



Development of Science Learning *E-Module Equipped with Game* On Material Classification of Living Things for Grade VII Students

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Article Information	ABSTRACT
Submit: 08 – 02 – 2023 Received: 14 – 04 – 2023 Published: 11 – 05 – 2023	Penelitian ini merupakan penelitian pengembangan dengan model ADDIE. Proses validasi media dan materi dilakukan oleh dosen dan guru menggunakan instrumen berupa angket, untuk mengukur kepraktisan oleh guru dan siswa menggunakan instrumen berupa angket, dan efektivitas bagi siswa diukur menggunakan instrumen hasil belajar yang terdiri dari 20 pertanyaan. Hasil pengembangan media berupa e-modul dengan hasil validasi ahli materi diperoleh 94%, validasi ahli media diperoleh 90% dalam kriteria sangat valid. Kemudian untuk hasil implementasi berupa hasil kepraktisan guru diperoleh 96,6%, hasil kepraktisan siswa diperoleh 96,91% dalam kriteria sangat praktis dan hasil keefektifan siswa diperoleh sebesar 0,71 dalam kategori tinggi dihitung dalam rumus N-Gain dan untuk ketuntasan klasikal diperoleh persentase sebesar 93,10% dengan kriteria sangat efektif. Berdasarkan hasil penelitian dapat disimpulkan bahwa e-modul pembelajaran IPA dilengkapi dengan permainan pada materi praktikum klasifikasi makhluk hidup ditinjau dari daya tarik, kemudahan penggunaan, kesesuaian materi dan efektifitas ditinjau dari pencapaian KKM. Keywords: <i>e-modul; game; klasifikasi makhluk hidup; pembelajaran IPA.</i>
Publisher	ABSTRACT
Program Studi Pendidikan Biologi, Fakultas Sains dan Teknologi, UIN Walisongo Semarang	This research is a research and development with the ADDIE model. In the media and material validation process carried out by lecturers and teachers using instruments in the form of questionnaires, to measure practicality by teachers and students using instruments in the form of questionnaires, and effectiveness for students was measured using learning outcomes instruments consisting of 20 questions. The results of media development in the form of e-modules, namely the results of the validation of material experts obtained 94%, the validation of media experts obtained 90% in very valid criteria. Then for the implementation results in the form of teacher practice results obtained 96.6%, student practice results obtained 96.91% on very practical features and student effectiveness results obtained at 0.71 including the high category calculated on the N-Gain formula and for classical mastery a proportion 93.10% is obtained with a very effective mixture. Based on the results of the research, it can be interpreted that the science learning e-module is equipped with a game about the classification of practical living

things in terms of attractiveness, ease of use, material adjustment and effectiveness in terms of KKM achievement.

Keywords: *Classification of Living Thing, E-module, Games, Science Learning*

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INTRODUCTION

E-module are independent teaching materials equipped with multimedia so that the learning process can be done anywhere and anytime. By using *e-module*, students are required to be able to solve problems in their own way. According to Mardiyah (2018: 53) in compiling teaching materials an innovation is needed to increase student interest in learning a material and reduce student dependence on teachers, as well as accustom students to independent learning and one of the innovations that can be used is to include a game (game). in teaching materials.

Based on the results of interviews with 2 science teachers in class VII A during the pre-research at SMP Negeri 2 Tanjungpinang and SMP Negeri 5 Bintan, it was found that the teaching materials used were still limited. From the results of 29 student questionnaires, namely teaching materials used by teachers in learning science at school, the results obtained were 71% of students answered with worksheets and textbooks. Students like learning that is presented briefly and accompanied by pictures. Apart from teachers, students also need other interesting teaching materials to support the teaching and learning process such as electronic modules. Teaching materials in the form of *e-modules* have never been developed by science teachers at SMP Negeri 5 Bintan and SMP Negeri 2 Tanjungpinang, even though teaching materials in the form of *e-modules* are very important for teachers to use in carrying out the learning process. With this teaching material, it is expected to create an atmosphere that allows students to learn (Prastowo, 2015: 16).

Most children like to play a *game* both on cellphones and on computers. Most children play *games* excessively and *the games* they play are rarely related to learning. This is supported by the results of interviews with parents of students at SMP Negeri 5 Bintan and the results of student questionnaires that on average students like *games*. *The games* played by students have nothing to do with learning. When viewed from the results of student questionnaires, the teaching materials that have been presented make students tend to get bored easily and often don't focus on studying a material so that it makes students difficult to learn material on the classification of living things. This is in line with research by Risanto et al, (2018: 2) which states that the material for classifying living things is considered difficult because many use Latin terms for naming groups of living things.

