



PRACTICUMMA: AN OPEN PLATFORM FOR ONLINE PRACTICUM AT ELEVENTH GRADE SCIENCE STUDENTS

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Abstract

During the online learning period, students experience many obstacles that cause the practicum to not run well, especially for schools with problems with laboratory facilities. Students also needed media that could be used for independent and repetitive learning. Therefore, the researcher developed the Practicumma website by integrating learning components (learning resources, teaching materials, media, methods & evaluation) for online practicum. The research objective was to develop a biology learning website for the eleventh-grade science students. The type of research used is R&D (Research and Development) with the ADDIE development model. Data analysis using qualitative and quantitative methods. The results showed that Practicumma was suitable for use in biology practicum according to the assessment of media experts at 76.7%, material experts at 80%, biology teachers at 83.53%, and limited scale test to students at 87.2%, so the average percentage of eligibility was 81.86% (very valid).

Keywords: *Media, Website, Practicum, Online*

INTRODUCTION

Over time, the development of the world of science and technology has been increasingly complex and changed every aspect of human life (Edward et al., 2018). The community's need for capabilities in the field of technology is critical. The rise of the industrial revolution 4.0 also requires teachers and prospective teachers to keep up with technological developments (Babosová et al., 2022; Lestariyanti, 2020; Norra, 2020;

Rohmatulloh et al., 2021). The pandemic is enough to be an evaluation to build a new face in Indonesia's education reform. The lack of quality of educators (teachers) in using digital technology is evident when the situation demands improvement and leaves the offline learning model to emergency distance learning (EDL) (Asmoro et al., 2021; Mahaffey, 2020; Rutherford et al., 2021). The shifting of face-to-face learning to digital learning causes the education component to



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experience unpreparedness. It is not optimal in its application, for example, in terms of school infrastructure, teacher learning models, and preparation of students in facing online learning (Adi et al., 2021).

Science learning as a product of knowledge obtained through a coherent process consists of concepts, principles, laws, and theories that can contribute to the formation of a creative generation (Saputro et al., 2020; Yusa et al., 2023). Biology learning is a fundamental scientific discipline at the level of everyday life and in science (knowledge) and technology. Biology acts as a science that involves reasoning, theoretical, systematic, and methodological abilities. Therefore, it is necessary to have a learning model to concretize abstract things in theory with scientific procedures. Typical learning through observation and experimentation and drawing conclusions from experiments are the main aspects that must be considered (Handayani, 2020).

Skills are skills to do something obtained from basic ability training (Tauhidah et al., 2017). The practicum is a reasonably effective method for students to develop science skills in learning biology. Redhana (2019) stated that the scientific approach to the 2013 curriculum aims to create conditions for students to have critical thinking skills, problem-solving, innovation, creativity, collaboration, and communication. In addition to these four skills, students are required to master scientific content and attitudes and have media literacy, information technology literacy, information literacy, and communication. Classroom research, such as multimedia learning, is a

significant need in the educational community with technological literacy, including students (Handayani, 2020). Ottander & Grelsson (2006) revealed that laboratory activities are highly urgent in learning biology and science in general. In this learning, an activity is needed that asks for student participation in solving problems. In addition, several materials require observation so that students can better understand and provide meaningful learning and improve practical skills (Yunus & Yuliana, 2020).

During the practicum, the obstacles experienced by biology teachers include the availability of relatively insufficient time, the absence of a laboratory assistant, and inadequate materials (Siburian et al., 2017). Rahmah et al. (2021) also stated that some schools in the upper secondary level of Banda Aceh City had not done many practica. The factor is the infrastructure and time allocation, which are still lacking. The same result was also studied by Masruri (2020) that at SMA Negeri 1 Moga, Pemalang Regency, Central Java, it could not be carried out optimally because of the difficulty in preparing the tools and materials to be used, the time allocation, plus the absence of a laboratory assistant to help prepare for the practicum, so the majority do not practice. According to research by (Buccelli et al., 2013), in the Piauí State area of Brazil, learning difficulties occur due to the lack of professional educators and the difficulty of accessing rural areas. Geographical conditions and inadequate transportation facilities also make it difficult to access schools.

