In order to evaluate the research being developed, a questionnaire was employed as the data gathering method in this study. The instrument used in this study was adapted from [10] which is then used to obtain data from the material validator and learning design. Alternative

answers for the instrument used use a Likert scale which is given through 4 responses, namely very good (4), good (3), less good (2), not good (1).

The data analysis techniques in this research are as follows:

### 1. Validity Data Analysis

Four answer alternatives specifically adapted to the question content were included in the expert validation questionnaire for the presentation, content suitability, language, completeness of the material, and relevance of the e-module. Strongly agree (4), agree (3), disagree (2), and disagree (1) were the scores given to each answer option. To ascertain the degree of validity and viability of the e-module, the assessment results from each validator material experts and learning design experts were averaged and subsequently transformed into questions [5]. The formula was used to determine the average score based on the total instrument completion [11]

$$V = \frac{\sum x}{\sum xi} \times 100\% \quad (1)$$

Information;

V= Percentage of module validity

$\sum x$ = total number of expert assessments

$\sum xi$ = total number of ideal values

Based on the calculation results using the formula above, a percentage is obtained. This percentage value is then classified and translated into a qualitative statement, as presented in the following Table 1 [5]. A module is said to be valid if it has reached a validity level above 70%.

**Table 1.** Module Validity Categories

No	Validity	Validity level
1	$85\% < V \leq 100\%$	Very valid
2	$70\% < V \leq 85\%$	Valid
3	$50\% < V \leq 70\%$	Less valid
4	$V \leq 50\%$	Invalid

### 2. Practicality Data Analysis

Percentages were used to assess student response data from questionnaires. A Likert scale with a positive category was used to analyze the questionnaire results in order to assess the product's practicality. A Likert scale with a positive category was used to organize the questions. The following details give positive assertions a high weight: very good (VG) is given a weight of 5, good (G) is given a weight of 4, sufficient (S) is given a weight of 3, less (L) is given a weight of 2, and bad (B) is given a weight of 1. Using the following formula, the average score from the entire instrument filling is calculated [11] :

$$P = \frac{\sum Tse}{\sum Tsh} \times 100\% \quad (2)$$

Information:

P= Percentage of practicality of the module

TSe = total score of all students' respondents

TSh = maximum possible score from all respondents

The calculation results using the formula above yield a percentage. These percentage values are then classified and translated into qualitative statements, as presented in the following table 2 [5]. A module is said to be practical if it has reached a practicality level above 70%.

**Table 2.** Module Practicality Level

No	Degree of Achievement (%)	Category
1	$80\% < P \leq 100\%$	Very practical
2	$60\% < P \leq 80\%$	Practical
3	$40\% < P \leq 60\%$	Less practical
4	$20\% < P \leq 40\%$	Not practical
5	$0\% < P \leq 20\%$	Very impractical

## 4 Results and Discussions

### Results

The five steps of the ADDIE model analysis, design, development, implementation, and evaluation are used in this development study. The goal of this project is to create an e-module learning model based on socio-scientific challenges and 21st-century abilities. The creation of this interactive e-module, which is based on Canva, aims to provide students with more engaging and simply comprehensible learning experiences by presenting educational materials digitally and dynamically. Constructivist learning theory, which emphasizes students' active participation in developing understanding through meaningful learning experiences, served as the foundation for the creation of the e-module. The five methodical steps of the ADDIE model analysis, design, development, implementation, and evaluation are followed throughout the module development process. This methodology was selected because it offers a methodical approach to development and enables researchers to make incremental changes based on input from students and experts. The following is an explanation of each stage's development results:

#### A. Analysis Stage

In order to determine demands and lay the groundwork for creating an e-module learning model based on socio-scientific concerns and 21st-century skills, the analysis phase was carried out. The curriculum, instructors (lecturers), and students were all included in the analysis.