Based on the results of 29 questionnaires for class VII students at Tanjungpinang 2 Public Middle School and Bintan 5 Public Middle School, namely students who did not understand the classification of living things on average, it reached 75%. Students have difficulty understanding material on the classification of living things because the material taught in the key part of the determination is slightly explained, making it difficult for students to understand the material. In this

material students have difficulty writing scientific names according to the rules and students also have difficulty making a list of simple determination keys. This is certainly very influential on student learning outcomes. The average daily test value is still relatively low. This can be proven by the results of students' daily tests at SMP Negeri 5 Bintan and SMP Negeri 2 Tanjungpinang on the classification of living things in general, they did not achieve 85% classical completeness. The availability of teaching materials in schools where researchers conducted research in the form of worksheets and textbooks and the ability of science teachers to use ICT have not been implemented in schools and no one has developed electronic teaching materials in the form of *e-modules*. This study aims to develop an *e-module* on Classification of Living Things material that is valid and practical to use for class VII Biology lessons and is effective in increasing ability to understand learning material. Based on the problems that have been described, because at SMP Negeri 5 Bintan and SMP Negeri 2 Tanjungpinang it has not yet been disclosed the development of science learning *e-modules* equipped with *games* on living things classification material for class VII students so this needs to be resolved. Therefore, researchers are interested in developing an " *e-module* Science learning is complemented by *games* on the material on the classification of living things for class VII students at SMP Negeri 5 Bintan.

METHODE

The type of research used is research and development (*Research & Development*). The research and development model used is the ADDIE model because the steps taken are easy to understand and the stages in this model are also carried out in detail and systematically, so that the product to be developed can be completed properly and is feasible to use. The ADDIE model developed by Robert Maribe Branch (2009: 2). This model consists of 5 stages, namely: 1) Analysis Phase, which includes: needs analysis, analysis of student characteristics, curriculum analysis and material analysis; 2) *Design* Stage, which is designing the media to be developed by making *storyboards* ; 3) *Development* stage, namely developing learning media that has been designed and conducting media and learning material validation stages; 4) *Implementation Phase*, at this stage the researcher conducts field trials. Researchers conducted a practicality test to find out the assessment of science teachers and assessments by the responses of students who were research subjects; 5) *Evaluation* stage, aims to revise the product with reference to suggestions and input that have been given by teachers and students from *implementation activities*, namely the trial process carried out previously so that later the development of learning media carried out by researchers will get valid, practical, effective results for use by various schools in the junior high school education level (junior high school). The time of the research was carried out on 04 August – 13 August 2022. Place of research in SMP Negeri 5 Bintan. The subjects used in this

study were 8 male students and 21 female students in class VII A at SMP Negeri 5 Bintan.

Data collection instruments include: 1) Instruments for measuring media validity, namely validation questionnaire sheets consisting of: a) media expert validation sheets; b) material expert validation sheet; 2) Instruments for measuring the practicality of using media are in the form of practicality sheets which are filled in directly by the science teacher and students after using the media which have several indicators such as attractiveness, ease of use and suitability of the material; 3) The instrument for measuring the effectiveness of the media is by evaluating cognitive learning outcomes. The test used to measure the effectiveness of the media is 20 *post-test questions* in an objective form.

The data analysis technique used is descriptive analysis technique. The validator provides an assessment of the developed media. The media, material validity rating scale and the media and material practicality rating scale can be seen in Table 1.

Table 1. Validity and Practicality Assessment Scale

No	Category	Score	Percentage Intervals
1	Strongly Agree (SS)	4	75%-100%
2	Agree (S)	3	50%-74%
3	Disagree (TS)	2	25%-49%
4	Strongly Disagree (STS)	1	0%-24%

(Source: Sugiyono, 2019: 11)

Validity and practicality data were analyzed by percentage (%), using the *percentages correction formula* as follows.

$$NP = \frac{R}{SM} \times 100$$

Information :

- NP = Expected percent value
- R = Score obtained
- BC = Maximum score

After the percentage is obtained, it is grouped according to the criteria which can be seen in Table 2.

