DEVELOPMENT ICARE BASED DIGITAL MODULE INTEGRATED WITH SETS APPROACH TO DIGESTIVE SYSTEM CONCEPT IN SENIOR HIGH SCHOOL

Refirman Djamahar[1], Anzelina Tristina[2*], Mahrawi[2], and Ika Rifqiawati[2]

[1]Biology Education Study Program, Faculty of Mathematics and Natural Sciences Universitas Negeri Jakarta, Jakarta, Indonesia
[2]Biology Education Study Program, Faculty of Teacher Training and Education, Universitas Sultan Ageng Tirtayasa, Banten, Indonesia
*Email: 2224190056@untirta.ac.id

Abstract: The limitations of learning resources can be felt in several aspects of the quality and quantity, form and types of learning resources available. Meanwhile, learning resources must be available quickly to realize effective learning, allowing students to push themselves to meet independent learning needs. Digital modules continue to be developed by researchers to support the independent learning process. This study aimed to establish teaching products in ICARE-based digital modules integrated with the SETS approach to the digestive system concept in senior high schools. The type of research used is research and development with the 4D model design by Thiagarajan, which consists of 4 stages: define, design, development, and disseminate. The result of the expert assessment ICARE-based digital module received the very feasible category, as the user responses test, the module got a very conceivable category. The Teacher response test got the highest score, with the grammar aspect getting the highest among other elements. This is because the language used in the module is an interactive language. Based on the result, ICARE-based digital modules can be used in the biology learning process, especially in the digestive system.

INTRODUCTION

Digital-based learning has been implemented in recent years in the education system in Indonesia. Various kinds of digital technology have begun to be applied in education to support effective learning by being influenced by 21st-century learning. In iapplication in the world of education, it directly requires students to do activities without being limited by space and time [1]. Education in the 21st century cannot be separated from the demands of 21st-century learning, namely the integration of technology as a means of media and learning resources to acquire knowledge with an extensive reach and at a relatively low [2]. Researchers have developed many digital-based learning resources to support the learning process in class. However, few schools still have limited learning resources used in class.

The limitations of learning resources can be felt in several aspects, including the quality and quantity of learning resources and the form and type of learning resources available. Meanwhile, learning resources must be available quickly to realize effective learning and allow students to push themselves to meet their independent learning needs [3]. Learning resources can be an alternative to increasing the productivity of educators and students in the learning process both in terms of maximum motivation, interest in learning, and learning completeness if supported by systematic learning management and delivery of material that is included with the utilization of multimedia in education. The selection of learning resources must be appropriate to the learning objectives to be achieved, economical,

practical, and easily accessible by educators and students, according to the situations and conditions in the learning process [4]. In this digital era, a digital module is one of the learning resources equipped with multimedia and continues to be developed.

Based on the analysis of the needs of three schools in Banten, the highest average value for using learning resources was 100% of students using printed books in the biology learning process in class, while learning resources were in the form of modules. Digital has the lowest figure of 16.66%. Besides that, students use the internet as an additional learning resource in class to find additional information. Because 61.11% of students considered printed books insufficient in terms of the completeness of the information in them, there was not a little information that was not yet available in the printed books used.

Another factor that causes difficulty for students to understand the material is the minimal use of learning resources provided by the teacher. Most teachers only use the lecture method and textbooks or LKS as learning resources for students. The digestive system is one of the materials presented in biology textbooks for class XI but is considered incomplete [5]. Students feel The material is complex because it includes body system material closely related to internal organs' structure and foreign terms. Research [6] shows that biological material considered difficult relates to internal organs, organ systems, and mechanisms in body organs. However, the printed books provided are still regarded as incomplete in explaining the concept of the digestive system material, often, the limited time

is the reason for students not to review the material provided.

Efforts that can be made to overcome these problems are that support learning resources are needed to achieve effective, active and independent learning to emphasize students' abilities to think critically, collaborate, and connect the knowledge gained with the real world. According to [7], learning biology in the material of the human digestive system is directly related to daily life. It requires students to have skills in applying the material and can also play a role in the community regarding problems associated with the digestive system. These skills can be achieved by using appropriate learning models in terms of mastery of the material and skills. One learning model that is seen as capable of providing opportunities for students to have the chance to apply the material they have learned is the ICARE Model (Introduction, Connection, Application, Reflection, Extension). The ICARE model is a learning model that can make it easier for students to apply the knowledge gained in everyday life. In addition, with the ICARE model, students can improve their skills to be more active in learning [8].

