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Research Article

Development of a biology practicum module with microtechnical preparations on the structure and function of plant tissue

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Abstract: There has been no development or preparation of microtechnical modules on the material structure and function of plant tissues equipped with preparations. Therefore, the purpose of this research and development was to produce modules equipped with microtechnical preparations and analyze their quality through validation of teaching materials experts, material experts, and readability by teachers and students on small- and large-scale trials. This type of research was Research and Development (R&D) with the ADDIE development model which has five stages, namely: analysis, design, development, implementation, and evaluation. The results of the development research were in the form of a product of a biology practicum module with microtechnical preparations. The quality of the modules according to the teaching materials experts and materials experts was very good with the percentages of 80.6% and 99.4%, respectively. The result of the teacher's response was 81.4% with a very good category and readability by students on a small and large scale respectively 88% and 82.7%. Based on this assessment, it shows that the module with this preparation was suitable for use as teaching material by teachers in biology learning activities on the structure and function of plant tissue.

Keywords: ADDIE; plant tissue; practicum module; preparation

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1. Introduction

Learning activities have a very large influence on the understanding of the material and student achievement. Effective learning is influenced by several factors, one of which is the teaching materials used by the teacher (Mauliya et al., 2020; Munawaroh, 2017). Teaching materials are tools and media that provide opportunities for students to gain independent learning experiences (Arkorful & Abaidoo, 2014; Lin et al., 2017). The right teaching materials can increase students' attention to the material being studied (Adalikwu & Iorkpilgh, 2013; Ajoke, 2017; Tuimur & Chemwei, 2015). Students' attention to the material is very influential on learning outcomes. More intensive student attention will facilitate the learning process so that it can increase achievement, including in this case biology learning achievement (Darling-Hammond et al., 2020).

Biology is part of science which studies living things and the natural environment. The objects of biological studies are things that are often found in real life. Therefore, biology learning activities should be packaged by bringing students closer to nature and real objects, although some materials in the field of biology study material that seems abstract because it is difficult to see directly (Biology Online, 2021; Lim, 2020). Biology is one

of the sciences that must be studied with scientific work principles and procedures and requires special skills to operate the equipment needed to study some of these abstract materials. Biology learning must emphasize giving direct experience to something that students are studying (Lase, 2021; Sulthon, 2016; Supriadi, 2015).

Based on the results of the needs analysis conducted at MTs Muhammadiyah 1 Malang, it is known that the learning process in the classroom still tends to use the lecture method. This can be seen from the results of the questionnaire which showed 77.8% of respondents answered that the method often used by teachers in learning activities was lecture. Meanwhile, learning in Basic Competence 3.4, namely "explaining the relationship between plant tissue structures and their functions, as well as their various uses in technology inspired by these structures" and Basic Competence 4.4, namely "presenting data based on observations of plant tissue structures and make a report with a bill that students must be able to make observations on the structure of plant tissues, as well as present data from observations in practicum".

The practicum was carried out by observing the morphological structure of plants with plant samples in the school environment, while for the practicum, direct observation of the structure of plant tissues had never been carried out. It is known from the results of the needs questionnaire analysis that 85.2% of respondents answered that they had never studied the structure and function of plant tissue with practicum and 92.6% of students expected a laboratory practicum. When viewed from the teaching materials used, 100% of students have used modules as teaching materials but the modules used only contain learning materials. The results of the analysis of the needs for developing a practicum module show that 100% of respondents need the development of a module that can be used to support practicum activities in the laboratory because they see that facilities function in schools are quite supportive to do practical learning.

Practicum activities can run well if they are equipped with supporting learning tools ranging from laboratories, tools, materials needed, as well as modules or practicum manuals (Reimers et al., 2020; Sufinah et al., 2013; World Health Organization, 2009). The laboratory is one of the supporting facilities for the implementation of teaching and learning activities, especially practicum learning models in various educational institutions (Agustina, 2018; Emda, 2017; Kertiasih, 2016; Latifa, 2015). The module is a learning tool that contains learning materials, methods and instructions for learning activities and exercises that are designed systematically and attractively to achieve the expected competencies (Aditia & Muspiroh, 2013).