As a form of evaluation and solution to the difficulties of some biology teachers and students in carrying out practicums during the pandemic, technical practicums that put students in practice and demonstrate practical tools directly need to be documented. The goal is that students can easily access information to support students' cognitive abilities and scientific skills regarding suitable material. Documentation in online practicum can be done in terms of visual (text), audio-visual (video), multimedia, or virtual schooling (Barbour & Reeves, 2009; Risnita & Sari, 2021). Some practicum also used Biology Virtual Lab (Kismiati et al., 2022). In addition, media development is needed to increase new interests and high curiosity, arouse students' learning stimulation and motivation, and their critical thinking power (Adi et al., 2016; Hidayat et al., 2020; Solekhah et al., 2020), especially in distance learning (Akour et al., 2020; Pelikan et al., 2021).

A literature study was conducted to determine the use of video as one of the supporting online practicums and their advantages over other media. According to Handayani (2020), video is a medium that contains much information and is straightforward because it can be delivered directly to students. The media is also considered useful for classroom learning because it increases understanding and retention and the potential for demonstrations, specimens, and illustrative environments that can be shown to students. According to Dewi (2018), cognitively video can be used as a substitute for textbooks at school. From the affective aspect, videos can

affect students personally and socially and tend to be interactive.

Learning to use the website is one type of learning media that follows the development of information and communication technology. According to Wahyunita et al. (2020), the web learning model allows the process of assimilation and accommodation simultaneously because this model gives students the freedom to absorb the material in the time that is considered the most appropriate and the method they prefer. According to research, website-based learning methods can also improve school student learning outcomes (Sari & Setiawan, 2018). During online learning, the website is widely accessed by students to find information about the material taught by the teacher (Muyasaroh et al., 2021). The website is an advantage because it is easily accessible by students via the internet and does not require large storage space. Students use various online learning media, Learning Management Systems (LMS), and social media applications (Faizah et al., 2021).

Practicumma is a website as a database of integrated practicum tools that integrates learning resources, teaching materials, practicum instructions, methods, media, and biology learning evaluation tests represented through website design. The integration of several learning tools allows supporting media to be used for students, thereby minimizing teacher performance in preparing learning tools that take much time. This media is an innovation created by the author based on observations and literature related to practicum, which is still minimal. In addition,

Practicumma can be applied to save time and costs and anticipate the limitations of facilities in several schools. The learning media is expected to support students' needs and by the demands of the development of information and communication technology in the world of education as well as an option when learning cannot be done offline.

Compared to direct practicum, *Practicumma* has advantages in terms of flexibility which can be accessed repeatedly without having to do practicum again. Students can also use the media anywhere and anytime if it has a stable signal condition. This flexibility allows *Practicumma* to be used as a medium for learning in class and for independent study at home for students. This independent learning can improve students' literacy skills (Muyasaroh et al., 2021). Based on this analysis, the research title '*Practicumma: An Open Platform for Online Practicum at Eleventh Grade Science Students*' is proposed. The purpose of this research is to develop *Practicumma* website, test its validity and describe students' responses to media.

METHODS

This type of research is development research (R&D). Borg & Gall (1983) stated that development research aims to develop and produce research products through cyclic and continuous steps such as field tests which, if they fail, must be revised to produce the appropriate product (Hassan et al., 2020; Rabiah, 2018). Researchers used ADDIE as a development model for making *Practicumma* media. According to Umami et al. (2021), the developer of

the ADDIE model is Dick and Carry on 1996, which has five stages: *analysis, design, development, implementation, and evaluation* (Alnajdi, 2018; Danks, 2011; Durak & Ataizi, 2016; Hsu et al., 2014; Muruganantham, 2015; Zulkifli et al., 2018). ADDIE is also used by Kadirbergenovna (2022), Mustami (2019), Yanti et al. (2018), Yotovska & Kalou (2018) & Meishanti et al. (2022) in biology learning. The development process requires several expert team tests (media and materials), research subjects, limited scale, field-scale, and product improvement revisions (Cahyadi, 2019).