The reasons above are the background for developing learning resources in the form of digital modules in the ICARE learning model. Applying the ICARE model to create digital modules will be integrated with the SETS (Science, Environment, Technology, Society) approach. The SETS approach is a learning approach by linking what is learned with reciprocally appropriate aspects of science, environment, technology and society as a form of integrated linkage [9]. So, in learning with the SETS approach, students are invited to make connections between elements of science in the learning that are being followed with aspects of the environment, technology, and society [10].

Several similar studies that support the development of ICARE-based digital modules integrated with the SETS approach include Ula's research regarding the outcome of ICARE-based modules for atomic core material obtained a score of 95.72% in a practicality test by students [11]. Research by Rery, ICARE-based modules on ion balance material and salt solution pH in class XI SMA/MA have been categorized as valid according to 3 validators in terms of content eligibility 93.93%, ICARE characteristics 100%, Percentage of response to use for 3 teachers and 20 students each at 93.33% and 90.12%. Riana's research, regarding the development of ICARE-based science learning modules integrated with the SETS approach to human respiratory system material, obtained 89.23% teacher responsive practicality test results, and cumulative students reached a percentage of 80.8% so that the developed module received positive response in practical criteria.

This research seeks to develop learning resources in the form of digital modules based on the ICARE learning model integrated with the SETS approach. The created learning resources are expected to make it easier for students to study digestive system material in class XI SMA. In addition, through the development of digital modules, teachers are expected to be able to take advantage of existing facilities at school. This research aims to develop learning resources in ICARE-based digital modules integrated with the SETS approach, which are expected to make it easier for students to study the digestive system in class XI.

RESEARCH METHOD
Type of Research
The method used in the development of ICARE-based digital modules is the R&D (Research and Development) method. Research and development methods are used to produce a product as a digital module based on the digestive system ICARE. The development model used in this study is the Four-D (4D) model developed by Thiagarajan in 1974 whose stages include Define, Design, Development, and Disseminate. In this study, the three steps that will be carried out are the define stage, the design stage, and the development stage, while one that is not carried out is the dissemination stage. This consideration is supported by the opinion of [12], which states that research development in its implementation is longitudinal (gradually can be multi-year) because the research is carried out to produce specific products that the wider community can use. Because this research is related to the subject's academic activities to be studied, the research is limited to a limited test in the development stage only.

Research Design
The research procedure consisted of three stages: define, design, and develop. The define stage is carried out to gather initial information about the conditions and needs that form the basis of development research. The design stage is the initial design stage of the product in the form of design and preparation of product assessment instruments. The development stage is the stage of making and testing the feasibility of the module which is carried out by validators of media and material experts.

Sampling Technique
Sampling in this study used a purposive sampling technique with the aim of researchers being able to select samples with a specific background to assess the digital module being developed. The student samples taken by the researchers were students who had completed studying the digestive system in high school and students who had the level of knowledge determined by the researcher.

Research Subject
In addition, the user response test involved biology teachers and high school students. The research subjects included three media expert

lecturers, three subject matter expert lecturers, three biology teachers at each of the selected high schools, and thirty students as limited response test subjects, ten students each from the three participating schools. The selection of the senior high school was based on regional differences with the same accreditation as a comparison of module assessments in three different schools.

Data Collection and Research Instrument

Data collection techniques were carried out through non-test methods using instruments consisting of needs analysis questionnaires, module feasibility assessment sheets, and user response test questionnaires. The due diligence assessment sheet and student response test used a closed questionnaire. This is intended so that the respondent only answers one answer in accordance with the respondent's character regarding a statement. The module due diligence sheet is a closed questionnaire using the Gutmann scale. The user response questionnaire instrument uses a Likert scale with four intervals: strongly agree, agree, disagree, and strongly disagree.

Data Analysis

Data processing techniques for open questionnaires are processed using descriptive analysis to determine the needs of teachers and students. Descriptive analysis techniques are used to analyze the results of the distribution of needs analysis questionnaires accumulated and converted into percentages. Data processing techniques from expert assessments and user response questionnaires were analyzed using descriptive statistical methods. The feasibility of the digital module was assessed by experts and user responses based on modifications to the criteria set by Depdiknas Kemendikbud, which consisted of 4 components: content feasibility, language, presentation, and graphics. Data in the form of scores obtained from the digital module due diligence assessment results are converted into percentages. Due diligence assessment sheets by experts and users are calculated using data processing techniques according to [13] as follows:

$$N = \frac{R}{SM} \times 100\%$$

NP: The value of the Percentage of eligibility sought
R: The raw score obtained
SM: Maximum score value
100%: Fixed number

The results of the percentage values are converted into qualitative values with the assessment categories in Table 1.