Learning modules used for science materials such as biology must be packaged properly in order to provide direct experience for students so that there is harmony between the material being studied with facts or reality that exists in nature (Oktaria, 2016; Yuberti, 2013). In general, the material on the structure and function of plant tissues can be studied in the form of observing preparations (Kusumawati, 2016; Silalahi & Adinugraha, 2019). Preparations are preparations in the form of preserved organs, tissues, cells and or an organism that can be used to study, observe and research (Holil et al., 2003).

With regard to microtechnical themes as well as material on the structure and function of plant tissues, several previous authors/researchers have attempted to publish their work. Junior high school biology module on "structure and function of plant tissue" has been developed (Utami, 2014). Scientific work has also been produced in the form of a thesis on "The use of learning modules on the material structure and function of the plant body to improve student learning outcomes for class VIII SMP" (Azmi, 2017). Especially for teachers and prospective teachers and students, a "Microtechnical Practicum Guide" (Prawasti et al., 2014), "Cytohistotechnology practicum module" (Sari et al., 2019), "Cell Biology Teaching Module and Its Role in Life" (Rahmadina, 2020), “Microtechnical online module” (Wahyuni & Purwanti, 2020), dan Continuous Professional Development Biology High School Module” (Arifin & Husein, 2021) has been developed or compiled. Especially for the practicum, a "guided inquiry-based animal microtechnique illustrative practicum guide" has been developed (Mustami, 2017). Based on the search results, it can

be emphasized that there has been no development or preparation of microtechnical modules on the material structure and function of plant tissues equipped with preparations.

Based on this background, it is necessary to develop a module with microtechnical preparations on the structure and function of plant tissue at MTs Muhammadiyah 1 Malang class VIII. Therefore, the objectives of this study are: (1) To produce a biology practicum module with microtechnical preparations for the material structure and function of plant tissue in class VIII at MTs Muhammadiyah 1 Malang and (2) To explain the quality and feasibility of a biology practicum module with microtechnical preparations on structural materials. and plant tissue functions that are valid, attractive and practical. The development of modules equipped with preparations is expected to be able to answer the problem of not carrying out a practical process on the material structure and function of plant tissues. The module refers to the standard content of the 2013 Curriculum with an attractive presentation and can be used as a medium of learning in the teaching and learning process with practicum to improve the skills of students.

2. Materials and Methods

2.1 Development Model

This research is a type of development research with the ADDIE model which includes the Analysis, Design, Develop, Implement, and Evaluate stages to produce certain products (Branch, 2009) as can be modeled in Figure 1.

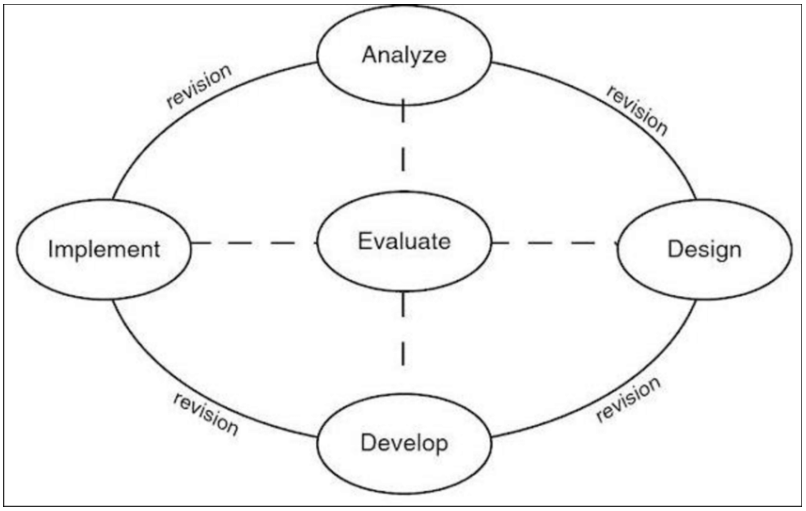

Figure 1. ADDIE development model (Branch, 2009).

This model is structured with systematic activities in an effort to find a solution to a problem related to learning resources. The research and development orientation is a product in the form of a module with microtechnical preparations that can be used by students as a learning resource.