This research was conducted at the MA Sunniyyah Selo which is located at the Kompleks Makam Ki Ageng Selo, Tawangharjo Grobogan. The time of the research was on 6-7 June 2022.

Sample of Research

The entire sample in the study used a *purposive sampling* technique, which is a sampling technique that has certain considerations (Sugiyono, 2015). The sample used as an analysis of the initial research needs was 34 students from seven random schools (MA Sunniyyah Selo, MAN 1 Kota Semarang, MAN 1 Grobogan, MA Matholi'ul Huda, MA Uswatun Hasanah, SMA N 3 Semarang & SMA N 1 Negara Bali) for the 2022/2023 academic year. The sample respondents in the small-scale test are the eleventh-grade science students at MA Sunniyyah Selo, Grobogan, totaling ten students. Rayanto & Sugianti (2020) stated that the number of samples in the ADDIE development model was generally 10-15 people. Data sources from the small-scale test

sample are students who own cellphones or laptops and can access the internet to assess the developed website.

Data Collection Techniques

Data collection techniques in this study were interviews, observation, questionnaires, and documentation. In this study, structured interviews were conducted as an initial survey of problems in the field on January 27, 2022. The resource person is a biology teacher at MA Sunniyyah Selo Grobogan named Septi Maharani, S. Pd. The observation was carried out directly at SMA N 1 Semarang in July – September 2021 to find problems during biology learning, especially related to practicum. The researcher observed the curriculum, learning process, materials and activities carried out by students during online learning. The questionnaire instrument in this development research was divided into four types, namely the urgency of the practicum and media needs, the questionnaire for the validation test of the material and media expert, the teacher's response assessment questionnaire, and the response questionnaire for the limited-scale test for the students of MA Sunniyyah Selo. In the questionnaire, several indicators of questions and statements contain a *Likert* scale with five alternative answers, namely very good, good, sufficient, not good, and very not good. The *Likert* scale measures the opinions, perceptions, and attitudes of a particular person or group in a phenomenon. The assessment rubric can be seen in table 1.

Table 1. Likert scale positive statement

Statement	Scale
Very Good (SB)	5
Good (B)	4
Sufficient (C)	3
Not Good (TB)	2
Very Not Good (STB)	1

In this study, documentation was used when conducting pre-research at the analysis stage by studying literature from books and journals, and other relevant sources. Documentation is also carried out at the design stage (making *storyboards* by researchers) and development (application development through illustrations).

Data Analysis

The data analysis used is descriptive and statistical in the form of qualitative and quantitative (Handayani, 2020). Qualitative analysis for interview data, observation, and documentation. Quantitative analysis is used to measure the level of validity or feasibility of *Practicumma*. The data are taken from a material validator questionnaire and media validator as well as the assessment of biology teachers. The student response questionnaire was applied in conjunction with a small-scale test. The results of the percentage of data from the expert validator's assessment of the *Practicumma* media are then converted into certain categories so that conclusions can be drawn on the level of validity of the developed media. The level of validity is presented in table 2.

Table 2. Range of scores in the assessment of the validity of the media

Score	Validation Level
0 - 20%	Very invalid and so should not be used
21 - 40%	Invalid or should not be used
41 - 60%	Sufficiently valid, and it is recommended not to use because it requires a complete revision
61 - 80%	Valid or usable but requires minor revision
81 - 100%	Very valid or can be used without revision

(Della, 2020)

Based on this scale, the learning device is declared valid if it meets the score from the expert validator with a valid and very valid range (Norra, 2018).