### 1. Curriculum Analysis

The Outcome-Based Education curriculum in the Economics Education Study Program is based on internal and external environmental analysis in the form of a SWOT analysis, comparative tracer study, and situational learning analysis. The curriculum is designed by considering the vision, mission, goals, and objectives of the study program, as well as input from stakeholders and job market needs. The curriculum is also aligned with the Indonesian National Qualifications Framework (KKNI) to ensure learning outcomes are appropriate to the level and grade of education. The Economics Education Study Program produces graduates who not only master classical economic theory but also possess data analysis skills, an understanding of digital technology, and effective communication skills. The graduate profile is designed to meet future job market needs and contribute to sustainable economic development. The Graduate Learning Outcomes (CPL) of the Economics Education Study Program are designed to ensure graduates possess competencies relevant to the needs of Industry 4.0 and Society 5.0. These CPL integrate four core literacies: data literacy, technological literacy, human literacy, and language literacy, which are essential in facing the challenges of the digital economy. These CPL are designed to ensure graduates possess a balance between theoretical understanding, practical skills, and the ability to adapt to technological developments in the context of economics education. The determination of study materials is based on the formulated Graduate Learning Outcomes (CPL). These study materials cover essential materials needed to achieve the expected competencies, taking into account the latest developments in the digital economy and economics education.

### 2. Analysis of the Need for Teaching Staff (Lecturers)

The researcher discussed this phase of analysis with the lecturers of the course team, and found that the use of teaching materials was able to provide a deeper understanding to students. 21st-century learning emphasizes the integration of technology, the development of critical skills such as critical thinking, creativity, communication, and collaboration (4C), as well as contextual and problem-oriented learning. The importance of developing 21st-century skills for students in facing the complex challenges of the modern world. Education must be able to produce individuals who are not only academically skilled but also able to adapt, solve problems and innovate. Therefore, there is a need for a learning model that can integrate skills effectively in learning, especially for prospective teacher students who will have an impact on their future students. In addition, socio-scientific issues related to the social context and sustainability will be integrated into the learning materials to provide a deeper understanding to students.

### 3. Student Needs Analysis

The student needs analysis was conducted to determine the teaching materials required by students in accordance with the curriculum used. The teaching materials that have not yet integrated learning models with 21st-century skills and socio-scientific issues in the context of economics learning. Therefore, researchers developed an e-module learning model based on 21st-century skills and socio-scientific issues, it is hoped that prospective teacher students can

prepare their students to become individuals who are not only competent in the academic field, but also have skills and a broad understanding of global issues.

## B. Design Stage

The Canva program was used to develop the electronic module (E-Module) for the study's 21st-century learning paradigm during this design phase. The researchers took a number of actions, such as:

### a. Compiling the material

The layout and navigation were designed directly using Canva's design features. Researchers systematically arranged the module's content and visual elements for easy understanding and navigation by students. Elements such as page titles, content, images, navigation icons, video links, and interactive activities were arranged to support a structured and engaging learning flow. Each page within the module featured a consistent layout, appropriate color scheme, and icons to facilitate easy navigation between sections. Furthermore, the module featured interactive hyperlinks that directed students to external learning videos, enhancing the learning experience. Compiling the E-Module framework in the following order is how new product development tools are designed:

#### 1. Cover

The module begins with a cover page featuring the title, subtitle, and relevant visual illustrations. The cover design is eye-catching with bright colors and graphic elements to enhance student engagement from the outset.



Fig 1. Cover

#### 2. Integration of socio-scientific issues

The module is equipped with a form of integration of socio-scientific issues in the context of economic learning.



Fig 2. Module Book

### 3. Learning Videos

The image shows a section of the module that includes links to instructional videos. The links are marked with icons and text so students can directly access additional materials independently.