2.2 Research Location

The research was conducted in stages at MTs Muhammadiyah 1 Malang which is located at Jl. Baiduri Sepah No. 27, Tlogomas, Lowokwaru District, Malang City, East Java, Indonesia.

2.3 Data Collection Instruments

The data collection instrument used in this study was a questionnaire. The questionnaire was used to test the feasibility of the biology learning module with microtechnical preparations carried out by teaching materials experts, material experts on the structure and function of plant tissue, school science learning teachers and student responses to the module. The assessment questionnaire was designed using a Likert Scale with alternative answers including very good, good, sufficient, less, and very poor. Based on the need for

quantitative analysis, the answer was given a score, namely very good = 5, good = 4, sufficient = 3, less = 2 and very poor = 1 (Sugiyono, 2017).

2.4 Data analysis technique

The data obtained through the assessment instrument were analyzed using descriptive statistics. Descriptive statistics are used to describe, describe or conclude data either numerically or graphically to get a glimpse of the data so that it is easier to read. Data analysis in this study was used to determine the quality and feasibility of the plant anatomy module.

Then the data obtained through questionnaires for material experts, teaching materials experts, teachers and questionnaires for students in the form of a Likert scale were analyzed by calculating the total score in each aspect. Converting the score in percentage form with the Formula 1 (Sudjana, 2005):

$$P = \frac{F}{N} x\ 100\% \quad (1)$$

Where P = Percentage; F = Total score obtained; and N = Total score

The results of the calculation of the data are then interpreted and concluded based on the assessment criteria adapted from Akbar (2013), as in Table 1.

Table 1. Validation criteria

No	Criteria (%)	Category	Validation level
1	81-100	Very worthy	Not revision
2	61-80	Worthy	Not revision
3	41-60	Decent enough	Revision
4	21-40	Less worthy	Revision
5	0-20	Not feasible	Revision

The percentage scores of each aspect of the assessment obtained from material experts, teaching materials experts, teacher and student responses are converted back into the module quality category so that conclusions can be drawn regarding the quality of the module. The percentage of module scores is then based on the score interpretation criteria, referring to Arikunto (2010) as presented in Table 2.

Table 2. Score interpretation criteria

Rating level (%)	Category
0 - 20	Very less
21 - 40	Not enough
41 - 60	Enough
61 - 80	Well
81 - 100	Very good

3. Results

This development research resulted in a product in the form of a module with microtechnical preparations on the structure and function of plant tissue at MTs Muhammadiyah 1 Malang. The following is a description of the results of development research conducted based on the ADDIE model.

3.1 Analysis

Based on this analysis stage, researchers can identify the causes of the incompatibility of learning conditions in the field with the ideal conditions expected in the 2013

Curriculum. The analysis stage contains two main activities, namely needs analysis (teachers and students) and curriculum analysis.

Based on the needs analysis and curriculum analysis, it was found that the specific objectives of the module were developed equipped with microtechnical preparations to support the learning process and the development of student skills from the material on the structure and function of plant tissue, namely the implementation of all core competencies, basic competencies and indicators so as to provide maximum conceptual understanding. and improve students' practical skills or use of laboratory equipment.

3.2 Design

The main activity at this stage is designing the module with preparations. The module consists of three parts, namely introduction, content, and closing. The introduction section consists of (a) cover page, (b) introduction, (c) table of contents, (d) glossary, (e) background, (f) description of core competencies, basic competencies, and indicators, (g) prerequisites, (h) instructions for using the module and (i) learning motivation. The content section consists of two main parts, namely learning activities and evaluation. The module has two learning activities according to the material on the structure and function of plant tissues, namely morphologically and anatomically. Learning activities in each material are equipped with a practical activity guide in the form of practical work steps that are equipped with pictures of how to do it. The evaluation section serves to test students' understanding of the material. The closing section consists of answer keys, bibliography and plant anatomical structure preparations as a learning reference.

3.3 Develop

The development stage is the product realization stage in this case in the form of a module with microtechnical preparations. The modules are arranged based on learning resources used by teachers and other supporting books such as the Science Electronic School Book from the Ministry of Education and Culture (2017), Campbell's Biology Book Eight Edition Volume II (2012), and Professor Gembong Tjitrosoepomo's Plant Morphology Book (2009).