RESULT AND DISCUSSION

The initial product development in this study was in the form of a biology practicum website called *Practicumma*. Research to develop this product is carried out using the ADDIE development model through the following stages:

Analysis

In this study, the analysis phase consisted of three categories: student character analysis, material analysis, and technology media analysis. Student analysis was carried out by distributing questionnaires. The material analysis includes material needed by students according to the curriculum or level of difficulty, while technology media analysis is to see whether there are facilities that support learning, such as internet connections, projectors, computers, and other learning media (Sadikin & Hakim, 2019). The development of *Practicumma* begins with analyzing the problems and needs during the learning process experienced by students and teachers. Field data was obtained from observations, interviews, and distributing

questionnaires to respondents. At this stage, primary data was collected to strengthen the research, including interviews, distributing questionnaires, and studying literature.

The interview was conducted with a biology teacher named Septi Maharani, S. Pd, on January 27, 2022. According to him, learning biology is still difficult because of the children's lack of interest in reading. The practicum implementation has also not run optimally due to time constraints, especially while online. The questionnaire was also filled out by 34 students of eleventh grade science in senior high school and distributed by researchers during 5 – 9 February 2022 via a *google form*. The study results showed that students still could not understand the material well during online learning (58% doubtful of understanding & 17.6% not understand). A total of 19 students admitted that they prefer visual media, which is the basis for making media researchers. In addition, respondents often use website-based media when learning.

Design

Design is the stage of designing the website media that will be developed. Researchers carried out the design stage based on the affirmation of students who agreed (88.2%) to develop learning media as a support for

biology practicum. The steps taken by the researchers at this stage were the determination of material and media design. Based on the results of distributing questionnaires, on average, students want to do practicum according to basic competencies of 4.1 – 4.6 in full. The highest proportion was in the blood group test practice (52.9%).

Based on these considerations, the following practical materials were chosen for the media are 1) Basics of microscopy and observation of cell structure in Shallots (*Allium cepa*) & Adam Eve cells (*Rhoeo discolor*); 2) Osmosis & plasmolysis diffusion events; 3) Observation of plant tissue structure; 4) Observation of animal tissue structure; 5) Observation of the movement system in animals (chicken bone structure (*Gallus gallus domesticus*) & muscle contractions in frogs (*Anura* sp.)), and 6) Observation of blood group test in humans. The selection of materials is also based on the KD Skills according to the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 37 of 2018, which has been analyzed as an indicator.

This web design or systematic contains six main menu groups, including the home, indicators, materials, profiles, references, and information: a) *Home*: contains the initial view of the web on the first page when dealing with the user; b) *Indicators*: contains an analysis of basic competency skills and learning objectives to be achieved by students; c) *Material*: contains the main content of the web, namely material introduction, practicum instructions, practicum videos, evaluation questions

and questions, reflections, and question columns, as well as a glossary according to basic competencies of 4.1 - 4.6 material; d) *Profile*: contains website identity, the purpose of creation, website usage guide, and developer profile.; e) *References*: contains additional information related to biology learning resources (virtual laboratory sites, material sites, and social media addresses for learning biology); f) *Information*: a menu category at the bottom of the sidebar that serves to provide information related to the website and other important aspects of web completeness, privacy, copyright, contact, site address, and related links. The link will also be linked to the UIN Walisongo Semarang campus website; g) *Other menus*: other menus support *Practicumma*.

Development

Development stages consist of two steps, website development and material development and website usage guide development. *Practicumma* website was built with several applications, namely XAMPP Control Panel Version 3.3.0 as the server and WordPress version 6.0 as the website. These two main applications can be downloaded for free on the internet. In addition, *Practicumma* is also designed with supporting applications, namely: 1) *Google forms* to create pretest forms, practicum question forms, post-test forms, and student reflection & motivation forms; 2) *Youtube* (practice video source); 3) *Canva* (website design and user guide); 4) *Google* (access material supporting images); 5) *Hosting and domain* (as easier access and website identity). Visitors can

access the website via the link <https://practicumma.net/>. The display

of the website can be seen in figure 1 and figure 2.