Table 1. Assessment Criteria

Score in percent(%)	Category
<20%	Very unfeasible
21% - 40%	Unfeasible
41% - 60%	Decent enough
61% - 80%	Feasible
81% - 100%	Very feasible category

[14]

RESULT AND DISCUSSION

The research aims to develop digital learning resources for high school on biology material, especially the digestive system in class XI. The digital learning resources are modules based on the ICARE learning model, integrated with the SETS approach in the connection stages.

The first stage in this study is the define stage, which includes an analysis of the needs for the development of learning resources, an analysis of the availability of learning resources, an analysis of the 2013 curriculum, and an analysis of the material.
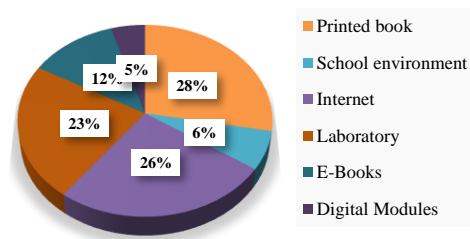

Figure 1. Average Use of Learning Resources

Based on a needs analysis conducted in three schools in Banten, the average use of learning resources in the three high schools is still limited to printed books and the internet as an additional learning resource to find relevant information. It is not yet available in the book,, while the usage of digital modules is still low, with a percentage of 5%, as shown in Figure 2. Based on the results of interviews with three biology teachers from the three high schools, only one teacher has used digital modules in the biology learning process. In addition, the teacher developed digital modules on other materials with a note that there were still many deficiencies in the modules being designed.

The material that is the topic of digital module development is raised based on the results of a needs analysis, that the digestive system is included in one of the materials that has not yet reached the minimum criteria completeness that the school has determined. The Percentage of 55.53% of students found it challenging to distinguishms in nng digestive system enzymes. Often, students are confused by the mention of various enzymes. Not only that, the the difficulty of describing the structure of digestive organs is the reason students still have difficulty learning it. Material analysis on the

863

digestive system concept refers to the 2013 curriculum with essential competencies 3.7 and 4.7

(see Table 3) in biology material, then reduced to indicators of competency achievement.

Table 3. Basic Competencies

Basic Competencies	3.7	Analyzing the relationship between the structure of the organ-composing tissue in the digestive system about nutrition, bioprocesses, and functional disorders that can occur in the human digestive system
	4.7	Present reports on the results of tests for food substances contained in various types of food ingredients concerning the energy needs of each individual, as well as food processing technology and food safety

The second stage is the design stage, which includes preparing test standards, media selection, format selection, and initial design. These four stages were carried out to build the content of the ICARE digital module being developed; at the end of the design stage, an initial design will be produced as a storyboard as a reference for making modules at the development stage. The test standards in the ICARE digital module are prepared for cognitive and psychomotor domains. Assessment in the cognitive part is carried out in the form of objective tests and subjective tests. In contrast, the psychomotor domain is carried out by assessing work and product performance.

The media chosen to be developed an ICARE-based digital module used as teaching material for the food digestive system in class XI high school. The ICARE digital module was prepared using the Canva application to design the module content and Heyzine Flipbook to present the digital module that had been prepared. Heyzine flipbook displays an ICARE digital module like a book that can be used

and read via students' smartphones. Besides, Heyzine Flipbook has exciting elements such as integrating video, sound, animation, and others [15]. After finishing designing the content and appearance, the resulting module is converted into a heyzine flipbook website. Available quizzes are made using the Wordwall website linked in the module, while the final evaluation uses the Google form in the form of multiple-choice questions.

The ICARE digital module component consists of three parts: preliminary activities, including module description, essential competencies and indicators of competence achievement, a brief description of the material, and an initial ability test. Learning activities consist of three learning topics: food substances, digestive tract and glands, and disorders of the food digestive system. The digital module format is adapted to the digital module format in terms of documents, orientation, and margins to suit students' ease of use. The presentation of the module output is presented in HTML and barcode.

Table 4. ICARE-based digital module design integrated with SETS

Sub Topic	Syntax	Description
Nutrients, Organs and Digestive Glands, Digestive Disorders	Introduction	It contains a brief description of the initial concept of the sub-topic to be discussed, accompanied by the learning objectives to be achieved.
	Connection	Contains phenomena that connect the material being studied with everyday life or topics previously taught by integrating the SETS approach to each presented phenomenon.
	Application	It contains student worksheets (LKPD), in which students are expected to practice applying knowledge and skills; besides that students are expected to solve the problems presented.
	Reflection	Contains summaries and quiz questions as a form of reflection and evaluation of student understanding
	Extention	Contains additional knowledge about phenomena related to the topic

The final stage in this research is the development stage (Develop). The development stage consists of product creation, validation of assessment instruments, expert assessment, product revision 1, development trials, and product revision 2. The results of product creation will become a

prototype for evaluation by experts and users to get suggestions and improvements regarding the product being developed.