Table 2. Conversion of Achievement Levels of Validity or Practicality

No	Achievement Level	Information
1	75%-100%	Very Valid
2	50%-74%	Valid
3	25%-49%	Invalid
4	0%-24%	Totally Invalid

(Source: Riduwan (2014: 41)

Data analysis of the effectiveness of learning media is to determine the level of cognitive learning outcomes of students before and after carrying out learning using the *e-module media* of living things classification, then written tests can be carried out on students. The formula used is as follows.

$$P = \frac{ni}{n} \times 100\%$$

Information :

- P* : Completeness of student learning
ni : The number of students who achieve KKM
n : The total number of students

Cognitive learning outcomes can be said to be complete learning if the evaluation results reach a value of \geq KKM, while classical completeness is said to be achieved if students who have completed learning reach $\geq 80\%$ of the total number of students. To determine the level of achievement of students' cognitive learning outcomes before and after learning using *e-module media*, the *N-Gain formula* can be used. To find out *the N-Gain*, the following formula is used.

$$N-Gain = \frac{Skor\ post\ test - skor\ pre\ test}{Skor\ maksimal - skor\ pre\ test}$$

Information :

- N-gain* : Gain Score
Scorepre – test : Value before using learning media
Score post – test : Value after using learning media

The Gain Index criteria can be seen in Table 3 below.

Table 3. Gain Index Criteria

Percentage	Interpretation
$0.7 < N - gain \leq 1.00$	Tall
$0.3 < N - gain \leq 0.7$	Currently
$0.00 < N - gain \leq 0.3$	Low
$N-gains = 0.00$	No decline
$-1.00 \leq N-gain < 0.00$	There was a decline

(Source: Sundayana (2014: 151))

RESULTS AND DISCUSSION

Research and development of *the e-module* of classification of living things equipped with *games* with the ADDIE model obtained the following results.

Analysis

The analysis phase carried out was needs analysis, student characteristics and material. The purpose of the needs analysis is to see the availability of teaching materials in schools. The results of interviews and questionnaires obtained were teaching materials used by students such as LKS and textbooks, 79.3% of students said that the appearance of teaching materials was less attractive because there were too many writings and pictures that made learning boring, on the other hand 62.1% students need teaching materials that contain quizzes as a learning evaluation. This is in line with the opinion of Putry et al., (2020: 19) which states that

good teaching materials are teaching materials accompanied by pictures and learning videos so that students can easily understand a material.

Analysis of the characteristics of students can be done in terms of the ability to think and the activeness of students. Based on the results of the student questionnaire, it was found that the average age range of students who were the subject of the study was 51.7 % of students aged 12-14 years. According to Piaget's theory in Mu'min (2013: 91) cognitive development can be divided into four stages, namely the sensory-motor stage (age 0-2 years), the pre-operational stage (age 2-7 years), the concrete operational stage (age 7 -11 years) and the formal operational stage (age 11-15 years). The age range of the students who were the subject of the study, namely 12-14 years old, was included in the theory of cognitive development at the formal operational stage (age 11-15 years). At this stage the child has been able to think abstractly, think logically, idealistically, predict, be able to solve problems and provide conclusions systematically. This is in line with the opinion of Bujuri (2018: 49) which states that the development phase of students is already able to think logically, rationally, scientifically and objectively towards something that is concrete or real. At this stage also 93.1 % of students often do not understand what the teacher explains when teaching, lack of enthusiasm for active learning of students. This is because the teacher explains the material using the lecture method so it is difficult for students to understand the material. Students tend to like *games*, but *the games* played by 96.6% of students have nothing to do with learning, 93.1% of students like teaching materials in electronic form, namely *e-modules* equipped with *games* so that learning is easy to understand and teaching materials can be used offline to make it *easier* for students to use quotas. This is in line with the opinion (Munandar et al., 2021) which states that *e-modules* accessible offline so that it doesn't become an obstacle when users run out of data packages when they want to use media.

Material analysis aims to find out which material is included in the difficult material category. Based on the results of the questionnaire for class VII A students, it was found that the material for the classification of living things was quite extensively studied, causing 89.7% of students to have difficulty determining groups of living things, 96.6% of students had difficulty making dichotomous keys and determination keys.. This is also seen from the results of students' daily tests on the classification of living things did not achieve the expected learning objectives. According to Aprianty et al, (2016: 3) material classification of living things is considered difficult because of the wide range of material, difficulties in understanding Latin, classifying and describing the characteristics of each phylum. This is in line with the opinion of Adrianto et al, (2022: 639) which states that the material for classifying living things is considered difficult by students because there are many Latin languages that must be memorized, it is difficult to determine roles, the learning time provided is limited. By developing *e-module media* can help explain and visualize examples and can help more contextual learning.

Design

In the *design process*, the learning media development needed is a design sketch. This is made in order to assist in designing the media to be developed. Researchers began to carry out the stages of designing the initial *e-module design*. The initial design that the researcher did was to make a storyboard, namely designing material, pictures, *games* regarding the classification of living things to be included in *the e-module*, incorporating features into the application and designing it as attractive as possible. The initial design of the product opener can be seen in Figure 1 below.