Tabel. Sitraks Model Pembelajaran Problem Based Learning

Tahap	Aktivitas Guru dan Peserta Didik
Tahap 1 Mengidentifikasi permasalahan yang dihadapi peserta didik terhadap masalah.	Guru menjelaskan tujuan pembelajaran, secara apa lagi yang diberikan. Guru memastikan peserta didik untuk dapat melihat sifat dalam situasi pemecahan masalah nyata yang dipilih oleh siswa.
Tahap 2 Menganalisis masalah peserta didik untuk belajar.	Guru membantu peserta didik untuk mendefinisikan dan menggunakan pengetahuan belajar yang dibutuhkan. Menguraikan masalah yang sudah dicatatkan pada tahap sebelumnya.
Tahap 3 Membangun pengetahuan individual maupun kelompok.	Guru mendorong peserta didik untuk mengajukan informasi yang sesuai dan mendapatkan informasi untuk mendefinisikan pengetahuan yang dibutuhkan untuk menyelesaikan masalah.
Tahap 4 Mengembangkan dan menyajikan hasil karya	Guru membantu peserta didik untuk berbagi tugas dan memotivasi atau menantang karya yang sesuai sebagai hasil pemecahan masalah dalam bentuk laporan, video, atau model.
Tahap 5 Menganalisis dan Mengevaluasi proses pemecahan masalah.	Guru membimbing presentasi dan mendorong kelompok, memberikan pengajaran serta menuliskan kepada kelompok lain. Guru bertanya peserta didik untuk mengartikan materi.

Fig 3. Module Online

### 4. Learning activities

The module is equipped with student reflection activities.



Fig 4. Learning activities

b. Organizing the material

At this stage, relevant material is selected and collected in the 21st century learning model e-module. There are 7 materials that will be discussed in the e-module, namely (1) 21st century learning, (2) In-depth learning (3) Problem-based learning (4) Project-based learning, (5) Discovery learning, (6) Inquiry learning, (7) Socio-scientific issues.

C. Development Stage

Experts in learning design and materials evaluated or verified the planned e-module during the development stage. The e-module's viability (validity) was evaluated using the assessment tool. Dr. Khairuddin E. Tambunan, M.Si., validated the material expert evaluation tool. The learning design expert assessment tool was validated by Adek Cerah Kurnia Azis, S.Pd., M.Pd. The following displays the findings of the experts' evaluation of the instruments:

**Table 3.** E-Module Feasibility Assessment Validated by Material Experts

Assessment Aspects	Expert Score	Category
Presentation	77.78%	Feasible
Material	79.17%	Feasible
Language	87.5%	Very Feasible
Total Score	81.48%	Feasible

The evaluation consists of three components: language, content, and presentation. Thus, it can be inferred that the material expert validator's validation results yielded a percentage value of 81.48% with the category "Feasible," indicating that while the E-Module can be utilized, certain aspects of it require revision. The suggestions or input received by the author from the assessment results are as follows: (a) Each learning model is presented with interactive videos,

so that the material presented is easy for students to understand, (b) There are illustrations/pictures for each learning model, to make it look more attractive.

**Table 4.** E-Module Feasibility Assessment by Learning Design Experts

Assessment Aspects	Expert Score	Category
Visual Display		
Use of Letters		
Physical Criteria	95.83%	Very Feasible
Voice		
User Ease		

A percentage score of 95.83% with the category "Very Feasible" was obtained based on the validation results evaluation table by the learning design expert validator, indicating that the E-Module learning design can be utilized. The learning design expert validator also offered feedback, stating that the module's color display is still less appealing, that primary colors should not be used, that the module display has not elicited a response, that broken and cut-off images should be avoided, and that the sound and module development procedures should be taken into consideration.