Figure 1. Website homepage display

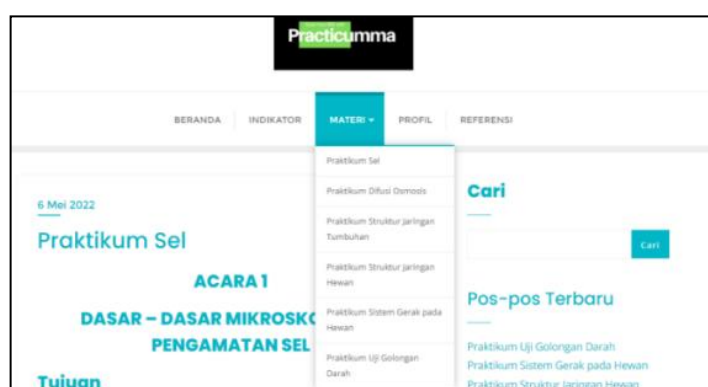


Figure 2. Website material page display

The preparation of the material was carried out by researchers through several accurate and relevant references to the material for class XI SMA Semester 1, namely books, scientific journals/articles, and websites. At this stage, the researcher makes questions (pretest, post-test, and practicum questions) to test students' understanding of the material and forms that can be filled out by students.

The usage guide was developed to make it easier for students and teachers to use the *Practicumma*. The guide is designed with MS. Powerpoint and Canva and is

available online on the website. In particular, the guide can be accessed through the website's main page or on the profile menu. The systematic guidelines for using the *Practicumma* website are as follows: 1) *Cover*: contains *Practicumma* logo, developer name, title, and study program identity. 2) *Foreword*: contains an overview of the developer's website development, materials, and thanks. 3) *User flowchart*: contains a flowchart of using the website from start to finish. 4) *Steps*: contains the steps for using the website 5) *Menus*: contains website display and menu functions.

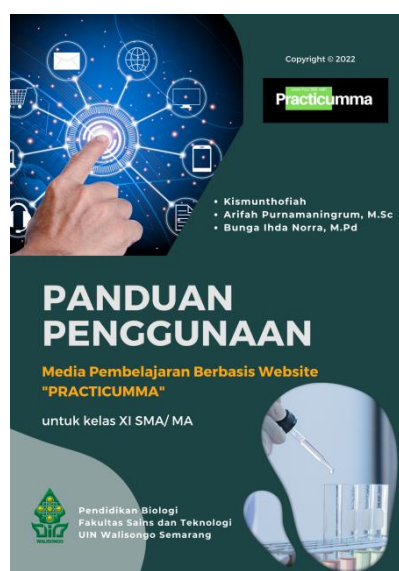


Figure 3. Over of the website usage guide

Implementation

There are three main assessments in the development stage: a validity test from a media and material expert, an assessment by a biology teacher, and a limited-scale test for the eleventh-grade science students. The small-scale test was carried out using a purposive sampling technique with ten students. Products that have been developed are then tested to determine the level of validity, quality, and effectiveness. This trial was carried out at the development and implementation stages.

Media validators are experts who have the ability in the field of biology to learn about media, especially about websites. Aspects of assessment for media experts include software engineering, functionality, visual communication, quality, efficiency, and product effectiveness. The media expert who assessed the validity and feasibility of *Practicumma* was Nisa Rasyida, M.Pd - a Biology Education Lecturer at UIN Walisongo Semarang. The results of the media expert's assessment can be seen in table 3.

Table 3. Results of media expert validation

Aspects	Validation Score	Percentage (%)
Software engineering	16	80
Functionality	26	74.28
Visual communication	311	77.50
Product quality	9	90
Product efficiency	14	70
Product effectiveness	19	76
Total score/ Percentage	115	76.70 %

The percentage of website media validation results in Table 3 obtained an average score of 76.70%, including the valid or appropriate category for use in the revised learning process (Della, 2020).

Material expert validation on media aims to assess the content of the *Practicumma* website. Validation was

carried out by a Biology Education Lecturer at UIN Walisongo Semarang who has expertise in scientific information on practical material for class XI Semester, especially in animal tissues and body systems, named Mirtaati Na'ima, S.Si., M.Sc. The results of material expert validation can be seen in table 4.