The validation of the teaching materials in the module was carried out by a lecturer in the Teaching Profession course and Media and Learning Resources, namely Mr. FJM, S.Pd. M.Pd. The validation questionnaire for teaching materials experts was carried out on March 7 and March 29, 2018. The validation questionnaire used 7 assessment criteria including compliance with the principles of developing teaching materials, module format, content feasibility, presentation, graphics, language, and benefits. The data on improving the quality of the module can be seen in the graphic diagram comparing the evaluation of the initial module and the module after the final revision in Figure 2.

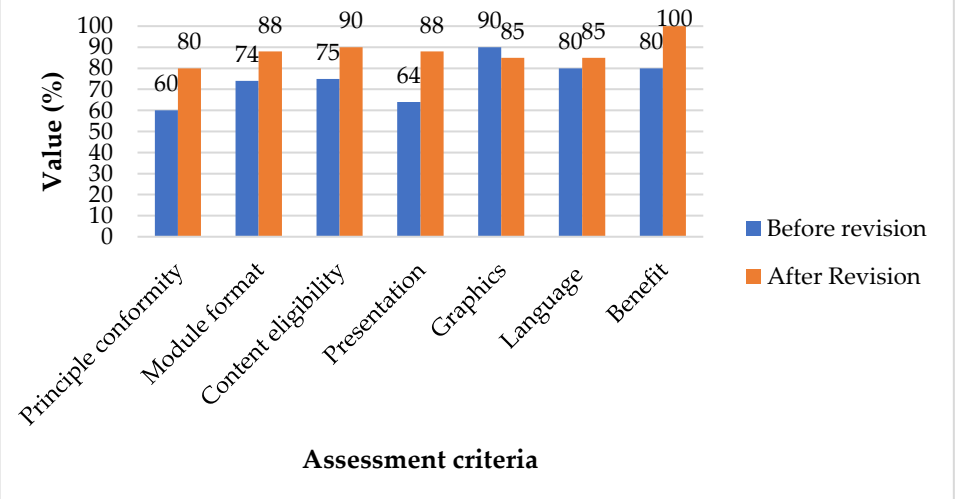

Figure 2. Comparison diagram of initial module assessment and module after revision

The material expert validation was carried out by a lecturer who teaches General Biology and Plant Anatomy courses, namely Dr. EP, M.P. The questionnaire was filled out on March 12, 2018. Validation of material experts used an assessment instrument with three assessment aspects, namely aspects of content feasibility, language, and presentation aspects. Data validation results by material experts are presented in Table 3.

Table 3. Data hasil validasi oleh ahli materi

No	Assessment criteria	Percentage (%)		Category
		Before revision	After revision	
1	Content eligibility	98.3	100	Very Worthy
2	Language Aspect	100	100	Very Worthy
3	Presentation Aspect	100	100	Very Worthy
	Average	99.4	100	Very Worthy

Based on Table 3, it is known that the results of the module assessment with microtechnical preparations by material experts are 99.4%. This value indicates that the biology module with microtechnical preparations for the material structure and function of class VIII SMP/MTs networks is included in the category of very feasible to be applied without revision. The maximum value by the material expert is obtained after the authors get suggestions for improvement first from the material expert validator so that the module assessed has met the expected criteria.

3.4 Implement

The implementation phase consists of two stages, namely small scale and large scale. The data obtained at the small-scale and large-scale implementation stages are quantitative data obtained from student and teacher responses to the developed module.

Small-scale implementation was carried out for 5 students and 1 science teacher. The questionnaire was filled in at MTs Muhammadiyah 1 Malang. The teacher's response to the module uses an assessment instrument that refers to four aspects, namely the material aspect, module format, presentation aspect and language aspect. The teacher response data on the quality of the module is presented in Table 4.

Table 4. Data on the results of the teacher's response to the module

No	Assessment criteria	Percentage (%)		Category
		Before revision	After revision	
1	Material Aspect	86.6	100	Very Worthy
2	Presentation Aspect	80	80	Worthy
3	Language Aspect	70	70	Worthy
Jumlah Keseluruhan		81.4	83.3	Very Worthy

Based on these data, it is known that the quality of the module before the revision was 81.4%, which means the module was very feasible and in accordance with the expected learning concept at MTs Muhammadiyah 1 Malang. Even so, the Module still gets suggestions to better adapt it to the learning needs in schools, especially in the material aspect to reach 100%. Comments and suggestions for improvement from the teacher only focus on the material aspect, namely the module title must be packaged more attractively so that it can arouse curiosity and interest students.