The ICARE digital module was developed per the material content packaged in the design stage. Accessing ICARE digital modules requires using the

internet to support interactive content presented in modules such as video playback, interactive quizzes, live worksheets at the application stage, and learning

evaluation. The prototype digital module can be seen in Figure 2.
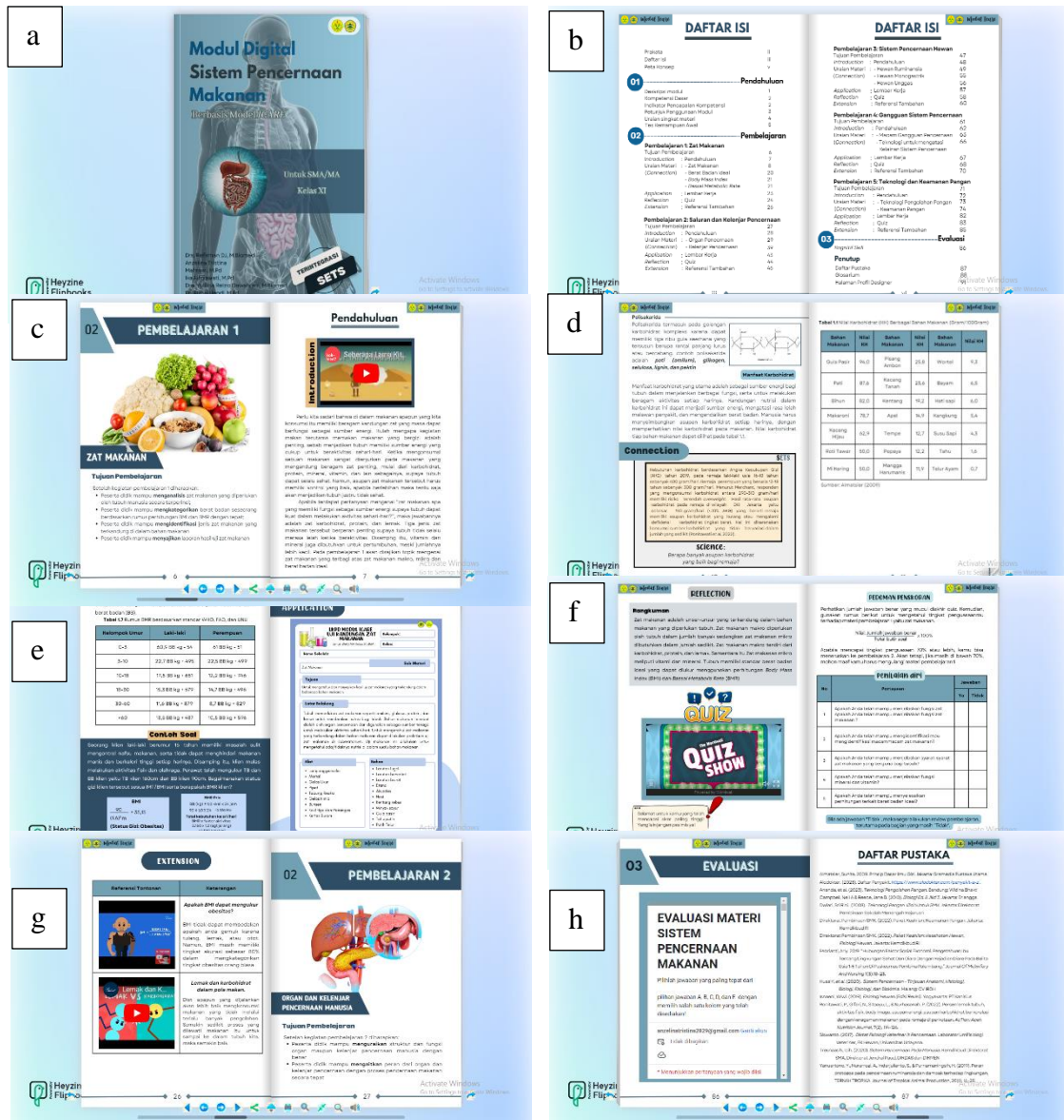

Figure 2. (a) Cover; (b) Table of Content; (c) Introduction; (d) Connection; (e) Application; (f) Reflection; (g) Extension; (h) Final Evaluation