Table 4. Material expert validation results

Aspects	Validation Score	Percentage (%)
Learning design	25	83.33
Contents of material	29	82.85
Use of language and communication	22	77.50
Total score/ Percentage	76	80%

The percentage of website content/content validation results in table 4 obtained an average score of 80%, including the valid or appropriate category for use in the revised learning process (Della, 2020).

After going through the validator of media experts and material experts, the media is assessed by the biology

teacher before being implemented to students. The biology teacher who assessed the *Practicumma* media was Septi Maharani, S.Pd from MA Sunniyyah Selo Grobogan. The results of the biology teacher's assessment of the *Practicumma* website media can be seen in table 5.

Table 5. Biology teacher assessment

Aspects	Validation Score	Percentage (%)
Material suitability	10	100
Serving clarity	8	80
Ease and access	13	86.67
Affordability	4	80
Serving components	8	80
Layout	8	80
Use of language	20	80
Total score/ Percentage	71	83.53 %

The percentage of biology teacher assessment results obtained an average score of 83.53%, included in the very valid category or very suitable

for use in the learning process without any revision (Della, 2020). The teacher also responded positively regarding the media, namely the suitability of the

content or material with the website being used.

The limited or small-scale group test was conducted with a sample of 10 students of class XI MIPA MA Sunniyyah Selo, which was determined based on the purposive sampling technique. This test is carried out online using the google form media. The purpose of conducting a

small-scale test is to determine the feasibility and responses of students regarding the *Practicumma* learning media so that it can be used as an analysis for the development and implementation of follow-up. The results of student responses related to the *Practicumma* website can be seen in table 6.

Table 6. Small-scale test results.

Aspects	Item Number	Total Score	Percentage (%)	Category
Media design	1	43	86	Very Good
	2	44	88	Very Good
	3	43	86	Very Good
	4	46	92	Very Good
	5	44	88	Very Good
Contents	6	45	90	Very Good
	7	42	84	Very Good
	8	42	84	Very Good
Product efficiency	9	44	88	Very Good
	10	45	90	Very Good
	11	43	86	Very Good
Product effectiveness	12	43	86	Very Good
	13	44	88	Very Good
	14	45	90	Very Good
	15	45	90	Very Good
	16	47	94	Very Good
Benefits of using products	17	43	86	Very Good
	18	42	84	Very Good
	19	41	82	Very Good
	20	41	82	Very Good
Total score/ Percentage			115	76.70 %

Formative evaluation is carried out at the product development stage based on revisions from the material and media validators. Evaluation is also carried out at the implementation

stage when the biology teacher's assessment and scale test is limited to students. Researchers also include student responses related to the product being developed. The evaluation

results are used as feedback on the development of *Practicumma* learning media. Revisions are made according to the evaluation results so that the media can be at the implementation stage when the biology teacher's assessment and scale test is limited to students. Researchers also include student responses related to the product being developed. The evaluation results are used as feedback on the development of *Practicumma* learning media. Revisions are made according to the evaluation results so that the media can be declared fully feasible to support practical learning.

Practicumma is a website as a database of integrated practicum tools that allows the integration of learning resources, teaching materials, practicum instructions, methods, media, and biology-based learning evaluation tests, which are represented through website design. The integration of several learning tools allows supporting media to be used for students, thereby minimizing teacher performance in preparing learning tools that take much time. This media is an innovation created by the author based on observations and literature related to practicum, which is still minimal. In addition, *Practicumma* can be applied to save time and costs and anticipate the limitations of facilities in several schools. The obstacles and limitations of the practicum were presented by Siburian et al. (2017) and Rahmah et al. (2021). During the practicum, the obstacles experienced by biology teachers include the availability of relatively insufficient time, the absence of a laboratory assistant, and inadequate materials (Siburian et al., 2017). Rahmah et al. (2021) also stated that some schools in

the upper secondary level of Banda Aceh City had not done many practica. The factor is the infrastructure and time allocation, which are still lacking.