Small-scale implementation also involved 5 students who were taken using cluster sampling technique. The selection of students is based on the ability seen from the value on the material structure and function of plant tissue. The following are the names of students selected in the small-scale trial in Table 5.

Table 5. Names of students who are included in the small-scale trial

No	Student name (Initials)
1	N B P S
2	M D
3	A M
4	H R
5	R A

Selected students are then given the opportunity to learn to use the module and then provide their responses through a questionnaire given by the author. Student response data were obtained using an instrument that refers to three main components, namely attractiveness of appearance, ease of use and usefulness. The results of student responses to the module are listed in Table 6.

Table 6. Module quality based on small-scale student responses

No	Assessment Aspect	Amount	Percentage (%)	Category
1	The attractiveness of the view	63	84.0	Very good
2	Aspects of ease of use	140	93.3	Very good
3	Benefit aspect	127	84.7	Very good
	Amount	330	88.0	Very good

The data from the small-scale test in each aspect is then converted into a quality module based on student responses. Based on the data obtained from student responses at the small-scale trial stage, it can be concluded that the overall quality of the module is very good. The total score is 330 out of 15 indicators carried out by 5 students and if it is a percentage the quality of the module gets a score of 88% in the very good category.

The large-scale trial phase was carried out on March 27, 2018 for class VIII A students at MTs Muhammadiyah 1 Malang which consisted of 22 students with different academic abilities to provide feedback on the developed module through 15 indicators. Data on student responses to the module from all aspects of the assessment can be seen in Table 7.

Table 7. Module quality based on student responses (large scale)

No	Assessment aspect	Amount	Percentage (%)	Category
1	Display attractiveness	266	80.6	Very good
2	Ease of use	550	83.3	Very good
3	Benefit aspect	549	83.1	Very good
	Amount	1365	82.7	Very good

Based on the data obtained from the large-scale implementation stage, it can be seen that the overall feasibility of the module received a score of 1.365 out of 1.650 for 15 indicators carried out by 22 students and if it was a percentage, it scored 82.7% in the very good category.

3.5 Evaluate

Product revision is an evaluation stage of the ADDIE development model which is carried out at several stages of research and module development with microtechnical

preparations starting from the validation stage of teaching materials experts, material experts, teacher and student responses at the trial stage.

The revision at the validation stage of the teaching materials expert was carried out after getting suggestions for improvement from the teaching materials expert which was carried out on March 7, 2018. One of the suggestions from the teaching materials expert was to adjust the indicators with the objectives and learning steps taken. Improvements made by the author are in the learning objectives in each chapter. An example of improvement in chapter 1. The author adds learning objectives about the activities carried out by students in learning activities. The comparison of the learning objectives before and after the revision can be seen in Figure 3.

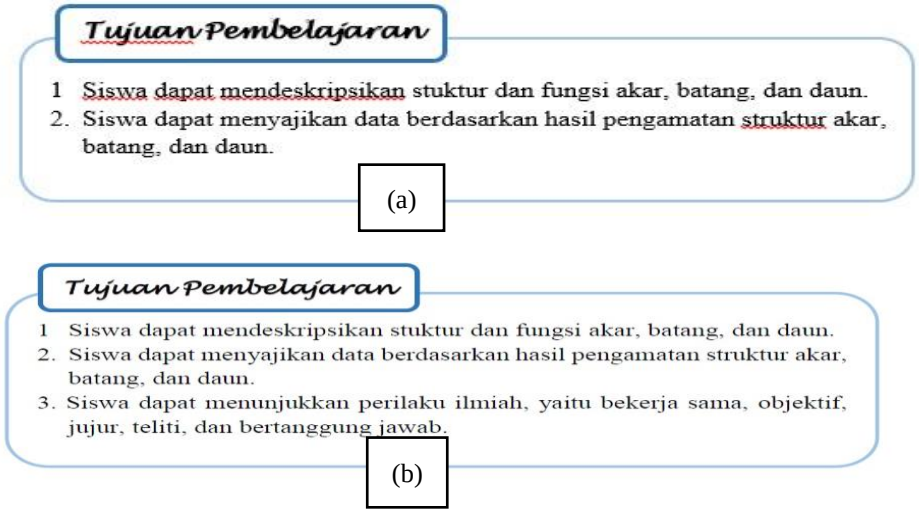

Figure 3. Comparison of learning objectives before revision (a) and after revision (b)