This stage begins with media and material validation by each expert in these two aspects. Material expert validation was carried out by three lecturers, and media expert validation was carried out by three expert lecturers. Based on calculations from the expert validation evaluation results in the medical aspect, the figure was in the very feasible category. In contrast, in the material aspect, the average score was 88.76%, which was in the very conceivable category.
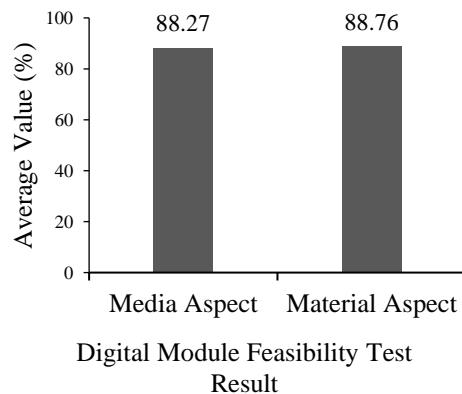

Figure 3. Expert Validation Result

The assessment category based on media aspects has 3 aspects: ease of use, design, and ease of access. The aspect of ease of access has the highest average value of 91.7%, including the sub-aspects of flexibility and compatibility. The ICARE digital module developed is presented in an HTML link and can be easily accessed online. Users can easily access the links listed in the module; however, there are still deficiencies in instructions for accessing the links contained in the module.

Digital modules using the flip application can add multimedia that can be directly accessed without leaving the application, such as videos and linked quizzes [16]. Developers should be able to utilize optimally user needs to facilitate access to the digital module. Aspects of ease of use get an average of 87.8%, including usability and interactivity sub-aspects. Aspects of design get an average value of 87.6%, including sub-aspects of cover, visual elements, display quality, and text quality.

Table 5. Media Expert Validation Result

Aspect	Number of Items	∑Score	Max Score	Aspect Value (%)
Ease of use	6	79	90	87.8
Design	15	197	225	87.6
Ease of access	4	55	60	91.7
Total	25	331	375	88.7

The assessment category in terms of material has five aspects, including aspects of material coverage, grammar, presentation techniques, SETS-integrated ICARE model learning, and learning evaluation. The grammar aspect has the highest average score, namely 91.11%; this aspect includes the suitability of improved spelling, level of development of students, and clarity of command sentences at the ICARE and SETS stages. According to experts, the language presented is by improved spelling usage guidelines; the language used is formal but still attracts students to participate in interactive learning. The module has the characteristics of standard and communicative language used. The module must encourage students to communicate ideas and thoughts orally and in writing. The use of speech must be appropriate to students' development level so that it is easy to

understand the language is more effective, simple, engaging, and still polite [17].

The learning aspects of the ICARE model get an average score of 90%; the sub-aspects include 5 ICARE stages of assessment. The presentation technique aspect received an average score of 87.50%. This aspect has sub-aspects, including appearance, concept continuity, supporting presentation of material, and systematic presentation. The material coverage aspect received an average score of 86.67% with sub-aspects including suitability essential competencies and indicator of learning competencies, learning objectives, material content, and learning evaluation aspects received an average score of 86.67% with sub-aspects namely learning feedback and suitability questions with indicators.

Table 6. Material Expert Validation Results

Aspect	Number of Items	∑Score	Max Score	Aspect Value (%)
Material Coverage	6	78	90	86.67
Grammar	9	123	135	91.11
Presentation Technique	8	105	120	87.50
ICARE learning model integrated with SETS approach	8	108	120	90
Learning Evaluation	4	52	60	86.67
Total	35	466	525	88.76

After validation by media and material experts, the digital module enters the revision stage based on the experts' suggestions and comments. Revisions based on media experts were made regarding errors in using fonts that were not yet compatible, module navigation, the variety of colors used, and video columns considered too small. Meanwhile, based on material experts, revisions were carried out by adjusting the operational verb level to the indicators of learning achievement being developed, adding variations to the quiz questions

into the HOTS (Highest Order Thinking Skills) category, further explanation regarding the problem phenomena presented at the connection stage, and adding command sentences in the form of invitations at each ICARE stage.
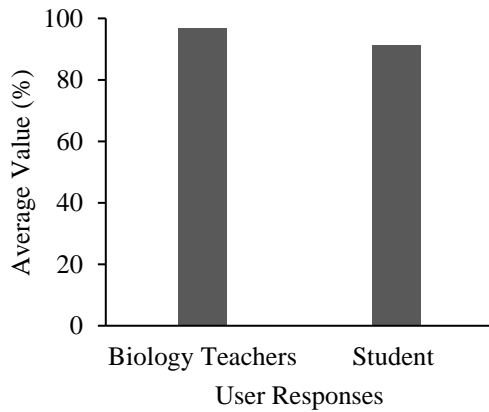
Figure 3. User ResponsesTest Result

After the digital module has passed the revision stage based on media experts and material experts, the digital module enters the user response test stage, namely teachers and students. In the teacher response test, this study used 3 high school biology teachers in class XI or class XII who were Figure 5. User Responses Test Result

willing to assess the digital module being developed. The assessment aspects of the user response test include material presentation, usability, grammar, appearance, and SETS-integrated ICARE model learning. The grammar aspect has the highest average score of 100%, and the learning aspect of the SETS-integrated ICARE model gets an average score of 98.95%. Aspects of usability get an average value of 97.22%. The element of presenting the material receives a score of 96.67%.