This problem was supported by interview with biology teacher named Septy Maharani S. Pd. According to him, learning biology is still difficult because of the children's lack of interest in reading. The practicum implementation has also not run optimally due to time constraints, especially while pandemic. Researcher also shared questionnaire to 34 students of eleventh grade science in senior high school during 5-9 February 2022. The study results showed that students still could not understand the material well during online learning (58% doubtful of understanding & 17.6% not understand). A total of 19 students admitted that they prefer visual media, which is the basis for making media researchers. In addition, respondents often use website-based media when learning.

In ideal condition, biology learning is a fundamental scientific discipline at the level of everyday life and in science (knowledge) and technology. Biology acts as a science that involves reasoning, theoretical, systematic, and methodological abilities. Therefore, it is necessary to have a learning model to concretize abstract things in theory with scientific procedures. Typical learning through observation and experimentation and drawing conclusions from experiments are the main aspects that must be considered (Handayani, 2020). Experiments are the activities of students to develop skills but are still minimally done in some schools. Some schools have props used manually by teachers and students (Puspita et al.,

2022). The practicum is a reasonably effective method for students to develop science skills in learning biology. Redhana (2019) stated that the scientific approach to the 2013 curriculum aims to create conditions for students to have critical thinking skills, problem-solving, innovation, creativity, collaboration, and communication. In addition to these four skills, students are required to master scientific content and attitudes and have media literacy, information technology literacy, information literacy, and communication. Classroom research, such as multimedia learning, is a significant need in the educational community with technological literacy, including students (Handayani, 2020)

Practicumma is a medium structured as a solution to the gap, needs and desires of students during biology learning, especially in terms of practicum. This learning media was developed with the hope that students gain knowledge, practice, and change in attitudes that can be seen based on their learning outcomes, according to Wati et al. (2021) This is evident from the results of a limited-scale test for students who show a very good score in terms of material content (86%), product efficiency (88%), product effectiveness (89.6%), and product benefits (83.5%). Not only that, but the students' responses also showed that the *Practicumma* website was good, interesting, fun, can function as a knowledge enhancer, and can help students' online learning. This is following the statement of Fauziyah et al. (2020), that the media developed should be able to increase students' learning motivation, increase desire and new interests, and stimulate

critical thinking also credible (Adi et al., 2016; Burns et al., 2020; Hidayat et al., 2020; Solekhah et al., 2020).

Practicumma learning media was also developed to support students according to the demands of the development of information and communication technology in the world of education, as well as an option when learning cannot be done offline. This statement is evidenced by the results of media expert validation which shows a good scale (80%) on product indicators that can overcome space limitations during student learning. Compared to direct practicum, *practicumma* has another advantage in terms of its flexibility which can be accessed repeatedly without having to do practicum again. Students can also use this media anywhere and anytime if it has a stable signal condition. This statement is evidenced by the results of the biology teacher's assessment on the ease and media access indicators which show an average score of 86.67% (very good). This flexibility allows *Practicumma* to be used as a medium for learning in class and for independent study at home for students. This independent learning can improve students' literacy skills (Muyasaroh et al., 2021).

According to research by Sari & Setiawan (2018), web-based learning media can also improve student learning outcomes in schools. These indicators can be seen in the effectiveness of learning. Learning is considered effective if it can answer the learning objectives. The tests' results show that the indicators and learning objectives have been presented in the *Practicumma* media. This media is compiled based on basic skill competencies (KD 4.1 to KD 4.6)

according to the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 37 of 2018. This is evidenced by the results of expert validation regarding the suitability of the material with learning objectives which shows a score of 80% (good, for the score of the media expert validator, 80% (good) for the material expert validator score and 100% (very good) for the score from the biology teacher.

Overall, the data from the validation and testing of this product were analyzed using descriptive percentage analysis. Based on the results of validation by material experts, media experts, assessments of biology teachers, and small-scale tests for students, it can be seen that the level of feasibility of *Practicumma* media can be used as learning media. The results of product validation and testing are visualized in the form of figure 4.