The second revision, namely the material expert validation stage, was carried out after getting suggestions for improvement from the material expert which was carried out on March 8, 2018. One of the suggestions is that the images used must be from clear literature sources or use personal documentation. The following are the results of image improvements in the module, as presented in Figure 4.

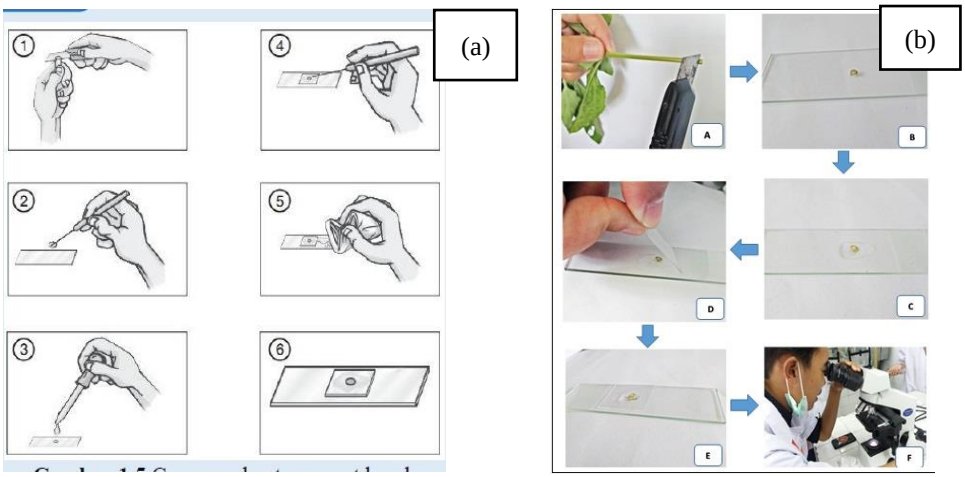

Figure 4. Comparison of pictures of practicum work steps before revision (a) and after revision (b)

The third revision is at the stage of small-scale implementation by subject teachers. Suggestions for improvement from the teacher is the module cover which is expected to make students interested in learning it. The author then revised the module cover by replacing the module title with a more interesting sentence. The revision of the module title

was carried out with the subject teacher so that the module title was changed to "The Miracle of Plant Tissue Construction". The selection of the title is considered the most appropriate to the material on the structure and function of plant tissues discussed in the module. The word miracle of construction represents the uniqueness that exists in the structure of plant tissue. The comparison of the learning motivation section before and after the revision can be seen in Figure 5.

Figure 5. Comparison of cover before revision (a) and after revision (b)

4. Discussion

Biology learning must be able to present the facts contained in reality. Biology is an exact science and not something abstract so that in its learning students must be brought to prove that they know the truth directly. One of the materials in biology learning at the SMP and MTs levels is the Structure and Function of Plant Tissues. Learning in this material should be able to bring students to directly prove the structure and function of plant tissues. Practicum/observation of plant tissue is an activity that must be done, but in reality, the learning process only uses a lecture and discussion system so that students seem to learn something abstract. In addition, learning that is packaged the same in each material reduces the development of student skills and practicum is one of the skills that need to be developed.

Based on the results of observations and filling out a questionnaire, it is known that MTs Muhammadiyah 1 Malang has sufficient facilities and infrastructure to carry out practical work on the material. However, learning with practicum is not implemented. The problem is that teachers and students often find it difficult to find something they are trying to learn because there are no reference preparations. Therefore, research and development are carried out by making biology learning modules with microtechnical preparations so that they can be used as reference when teachers and students have difficulty finding the object being studied.