The display aspect got a score of 90.4%. This aspect received comments from the biology teacher, namely that the teacher thought that the images presented in the module were not clear enough or that the images were still blurry and showed too small. Suggestions for giving the images could be specially enlarged or clicked on to be displayed separately. The font section of the text presented still has a font size that is too small. It is recommended that the font be adjusted to a size that is neither too small nor too large.

Table 7. Biology Teacher Response Test Results

Aspect	Number of Items	∑Score	Max Score	Aspect Value (%)
Presentation of Material	5	58	60	96.67
Utility	3	35	36	97.22
Grammar	2	24	24	100
Appearance	7	76	84	90.47
ICARE learning model integrated with SETS approach	8	95	96	98.95
Total	25	288	300	96%

The assessment aspects of the limited response test for students include aspects of material presentation, usability, grammar, appearance, and SETS-integrated ICARE model learning. The grammar aspect has the highest average score of 100%, and the learning aspect of the SETS-

integrated ICARE model gets an average score of 98.95%. The usability aspect received an average score of 97.22%. The material presentation aspect received a score of 96.67%. The display aspect got a score of 90.4%.

Table 8. Student Response Test Result

Aspect	Number of Items	∑Score	Max Score	Aspect Value (%)
Presentation of Material	5	549	600	91.5
Utility	3	334	360	92.78
Grammar	2	224	240	93.33
Appearance	7	758	840	90.23
ICARE learning model integrated with SETS approach	8	844	960	87.7
Total	25	2709	3000	90.3

The define phase begins with an analysis of the needs for the development of ICARE-based

digital modules which is carried out by distributing questionnaires to teachers and class XI students who

have studied the digestive system material. Two questionnaires are given to students with closed questionnaires, including the initial questionnaire, which contains general questions related to learning resources and material topics that are considered problematic.

The results of the analysis of the answers to the initial questionnaire were rearranged follow-up questionnaire questions to provide questions more referring to the interest in developing digital modules. Besides that students can give solutions to which parts of the material are considered difficult in studying the digestive system in high school. The results obtained in a special questionnaire related to material still tricky for students to understand, namely on topics related to various enzymes, structural parts and digestive organs, as well as foreign terms that are difficult to memorize or remember. This aligns with Raida's research that material considered difficult in biology is material about organ systems, many biological objects that cannot be observed directly, are abstract, and use many foreign terms.

Analysis of teacher needs is done by giving questionnaires and interviews. The results of the interviews found that the use of digital modules in delivering offline and online material was still minimal, considering that teachers relied on learning resources already available at school and internet assistance to find more information in studying digestive system material. According to the results of teacher interviews, it was found that students had difficulty understanding digestive system material, even though it is closely related to everyday life. The preparation of indicators for achieving competence in each lesson must be adjusted to the needs of each material topic to be discussed.

The curriculum used in the three schools that were the subject of the study was the 2013 curriculum. The results of the curriculum analysis in Permendikbud No. 24 of 2016 concerning core competencies and basic competency lessons in the 2013 curriculum show that the 2013 curriculum develops four core competencies, namely (KI. I) Core Competencies of spiritual attitude, (KI. II) Core Competencies of social attitudes, (KI. III) Core Competencies knowledge and (KI. IV) Core Competency skills. Essential competencies in biology subjects are generally categorized into four directions, namely critical competencies, which lead to spiritual strengthening, attitudes, knowledge, and abilities.

Referring to Permendikbud No. 59 of 2014 regarding the characteristics of subjects and learning load, for class XI, a minimum schedule of at least 18 effective weeks and learning load each week is 44 hours of lessons. Each week effectively contains 3 hours of lectures for biology subjects, so the total hours of biology lessons for class XI is 54 hours per semester. In the 2013 curriculum, digestive system material is contained in essential competencies 3.7

and 4.7. Material analysis was carried out to limit the discussion of the digestive system material for class XI. The material discussed in the digital module includes food substances, the human digestive tract and glands, human digestive disorders and systems, food technology and safety.