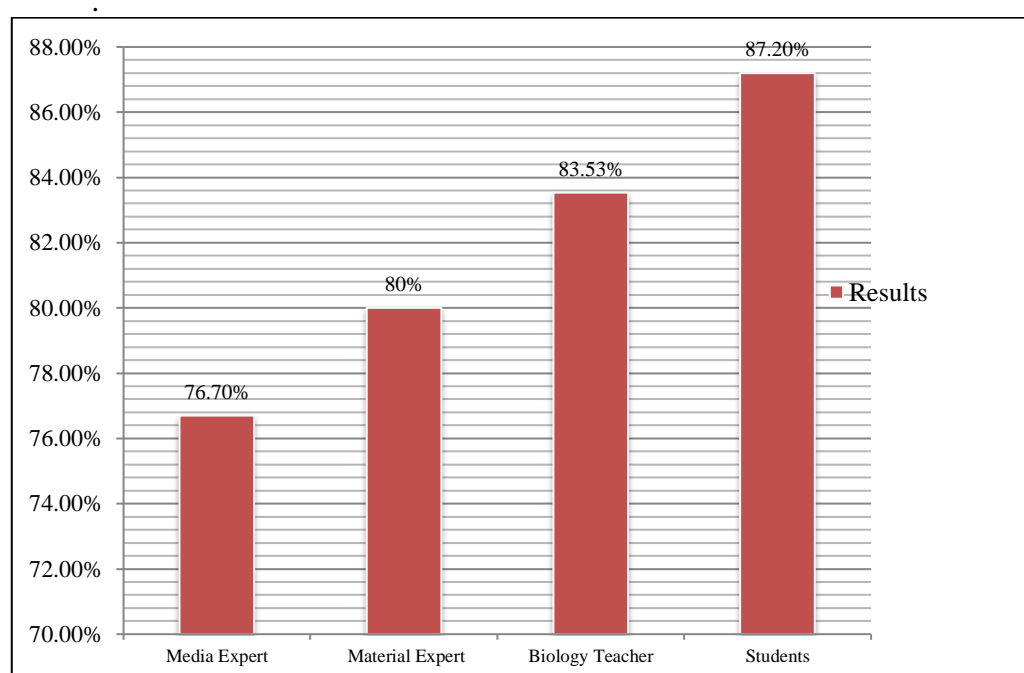


Figure 4. Graph of media validation and test results

Figure 4 shows the results of the media expert assessment of 76.7% in the appropriate category, 80% of the material experts in the appropriate category, 83.53% of the biology teacher assessment in the very appropriate category, and 87.2% of student responses on the small-scale test with very decent or very good category. These results can be calculated on average to determine the level of media feasibility, with the

accumulative percentage obtained is 81.86%. According to Della (2020), at this level the media is already in a very feasible category to be used as a medium in biology learning.

CONCLUSION AND SUGGESTIONS

Research and development to produce *Practicumma* website products have been developed by researchers as an independent learning

medium for eleventh grade science students. From this research, it can be concluded that the *Practicumma* website is declared very valid and feasible to be applied in the learning of eleventh grade science students. This is evidenced by the results of the validation of media experts 76.7%, material experts 80%, biology teachers 83.53%, and a limited scale test 87.2%, so the average feasibility percentage is 81.86% (very good and very feasible).

The percentage of responses obtained in the small-scale test was 87.2% (very good). Students convey a variety of responses that can be used as an evaluation of media development. The students' responses also showed that the *Practicumma* was good, interesting, fun, can function as a knowledge enhancer, and can help students' online learning.

Suggestions based on the development of *Practicumma* are: 1) Criticisms, suggestions, and improvements in the development of the *Practicumma* website can be continued to produce products with a high level of validity; 2) Development of follow-up products can be done by testing the effectiveness of students when applied in learning; 3) The *Practicumma* website needs to be standardized by BSNP to measure the quality and usability of the website as a learning platform; 4) Students can use the *Practicumma* learning media to support understanding related to biological material. The limited facilities, tools & materials, and time are not expected to be an excuse for not holding the practicum, even though it is done online; 5) Further researchers can conduct more innovative and creative research to increase students' motivation and enthusiasm for

learning. Especially in the current era, students have more imagination and abilities, so educators must be able to adjust to these conditions.

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