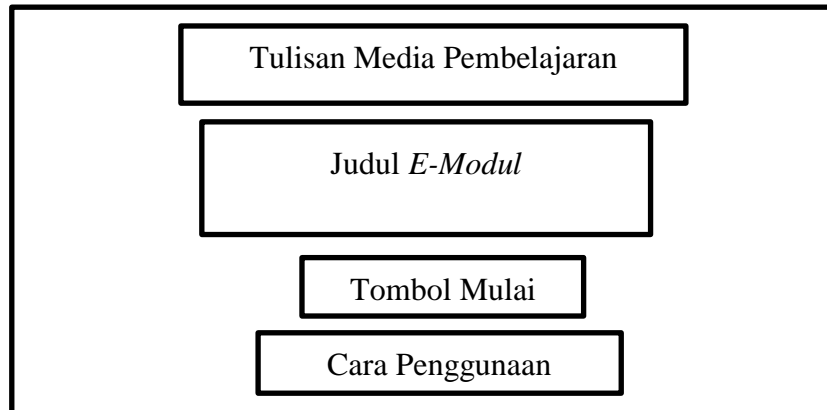


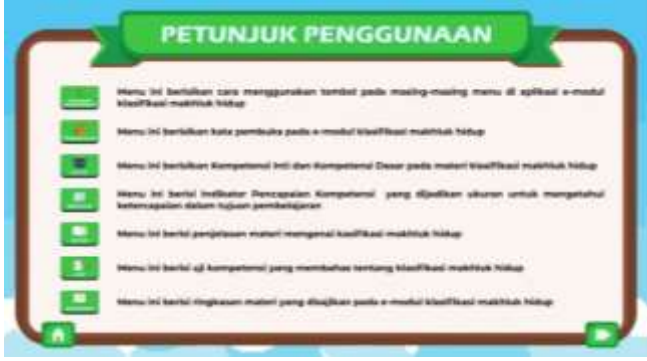
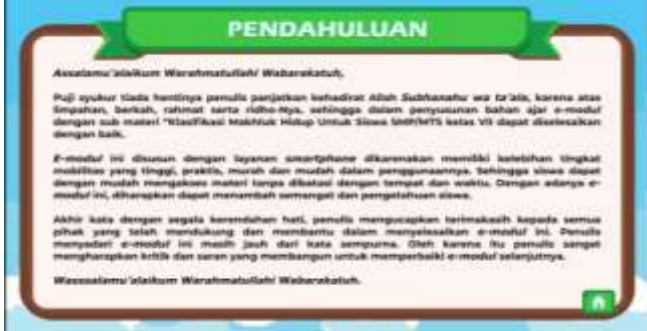
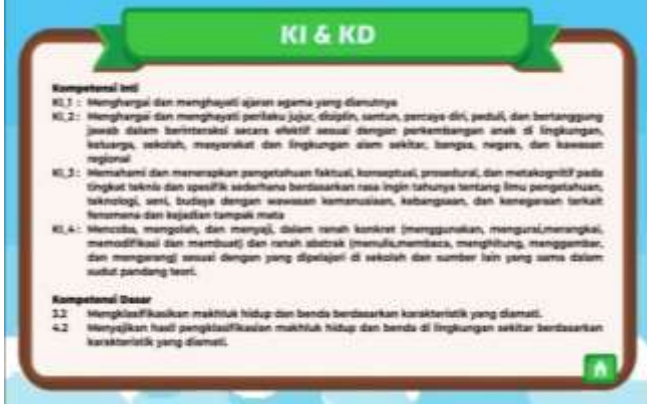

Figure 1. Product Development




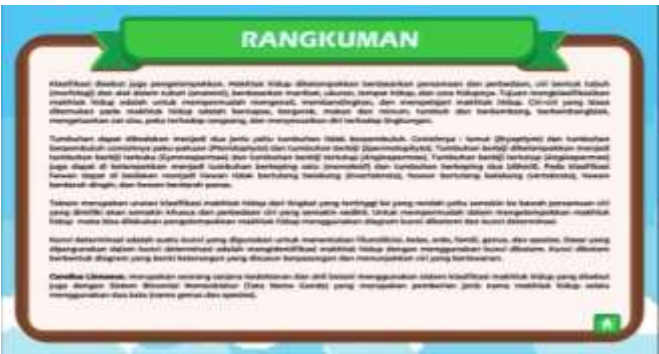
Development




At the development stage, of course, it is carried out according to the design. After that, the media will be validated by expert lecturers and science teachers at SMP Negeri 5 Bintan. In the validation process, the validator uses instruments that have been prepared in the previous stage to assess and provide input on the media being developed so that it is valid for use. The *e-module* media that has been developed is validated and revised by experts. The menu display that has been validated and there are improvements from experts can be seen in Table 4 below.