The Design phase begins with designing an outline of the contents of the digital module. The digital module developed is given the innovation of an ICARE learning model, which consists of 5 stages: Introduction, connection, application, reflection, and extension. The selection of the learning model as the basis for the development of the digestive system digital module is the ICARE learning model, which is seen as being able to provide opportunities for students to have the chance to apply what they have learned in class. This is in line with studying digestive system material in the hope that students can use the material in everyday life. The SETS approach is integrated into the ICARE model to support presenting phenomena or problems in the connection stage by looking at the aspects of science, environment, technology, and society in raising the problem.

In the development stage, the feasibility and user response tests are carried out at this stage. Based on the results of the feasibility test of media experts, the highest average score is owned by the aspect of ease of access, namely 91.7%. The digital module developed has the final result in a direct link to the digital module; anyone can access the module at any time via the available link or barcode; module access requires the internet and a stable network. According to [18] the purpose of digital modules is to develop one of which is that modules can be used anytime and anywhere, so that student learning activities are binding. At the same time, the design aspect has the lowest score among the three aspects of media assessment.

According to the expert, colour diversity on each page is necessary so that apparent differences can be seen in each discussion point presented and in the colouring of the background stages of the ICARE model. According to [19], the colour display in the module is an important aspect that must be met; the module design will be the main thing for the user to open and use the module. Colour diversity is needed, but the colour difference does not adjust much to change the colour alignment on one page.

Based on the results of the feasibility test module by material experts, overall the content of the material presented is very appropriate. However, there are still revisions or additional input regarding the presentation of the material. The grammar aspect has the highest score of 91.11%, the language used in the formal module and uses the improved speliing writing guidelines, according to. While the elements of material coverage and learning evaluation have the lowest average value of 86.67%, this is because there is some material presented that is too broad for class XI students and the learning evaluation

presented is suggested to be included in the HOTS (High Order Thinking Skills) category seeing essential competencies 3.7 with operational verb analyzing, the hope is students can answer questions with the HOTS level at the reflection stage. According to [20], HOTS questions can train students' analytical skills in solving the given problems.

The user response test involved 3 biology teachers from different institutions, as well as 10 class XII students from each high school who were the study subjects, so the total limited student response test was 30 class XII students. Based on the teacher's response test results, the display aspect had the lowest average value, namely 90.4%; according to the teacher, the images presented in the module should be enlarged so that students can see clearly. The grammatical aspect gets the highest score, namely 100%; this is in line based on the material expert's due diligence test, that the grammatical element has the highest score. Overall, the evaluation results of the modules that have been developed are in the very feasible category.

In the student response test, the learning aspect of the SETS integrated ICARE model has the lowest average score of 87.7%; this is because the time for the response test is minimal, while students need direct application in learning each syntax in the ICARE model, in its application in class such as stages The application has not been implemented directly because it requires additional time to try the implementation of the practicum presented. According to [21], the syntax in the learning model should be applied based on predetermined stages so that no learning steps are left behind. The grammatical aspect has the highest score.

Based on the feasibility test and user response test results, the SETS integrated ICARE digital module has a very feasible category and can be used in the biology learning process in class XI, especially in the digestive system material. The suggestions and input of teachers and students became the final revision of the digital module to become the final product of the digestive system digital module based on ICARE; the module trial was limited to a limited response test, and it is hoped that the next digital module can be tested for its effectiveness in class XI SMA.

The advantage of developing digital module products based on the ICARE model is that the module presents learning material referring to the steps in the ICARE learning model. The presentation of learning material is followed by a connection stage that connects problems in daily life based on aspects of the SETS approach. The steps in the ICARE model require students to be able to apply them by doing practicums, reflecting on learning through interactive quizzes and stimulating students to expand their understanding in the extension stage. Digital modules can be accessed easily via smartphone or laptop with the help of the internet.

CONCLUSION

Based on the developmental research that has been carried out, the resulting learning resources are digital modules based on the ICARE learning model, which are integrated with the SETS approach to the concept of the digestive system in high schools, obtaining the results of the digital module feasibility test by media experts of 88.27%, material experts of 88.76%. Each biology teacher carried out user response tests from three different and 10 class XII students at each of these schools. The teacher response test obtained an average score of 96%, while the limited student response test obtained an average of 90.3%. The results of the percentages obtained based on the feasibility test and user response test of digital modules based on integrated ICARE are included in the category of very feasible to use according to the range of interpretation of the module assessment. ICARE-based digital modules integrated with SETS can be used in the learning process in class or independently.