#### D. Implementation Stage

Experts validated and revised the e-module before it was piloted and put into use. The e-module, a 21st-century skills-based learning model, and socio-scientific issues were evaluated by educators (team lecturers) based on four factors: material organization, evaluation and practice, e-module teaching material product, and user impact. The table below displays the educators' (team lecturers') replies to the e-module:

**Table 5.** Results of Educator Response Data Analysis on the Practicality Questionnaire

Assessment Aspects	Expert Score	Category
Organizing Materials		
Evaluation and practice	82.35%	Very Practical
E-module teaching material products		
Effects for users		

**Table 6.** Results of students Response Data Analysis on the Practicality Questionnaire

Assessment Aspects	Expert Score	Category
Ease Users	86.80%	Very Practical

The results of the assessment of the educators' (team lecturer) responses to the e-module on the completed questionnaire obtained an average overall assessment score of 82.35% (very practical) and the responses of students as e-module users obtained a score of 86.80% (very practical).

#### E. Evaluation Stage

The evaluation stage, which is the last phase in the ADDIE model, is where the success of the E-Module product development objectives is measured, specifically by examining the

feasibility and practicality analysis results.

a. Evaluation at the Feasibility Analysis stage

Validators, who included professionals in learning design and topic content, did the assessment. The table below displays a summary of the 21st-century skills-based learning model e-module assessment's validation results:

**Table 7.** Recapitulation of Validation Results

No.	Validator	Feasibility Percentage	Category
1.	Subject Matter Expert	81.48%	Feasible
2.	Learning Design Expert	95.83%	Very Feasible
	Average	88.65%	Very Feasible

The 21st century skills-based learning model e-module is classified as "Very Feasible" based on the average percentage result of 88.65% in the table above.

b. Evaluation at the Practicality Analysis stage

The practicality assessment was conducted by the course team lecturers and students. Summary data on the practicality of using the e-module learning model based on 21st-century skills and socio-scientific issues can be seen in the table below:

**Table 8.** Recapitulation of Practical Results

No.	Users	Practicality Percentage	Category
1.	Team Lecture	82.35%	Very Practical
2.	Students	86.80%	Very Practical
	Average	84.58%	Very Practical

The practicality assessment was conducted by the lecturers of the course team and students through a response questionnaire. The average percentage result was 84.58%, thus categorizing the e-module as a 21st-century skills-based learning model as "Very Practical."

## Discussions

The results of this development research are to produce an e-module of a 21st-century skills-based learning model and socio-scientific issues, the tests carried out on this product are a feasibility test, namely validating the product with material experts and design experts, as well as a practicality test by conducting a user response test, namely the team lecturer and students. The material contained in this e-module is related to 21st-century skills-based learning models. 21st-century learning emphasizes technology integration, the development of critical skills such as critical thinking, creativity, communication, and collaboration (4C), as well as contextual and

problem-oriented learning. With a socio-scientific approach, the material presented is integrated with controversial and complex social issues based on scientific ideas and principles. The results of the feasibility and practicality tests state that the final product in the form of an e-module of a 21st-century skills-based learning model and socio-scientific issues is feasible and practical for use by students.

Learning using e-module emphasizes students to be able to learn independently and actively, so that learning is not only focused on the lecturer but there is two-way interaction. Assignments related to socio-scientific issues and problem-solving in everyday life can become discussion material for students and encourage active participation in the learning process. Learning that presents socio-scientific issues includes social, environmental, and ethical aspects in the context of science. Socio-scientific issues are important in educating future generations. Prospective economics teachers must be able to integrate these issues into their learning so that students can understand the impact of science on society and the environment. With socio-scientific-based learning, students will be stimulated to discuss and argue, which can improve their critical thinking skills [2].

The e-module is expected to make a significant contribution to updating the economics education curriculum and equip prospective economics teachers with relevant skills and contextual knowledge. Curriculum overloaded with content make it more difficult for students to acquire skills, as well as the lack of support from educators in combining knowledge and skills pedagogy and deep learning experiences [12]. With this understanding, it is hoped that it can provide a foundation for the development of an economics curriculum that is more adaptive, relevant, and empowers prospective economics teachers to create learning experiences that motivate and prepare students to ever-evolving world.