Table 4. Display of the Media *E-Module* menu

Part	Fill	Repair
Opening menu display	<p>The screenshot shows a colorful interface with a blue background. At the top, there are three yellow stars. Below them is a green banner with the text 'MEDIA PEMBELAJARAN'. Underneath is 'E-MODUL IPA' in green, followed by 'KLASIFIKASI MAKHLUK HIDUP' and 'UNTUK SISWA KELAS VII SMP' in white text on a blue background. At the bottom, there are two cartoon animals, a brown bear and an orange fox, and a green 'MULAI' button.</p>	<p><i>Background</i> replacement and has been replaced by adding images of living things</p>

Part	Fill	Repair
<p>User manual display</p>		<p>Before the revision there was no home button and after the revision a <i>home button</i> was added and the contents of the user manual were improved</p>
<p>Introductory menu display</p>		<p>Before the revision, the next menu button and the menu button to return to the previous page were removed and replaced with the <i>home button</i> (revised)</p>
<p>KI&KD menu display</p>		<p>-</p>
<p>Indicator menu display</p>		<p>-</p>

Part	Fill	Repair
<p>Material menu display</p>		<p>There is no home button and a home button has been added</p>
<p>Quiz menu display</p>		<p>-</p>
<p>Game menu display</p>		<p>-</p>
<p>Summary menu display</p>		<p>-</p>

Part	Fill	Repair
Glossary menu display		-
Developer profile menu display		-
Bibliography menu display		-

The validation results from material and media experts can be seen in Tables 5 and 6:

Table 5. Product Validation Results Viewed from the Material Aspect

No	Assessment Aspects	Percentage	Criteria
1	Compatibility of Material Description with Basic Competency	100%	Very Valid
2	Material Accuracy and Truth	89.5%	Very Valid
3	Learning Support Materials	92.5%	Very Valid
	Average	94%	Very Valid

Based on Table 5, material validation is carried out to obtain valid material in the developed media. Material expert validation was carried out by material experts 1 Lecturer in Biology Education FKIP UMRAH and material experts 2 teachers of SMP

Negeri 5 Bintan obtained a percentage of 94% which indicated a very valid category with several improvements, namely the validator gave directions to the media by adding an explanation regarding animal classification, plant classification, cold-blooded and warm-blooded animals as well as typo fixes in writing and numbering. The aspect of suitability of the material with KI and KD obtained a percentage of 100% with a very valid category because of the suitability of the material with the Core Competencies and Basic Competencies and the suitability of the material with learning objectives. This is in line with the statement of Miftah & Rokhman (2022: 416) which states that one of the criteria for selecting media is the suitability of the media with curriculum materials and learning objectives.

The accuracy and correctness aspect of the material obtained a percentage of 89.5 % with a very valid category because the material is presented clearly, the material is presented using language that is easy to understand. This is in line with Nurrita's opinion (2018: 171) which states that to improve quality learning, the material presented must be systematic and interesting. Aspects of learning support material obtained a percentage of 92.5 % with a very valid category because the material presented is in accordance with the development of science and technology, making it easier for students to understand the material and the images are presented clearly. This is in line with the opinion of Kristianto & Rahayu (2020: 16) which states that media equipped with images will be interesting for students to understand a material. Based on the results of all aspects, material validation on the *e-module media* obtained a percentage of 94% with very valid criteria.

Table 6. Product Validation Results Viewed from the Media Aspect

No	Assessment Aspects	Percentage	Criteria
1	Media View	91%	Very Valid
2	Programming	91.6%	Very Valid
3	Benefits	87.5%	Very Valid
	Average	90%	Very Valid

Based on Table 6, the media validation process was carried out by media expert 1, namely the Biology Education Lecturer at FKIP UMRAH and media expert 2, namely the Science teacher at SMP Negeri 5 Bintan obtained a percentage of 90% in a very valid category and additional input in the form of suggestions for improvement so that the media becomes more valid for later used by students, including replacing *the background* media which was previously plain blue with the addition of pictures of animals and plants. Then on the previous media there was no *home button* now there is a *home button*. Judging from the aspect of media display, a percentage of 91% is obtained with a very valid category because according to experts it is already good in the media display section, it can be seen that several criteria such as color and media design are attractive, feature layout is organized, and image quality is good. This is related to the opinion of Sungkono (2008: 74) which states that the criteria for selecting good learning media are media that meet

technical quality standards such as image quality, color, narration, effects, and *background* so that the selected learning media can attract students' attention.