REFERENCES

[1] Samsinar, S., & Fitriani, F. (2020). Character-Based Learning and Self Development to Improve the Sudent Character Education. *Lentera Pendidikan: Jurnal Ilmu Tarbiyah Dan Keguruan*, *23*(1), 108-126

[2] Mardhiyah, R. H., Aldriani, S. N. F., Chitta, F., & Zulfikar, M. R. (2021). Pentingnya Keterampilan Belajar di Abad 21 sebagai Tuntutan dalam Pengembangan Sumber Daya Manusia. *Lectura : Jurnal Pendidikan*, *12*(1).

[3] Prastowo, A. (2018). Sumber Belajar & Pusat Sumber Belajarteori Dan Aplikasinya Di Sekolah/Madrasah. *Jurnal AL-IRSYAD*, *8*(1).

[4] Samsinar S. (2019). Urgensi Learning Resources (Sumber Belajar) Dalam Meningkatkan Kualitas Pembelajaran. *Didaktika : Jurnal Kependidikan*, *13*(2).

[5] Solikhatun, I., Santosa, S., & Maridi. (2015). Pengaruh Penerapan Reality Based Learning Terhadap Hasil Belajar Biologi Siswa Kelas X SMA Negeri 5 Surakarta. *Jurnal Pendidikan Biologi*, *7*, 49–60.

[6] Raida, S. A. (2018). Identifikasi Materi Biologi SMA Sulit Menurut Pandangan Siswa dan Guru SMA se-Kota Salatiga. *Journal of Biology Education*, *1*(2).

[7] Mahrawi, M., Istikomah, U., & Ratnasari, D. (2021). Development of E-Book Learning Media Based on Problem Solving in the Material of the Human Digestive System. *Science Education and Application Journal*, *3*(2), 75.

[8] Rery, R. U., Haryati, S., & Shanderi, I. (2022). Development of module based introduction, connection, application, reflection, extention (icare) on ion balance and pH of salt solution class xi sma/ma. *Jurnal Pendidikan Kimia*, *14*(2), 131–138.

[9] Amalini, H., & Winarsih, W. (2022). Pengembangan Perangkat Pembelajaran Biologi Berbasis Sains Teknologi Masyarakat dan Lingkungan Kelas X SMA. *Berkala Ilmiah Pendidikan Biologi (BioEdu)*, *11*(1), 206-217.

[10] Riana, A. (2021). *Pengembangan Modul Pembelajaran IPA berbasis ICARE terintegrasi pendekatan SETS (Science, Envirinment, Technology, and Society) pada materi sistem pernapasan Manusia untuk siswa SMP Kelas VIII*. IAIN Bengkulu.

[11] Ula, N. M. (2021). *Pengembangan e-module berbasis Icare (Introduction, Connection, Application, Reflection, Extention) untuk SMA/MA pada materi Inti Atom dan Radioaktivitas* [repository.um.ac.id]. http://repository.um.ac.id/182326/

[12] Sugiono, S. (2019). *Metode Penelitian Kualitatif, Kuantitatif, RnD*. Bandung.

[13] Purwanto. (2013). *Evaluasi hasil belajar*. Yogyakarta: Pustaka Pelajar

[14] Riduwan. (2015). *Dasar-Dasar Statistika*. Alfabeta.

[15] Manzil, E. F., Sukamti, S., & Thohir, M. A. (2023). Pengembangan E-Modul Interaktif Heyzine Flipbook Berbasis Scientific Materi Siklus Air Bagi Siswa Kelas V Sekolah Dasar. *Sekolah Dasar: Kajian Teori dan Praktik Pendidikan*, *31*(2), 112-126.

[16] 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.

[17] Kosasih. (2021). Pengembangan Bahan Ajar. Jakarta: Bumi Aksara

[18] Puspitasari, A. D. (2019). Penerapan media pembelajaran fisika menggunakan modul cetak dan modul elektronik pada siswa SMA. *JPF (Jurnal Pendidikan Fisika) Universitas Islam Negeri Alauddin Makassar*, *7*(1), 17-25.

[19] Rayanto, Y. H., & Supriyo. (2021). *Models & Design of Teaching*. CV Jejak

[20] Marada, R., Nusantari, E., & Dama, L. (2021). Pengembangan Instrumen Berbasis Higher Order Thinking Skiil (HOTS) untuk Melatih Kemampuan Berpikir Kritis Siswa pada Mata Pelajaran Biologi. *Normalita (Jurnal Pendidikan)*, *9*(2)

[21] Amran, A., Perkasa, M., Jasin, I., Satriawan, M., & Irwansyah, M. (2019). Model pembelajaran berbasis nilai pendidikan karakter untuk generasi indonesia abad 21. *Lentera Pendidikan: Jurnal Ilmu Tarbiyah Dan Keguruan*, *22*(2), 233-242.