Science subjects in junior high school are a combination of three fields of science, namely biology, physics and chemistry. Based on the Basic Competence (KD) of the 2013 curriculum, one of the learning materials in KD 3.4 class VIII is to analyze the relationship between plant tissue structures and their functions, as well as their various uses in

technology inspired by these structures. KD 4.4, namely presenting data based on the results of observing plant tissue structures (roots, stems, leaves) and making a report.

In connection with this, a biology practicum module has been developed which is equipped with microtechnical preparations which are based on the AD-DIE development model on the material of Plant Tissue Structure and Function. The module is equipped with plant anatomy preparations and has been adapted to the 2013 curriculum for class VIII SMP/MTs students. This biology practicum module with microtechnical preparations has been deemed worthy to be used as one of the teaching materials.

Teaching materials are a set of learning materials/substances that are arranged systematically, showing a complete figure of competencies that will be mastered by students in learning activities. Teaching materials are learning materials that broadly consist of knowledge, skills, and attitudes that students must learn in order to achieve predetermined competency standards (Nurfatuhiyah, 2017; Permadi et al., 2018). In detail, the types of learning materials consist of knowledge, skills, and attitudes or values. Teaching materials are all forms of materials used to assist teachers/instructors in carrying out teaching and learning activities in the classroom. The materials in question can be in the form of written materials or unwritten materials (Sukmawati, 2014).

Teaching materials that have been arranged have an important role in learning. Teaching materials are tools and media that provide opportunities for students to gain learning experiences (Djono, 2013; Milrad, 1998). With and through the available teaching materials, learners will gain experience relating to: a) facts in life, b) models of life, c) symbols used in life. Through this experience, learners will practice 1) assessing and developing ideas, 2) solving problems, 3) acquiring skills, and 4) fostering and developing mental attitudes as well as appreciative and creative power (Nurjaya, 2012).

Teaching materials are a set of learning tools or tools that contain learning materials, methods, in order to achieve the expected goals, namely achieving competence or subcompetence with all complexities (Bahri et al., 2020; Jabri, 2017; Setyawan et al., 2018; Sukerti & Marsiti, 2021). The development of teaching materials is structured to be one of the references that will support the development of students so that there is a balance between physical and spiritual needs (Kusumam et al., 2016).

The teaching materials that have been developed are in the form of modules. The module is a book created and designed for independent learning without teacher guidance (Ahmad & Lestari, 2010; Zainul et al., 2018). The module must at least contain learning instructions, competencies to be achieved, learning materials, supporting information, exercises, instructions for use, evaluation and responses to evaluation results. A module can be more useful if it is easy to understand and use and has an attractive appearance (Lubis et al., 2015).

The module as one of the teaching materials has several advantages in the learning process. The advantages of learning with modules are as follows: (1) Modules can provide feedback so that students know their shortcomings and immediately make improvements; (2) The module has clear learning objectives so that students can learn directed to achieve learning objectives; (3) The module has an attractive design, is easy to learn, and can answer learning needs which will lead to student motivation to learn; (4) The module is flexible because the module material can be studied by students with their own abilities; (5) Cooperation can be established because the module can minimize competition; and (6) Remedies can be done because the module provides sufficient opportunities for students to be able to find their own weaknesses and mistakes with the references that have been set in the module (Lasmiyati & Harta, 2014).

The development of the module is based on a psychological and philosophical perspective on constructivism theory which views that each individual forms or builds most of what they learn and understand (Septyenthi et al., 2014). Modules can be a solution to provide the desired understanding even though each student has a different learning process and ability.

The developed module is equipped with microtechnical preparations. This is the novelty of this research and development. Preparations are preparations in the form of

organs, tissues, cells, and or bodies of organisms that are preserved in a medium to make it easier for someone to study, observe, or research. Preparations in the field of education have an important role as a means of supporting learning. Preparations can help explain material that seems abstract and difficult to observe. The function of preparations in the field of biology at various levels of education is very important to provide knowledge and direct experience about the body or certain organ parts in animals and plants. Preparations can be used as a reference when in the learning process the material being studied requires students to directly observe the object being studied (Holil et al., 2003).