The programming aspect obtained a percentage of 91.6 % with very valid criteria. because in the programming aspect there are features on the media that are complete, ease of use of features, and ease of installing media. According to experts, the programming aspect is good because the features in the media are easy to use. Aspects of usefulness obtained a percentage of 87.5% with very valid criteria because according to experts it is good and the media can be used as a means or container for conveying messages from teachers to students, so that students can focus more on following the learning process and can increase students' attention while studying. This is in line with Sadiman's opinion (2014: 7) that the use of media in learning is important, because learning media can be used to channel messages from senders to recipients so that they can stimulate thoughts, feelings, concerns and interests and understanding of students so that the learning process occurs. Based on the results of all aspects, validation of the *e-module media* for classification of living things get a percentage of 90%. In this case the researcher considers that this media is good because it has been tested. This is in line with Abidin's opinion (2016: 14) who said that the criteria for good learning media were media that had been confirmed through trials or validation.

Implementation

Implementation stage, all the media designs developed are applied after revisions to the media, which are then implemented in real situations. The trials carried out were to see the level of practicality and effectiveness of learning media. The practicality test phase is carried out to determine the practicality level of *the e-modules* used in the learning process. *For e-modules* that have been validated and revised, practicality tests will then be carried out by distributing practicality questionnaires that have been validated by the previous instrument validator. This questionnaire was given to science teachers and class VII A students at SMP Negeri 5 Bintan. The results of the teacher and student practicality test can be seen in Table 7 and Table 8.

Table 7. Results of the Practical Questionnaire by the Teacher

No	Assessment Aspects	Percentage	Criteria
1	Attractiveness	100%	Very Practical
2	User convenience	90%	Very Practical
3	Material suitability	100%	Very Practical
	Average	96.6%	Very Practical

Based on the results of the teacher practicality questionnaire in Table 6, the average teacher response to the media is 96.6 %. Thus, the high percentage of teachers who give a positive response proves that the media can be said to be very practical to use. The practical validator is a science teacher at SMP Negeri 5 Bintan. Assessment of the practicality of the media is seen from 3 aspects, namely the aspect of attractiveness, ease of use and suitability of the material. The teacher's

assessment of the attractiveness aspect obtained a percentage of 100% in the very practical category because according to the teacher the design of the application being developed was already attractive, so it has appeal to its users. As stated by Arsyad (2013: 31) that the design of media appearance is a feature and principle so that a learning media must be able to become dynamic visuals.

The aspect of ease of use obtained by the percentage of assessment from the teacher is 90%. with a very practical category because the developed *e-module is easy for users to access and operate so users don't waste a lot of time*. This is in line with the opinion of Annisa et al, (2020: 78) the practicality of learning media is important to know because one of the practical requirements of learning media is that it is easy for users to use. While on the aspect of suitability of the material obtained a percentage of 100%. From this aspect the teacher has assessed it well because the presentation of the material in *the e-module* has been presented clearly and structuredly.

Table 8. Practicality Questionnaire Results by Students

Subject	No	Rated aspect	Percentage	Criteria
29 students of class VII A	1	Attractiveness	95.25%	Very Practical
	2	Ease of Use	97.64%	Very Practical
	3	Material Suitability	97.84%	Very Practical
		Overall Average	96.91%	Very Practical

The practicality test of students on the media consists of 3 aspects as well as the practicality test given to the teacher. Every aspect belongs to the "very practical" category. The average student gives a score of 4 and 3 which states that the media can be accessed easily and can be used anywhere and anytime. This is in line with the research of Widiana & Rosy (2021: 3730) which states that students can have independent teaching materials that can be used anywhere and are able to think scientifically in the learning process. In the aspect of suitability of the material, getting a very practical category because in *the e-module* is presented some content such as quizzes that can test students' understanding while learning, there is a video so students can re-understand the lesson, *games* are played so students don't get bored when using *the e-module* and the material interspersed with competency tests aims to see how well students understand the material. This is in line with Arsyad's opinion (2015: 90) which states that the learning media used must emphasize the clarity and accuracy of everything. Based on the results of the practicality assessment, it can be concluded that the *e-module media* is categorized as "very practical" with an average acquisition of 96.91% that the *e-module media* can be used as a practical learning medium and can assist students in understanding material classification of living things. The results of the effectiveness of students can be seen in Table 9 below.