## **5 Conclusions and Suggestions**

### **Conclusions**

This study develops e-modules as teaching resources. a method of instruction based on 21st-century skills and socio-scientific issues. This development research employs the ADDIE paradigm, which comprises the stages of analysis, design, development, implementation, and evaluation. The study's conclusions demonstrate that the e-module learning model, which was created based on socio-scientific problems and 21st century abilities, is "extremely feasible" to use as teaching resources for both teachers and students. expertise in learning design and material expertise have attested to this. The practical consequences of the e-module learning model, which are focused on socio-scientific issues and 21st century skills, can be categorized as "Practical" for use in the educational process based on the team lecturers' comments.

### **Suggestions**

The research conducted is not free from researcher limitations, so there are several suggestions,

namely:

1. To determine the material to be compiled, researchers and lecturers from the course team need to communicate well with each other.
2. It is recommended that the content in this e-module be developed in accordance with the learning strategy for the semester and the available infrastructure in order to guarantee appropriate planning and execution.

## References

- [1] Wijaya, E. Y., Sudjimat, D. A., & Nyoto, A. Transformasi pendidikan abad 21 sebagai tuntutan pengembangan sumber daya manusia di era global. 1, 263–278 (2016).
- [2] Rahayu, Y., Suhendar, S., & Ratnasari, J. Keterampilan argumentasi siswa pada materi sistem gerak SMA Negeri Kabupaten Sukabumu-Indonesia. *Biodik*, 6(3), 12-318 (2020) <http://dio.org/10.22437/bio.v6i3.9802>
- [3] Daryanto. Menyusun Modul. Yogyakarta: Gava Media. (2013)
- [4] Najuah, Lukitoyo, P. S., & Wirianti, W. Modul Elektronik: Prosedur Penyusunan dan Aplikasinya. In *Yayasan Kita Menulis* (2020)
- [5] Yuni, R., Sari, P., Julianty, M., Thohiri, R., Kemala, P., & Lubis, D. Development of E-Module using Heyzine Flipbook Maker Through The Problem-Based Learning Model In the Educational Economics Course At Economics Education Study Program Universitas Negeri Medan. *Proceedings of the 6<sup>th</sup> ICIESC, Medan, Indonesia* (2024). <https://doi.org/10.4108/eai.17-9-2024.2352991>
- [6] Sholeh, M., Rachmawati, R. Y., & Susanti, E. Penggunaan aplikasi Canva untuk membuat konten gambar pada media sosial sebagai upaya mempromosikan hasil produk UKM. *Selaparang: Jurnal Pengabdian Masyarakat Berkemajuan*, 4(1), 430-436 (2020)
- [7] Farisia, Fitriyah, A., Dzulkarami, D., Jannah, S. W., & Irsyad, A. S. Penggunaan Aplikasi Canva Sebagai Media Pembelajaran Bahasa Indonesia MI/SD. *Jurnal Pendidikan Transformatif*, 3(3), 51–61 (2024)
- [8] Abdul Majid. Strategi Pembelajaran. Bandung: PT Remaja Rosdakarya (2014)
- [9] Sugiyono. Metode Penelitian Kuantitatif, Kualitatif, dan R & D. Bandung: Alfabeta (2019)
- [10] Violadini, Ririn, and Dea Mustika, 'Pengembangan E-Modul Berbasis Metode Inkuiri Pada Pembelajaran Tematik Di Sekolah Dasar', *Jurnal Basicedu*, 5.3 (2021), 1210–22 <<https://doi.org/10.31004/basicedu.v5i3.899>>
- [11] Nesri, Fabiana Dini Prawingga, and Yosep Dwi Kristanto, 'Pengembangan Modul Ajar Berbantuan Teknologi Untuk Mengembangkan Kecakapan Abad 21 Siswa', *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, 9.3 (2020), 480 <<https://doi.org/10.24127/ajpm.v9i3.2925>>
- [12] Muhali. Pembelajaran Inovatif Abad Ke-21. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, 3(2), 25–50 (2019)