The types of preparations can be distinguished based on several characteristics including size, resistance and media used, and manufacturing techniques and objects to be observed. Based on the size, the preparations are divided into two, namely microscopic and macroscopic preparations. Microscopic preparations included range preparations, pollen preparations, smear preparations, whole mounth preparations, squash preparations and section preparations. Meanwhile, macroscopic preparations include dry preparations and wet/fresh preparations (Holil et al., 2003).

Preparations based on their resistance and media are divided into temporary preparations, semi-permanent preparations and preserved preparations. Temporary preparations are not durable, the medium is water or volatile chemicals. Semiperm-harvest preparations are slightly more durable preparations, the medium is concentrated resistant glycerin. Preserved preparations are preparations that have the longest shelf life because they have been histologically processed and preserved with Canada bal-sam which is soluble in xylol (Latifa, 2015).

Based on the manufacturing technique and the object observed, it is divided into rubbing preparations by rubbing bone on a grinding stone to a certain thinness, smear preparations with blood metesi on glass objects and sticking glass objects to other objects to move them in the opposite direction, stretching preparations by stretching subcutaneous layer, pollen preparations to observe the shape of pollen on the stamens, maceration preparations to observe cell shapes, squash preparations to observe mitotic and meiotic divisions, whole mounth preparations to observe the overall shape of plants or small organisms, and section preparations to observe the structure plant or animal tissue (Wahyuni, 2015).

The plant section method is a method of making microtechnical preparations that aims to make large and thick objects in plants visible for cells and tissues under a microscope. The plant section method uses paraffin technique as the embedding medium with thin slices. Therefore, this method is also known as the paraffin method. The paraffin method is used in the preparation of preparations because it has several advantages, including the embedding process is faster and simpler, the embedding material can be stored for a long time in dry conditions, and can make thin slices to produce quality preparations (Firdaus et al., 2017).

The purpose of making microtechnical preparations using the plant section method is to make and observe the structures of plant tissues and cells in the form of cross-sectional or longitudinal slices on the roots, stems, and leaves of plants (Wahyuni, 2015). The preparation of whole preparations is strived to be permanent or durable so that it can be observed again at any time.

The existence of a biology practicum module equipped with microtechnical preparations on the structure and function of plant tissue will support laboratory activities, especially practicum. Laboratory activities in biology learning have the function of connecting theories/concepts with existing practice and facts, increasing student interest or interest, developing analytical attitudes and correcting misconceptions that may occur during classroom learning. There are several forms of practicum, including practicum that is training, practicum that is giving experience, and practicum that is investigative in nature (Maknun et al., 2012).

Practicum is one of the learning activities that aims to give students the opportunity to get real experience in order to increase understanding of theory or so that students

master certain skills related to a knowledge of a subject. Practical activities are actually included in the subsystem of learning with structured and scheduled activities.

Practical activities encourage students to be directly involved in the learning process so that the learning process is more interesting because students can be more active. Practical activities can provide students with experience to observe phenomena that occur so that students better understand the concepts being studied. Practical activities are carried out to prove, understand, observe, and discover new things in accordance with the theory received in class. Practicum can increase learning motivation, understanding the material and make students learn how to use laboratory tools by learning to use them directly. An effective means of learning is learning by doing, meaning that a person learns effectively if he does it directly (Hudha, 2011).

5. Conclusions

Based on the research that has been carried out, it can be concluded that (1) The results of product development, namely the biology practicum module equipped with microtechnical preparations are made based on the ADDIE development model on the material Structure and Function of Plant Tissues equipped with plant anatomy preparations and adapted to the 2013 curriculum for junior high school students /MTS class VIII. (2) The biology practicum module with microtechnical preparations is appropriate to be used as one of the teaching materials.

The suggestions that the author can give based on the results of research and development of the Biology Learning Module with Microtechnical Preparations using the ADDIE development model are as follows: (1) For schools. The biology learning module with microtechnical preparations on the structure and function of plant tissue can be used as one of the teaching materials that gives students direct experience of the actual shape of plant tissue to improve mastery of the material. (2) For Students. Learning activities with this module use laboratory equipment, including a place for preparations made of glass and easily broken so that in its use must be more careful. (3) For Further Researchers. Future researchers are expected to be able to continue this research by providing a touch of innovation and testing the effectiveness of its use.

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