Table 9. Student Effectiveness Results

Category	Daily Deuteronomy Value	Post-Test Results
The highest score	95	100
Lowest Value	0	60
Average	47.5	80
Total Number of Students	29 students	29 students
Number of Completed Students	13 students	27 students
Mastery of Classical Learning	44.82%	93.10%
Average <i>N-gain</i>	0.71 (High)	

The effectiveness of the use of *e-modules* is carried out by tests in the form of students' cognitive learning outcomes. The results of this cognitive test were carried out in two stages, namely the daily test scores of students who the researchers had obtained their scores on the material before using the media that the researchers developed, namely not achieving 85% classical completeness. Then the researchers compared the results of the *post-test cognitive tests* after using the media. The *post-test* questions that the researchers made consisted of 20 objective questions and were tested on students who were the test subjects, namely class VII A students at SMP Negeri 5 Bintan. To measure the effectiveness of the media is done by comparing the average value of the daily test results with the results of *the post-test* using the *N-Gain formula*. Based on the results of *the N-Gain* calculation, an average *gain score* of 0.71 is obtained in the "high" category. The number of students who completed the KKM was 27 out of 29 students with a classical completeness percentage of 93.10% in the very effective category.

This is in accordance with the opinion of Permatasari & Marniati (2019: 56) which states that one class is declared complete in learning if in the class there are > 80% of students who complete. The increase is supported by the competencies contained in the media developed by the researcher which are presented clearly and easily understood and remembered by students what are the important points of each material making it easier for students to answer questions that are in accordance with the classification of living things. This is in line with Anwar's opinion (2017: 472) which states that a learning is considered effective if the score achieved has met the predetermined mastery limits. This is consistent with the findings when distributing student questionnaires and interviewing science teachers that the obstacles students face when studying living things classification material are the limited teaching materials used by teachers. The teaching materials used are worksheets and textbooks which only contain text and pictures. Thus encouraging researchers to develop *e-module media*. The developed *e-module* media contains a variety of interesting components so that all senses can function. In line with what was expressed by Asikin & Daningsih (2018: 198) the more senses and student movements involved in the learning process, the easier it is for students to define meaning. Based on these results, it can be concluded that *e-module* media is effectively used in learning material classification of living things.

Evaluation

Evaluation is the final stage of the ADDIE model. Evaluation is carried out from implementation activities. The results of the evaluation were obtained from the suggestions of the teachers and students who participated during the trial run, so that from this evaluation stage a revision was made for the perfection of the media being developed. During the trial, the teacher said that the media being developed was good and very supportive of learning and students also said the media being developed was good, both in terms of appearance, how to use it, and the presentation of the material which was easy to understand. Based on the effectiveness test, the results of the acquisition score were obtained which categorized that the development of *e-module media with games* was "very effective". This is in line with the opinion of Uno & Muhammad (2012: 173) that learning can be considered effective if the score achieved meets the specified mastery limit.

CONCLUSIONS AND SUGGESTIONS

Based on the development research carried out, it can be concluded that *the e-module* Classification of Living Things that was developed has valid and practical criteria used for class VII Biology learning and is effective in increasing abilities in understanding learning material. The development of *the e-module* for classification of living things is said to be effective based on the results of the *N- Gain calculation* which is equal to 0.71 which indicates that *the e-module* for classification of living things has a high level of interpretation. The number of students who achieved the KKM was 27 students with a classical completeness percentage of 93.10 % with very effective criteria. The research suggestion is that *e-module* products can be presented offline to make it easier for students to use quotas and for the future the included *games should be made at a level level*.

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REFERENCES

- Abidin, Z. (2016). Application of Selection of Learning Media. *Edcomtech: Journal of Educational Technology Studies*, 1 (1), 9–20.
- Adrianto, H., Setyawan, Y., Banjarnahor, DP, Kusumah, IP, & Messakh, BD (2022). Provision of New Classifications of Animal Living Things to Biology Teachers. *Sebatik*, 26 (2), 638–643. <https://doi.org/10.46984/sebatik.v26i2.2152>
- Annisa, AR, Putra, AP, & Dharmono. (2020). Practicality of Learning Media for

- Antibacterial Power of Sapodilla Fruit Extract Based on Macromedia Flash Practicality Of Learning Media for Antibacterial Power of Sapodilla Fruit Extract Based on Macromedia Flash. *Science Education Innovation*, 11 (1), 72-80
- Anwar, M. (2017). Creating Effective Learning Through Hypnoteaching. *Expose: Journal of Legal and Educational Research*, 16 (2), 469–480.
- Aprianty, V., Yeni, LF, & Wahyuni, ES (2016). Description of Students' Learning Difficulties in Sub-Material of Class X Invertebrates MAN 2 Pontianak. *Equator Journal of Education and Learning*, 5 (12), 1–13.
- Arsyad, A. (2013). *Learning Media*. Jakarta: Rajagrafindo Persada
- Asikin, N., & Daningsih, E. (2018). Development Audio-Visual Learning Media of Hydroponic System on Biotechnology Topic For Senior High Schools. *Journal of Education and Humanities* 174 (Ice 2017), 197–201.
- Asyhar, R., Afrida., & Widiastiningsih, R. (2015). Development of E-Modules using Pageflip Professional 3D Software for Class X Chemistry Learning at Al-Falah Islamic High School, Jambi City. *Journal of the Indonesian Society of Integrated Chemistry*, 7 (1), 18–24.
- Branch, R. M. (2009). *Instructional Design : The ADDIE Approach*. New York : Springer Science & Business Media
- Bujuri, DA (2018). Analysis of Cognitive Development of Elementary Children and Its Implications in Teaching and Learning Activities. *LITERACY (Journal of Education)*, 9(1).37-50
- Dwi, RA, & Subagio, FM (2013). Using Image Media to Improve the Learning Process of Plants and Animals Themes in Elementary Schools. *Journal of Elementary School Education*, 1 (2), 1–9.
- Irfan, MK, Yelianti, U., & Muhaimin. (2019). Development of 3D Pageflip-Based Biology Learning E-Module on Classification of Living Things for Class VII Students of SMP Development. *Edu-Science*, 8 (1), 9–16.
- Kristianto, D., & Rahayu, TS (2020). Development of E-Comic Learning Media to Improve Grade IV Mathematical Problem Solving Ability. *Tambusai Journal of Education*, 4 (19), 939–946.
- Mardiyah, AA (2018). Application of Games in Middle School Indonesian Language Teaching Materials. *Journal of Education*, 5 (1), 53 – 69.
- Miftah, M., & Rokhman, N. (2022). Selection criteria and principles of using ICT-based learning media according to the needs of students. *Educenter : Scientific Journal of Education*, 1 (4), 412–420.
- Mu'min, SA (2013). Jean Piaget's Theory of Cognitive Development. *Al-Ta'dib Journal*, 6 (1), 89-99.
- Munandar, RR, Cahyani, R., & Fadilah, E. (2021). Development of Sigil Software E-Module to Improve Student Learning Outcomes During the Covid-19 Pandemic. *Biodik*, 7 (4), 191–202. <https://doi.org/10.22437/bio.v7i4.15204>
- Nurkholis. (2013). Education in an Effort to Advance Technology By: Nurkholis Doctor of Education, Alumnus of Jakarta State University Extraordinary Lecturer in Tarbiyah Department, STAIN Purwokerto. *Journal of Education*, 1 (1), 24–44.
- Nurrita, T. (2018). Development of Learning Media to Improve Student Learning Outcomes. *Journal of Education*, 3 (1), 171–187.
- Permatasari, ANI, & Marniati. (2019). Application of the Design Making Module with the Help of Collage in the Basic Subject of Design for Class X Fashion Design at SMK Negeri 1 Buduran Sidoarjo. *Journal of Education*, 8 (1), 52-61
- Prastowo, A. (2015). *Creative Guide to Making Innovative Teaching Materials*.

Yogyakarta : DIVA Press

- Putry, HME, Adila, VN, Sholeha, R., & Hilmi, D. (2020). Video Based Learning as a Learning Media Trend in the 4.0 Era. *Tarbiyatuna: Journal of Scientific Education*, 5 (1), 1–24.
- Qomarul, YR, Putu, SIN, & Bagus, PMI (2018). Development of Physics Education Game Learning Media to Increase Student Motivation and Achievement in Materials of Straight Straight Motion, Regular Change, and Free Fall. *Journal of Physics Learning Research*, 8 (2), 21–30.
- Rabayanti., Noer, AW, Afiah, N. (2021). Efforts to Improve Learning Quality Through Integrated Learning Systems. *Dishum Journal*, 1 (1), 22–35.
- Riduwan. (2014). *Research Proposal Preparation Methods & Techniques*. Bandung : Alfabet
- Risanto, R., Asikin, N., & Muhartati, E. (2018). Development of Macromedia Flash Learning Media on Classification of Living Beings for Class VII Students. *Biology Thesis Articles 03*, 2 (15), 1 – 5.
- Sadiman, A., Anung, R., & Rahardjito, H. (2014). *Educational Media*. Jakarta: Rajawali Pers.
- Sugiyono. (2019). *Research and Development Methods*. Yogyakarta: ALPHABETA, CV.
- Sundayana, R. (2014). *Education Research Statistics*. Bandung: Alfabet.
- Syafira, Z & Roesminingsih, MV (2020). Tutor Competency and Learning Quality at the English Is Friend Course Institute in Surabaya. *Journal of Education for All*. 4 (3), 82–92.
- Widiana, FH, & Rosy, B. (2021). Development of Flipbook Maker-Based E-Modules in Office Technology Subjects. *Educative : Journal of Education*, 3 (6), 3728–3739.
- Uno & Muhammad, N. (2012). *Learning with the PAILKEM Approach*. Jakarta: Earth Script.