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The Development of Supplement Book of Mycorrhizal Spore Based on Science Literacy at The Campus Forest in State University of Medan

Gloria Sirait
Biology Education Study Program
Universitas Negeri Medan, Medan, Indonesia

Ashar Hasairin
Biology Education Study Program
Universitas Negeri Medan, Medan, Indonesia

Syahmi Edi
Biology Education Study Program
Universitas Negeri Medan, Medan, Indonesia

Abstract: This study aims to determine the feasibility and effectiveness of the supplement book of mycorrhizal spore based on science literacy at the campus forest in State University of Medan that has been developed. The subjects of this research are material experts, learning experts, design experts, and students who take the Lower Level Organism Taxonomy course in the Department of Biology, State University of Medan. Research and development (R and D) with the Thiagarajan (4D) model, namely: (1) Define data taken from the results of student needs analysis and get a score of 69% Students to need mycorrhizal spore supplement books based on scientific literacy, (2) Design the outline of the supplement book produces four chapters that will be discussed, namely, introduction, the development of mycorrhizae in the tropics, methods of observing mycorrhizal and mycorrhizal fungi on mahogany trees in the Unimed campus forest, (3) Development of field research that has been carried out to obtain results. the results of three genera of mycorrhizal spores found under the tree *Swietenia mahogany* L, namely *Glomus* sp. with 28 types of spores, *Gigaspora* sp. with 4 types of spores, and *Acaulospora* sp. with 3 types of spores. After the observation results are obtained, it is developed into a supplement book that will be tested for feasibility. The results of the material expert assessment obtained a score of 81% in the very worthy category and 95% for the assessment of scientific literacy aspects in the very worthy category, and the results of the learning expert assessment obtained a score of 85.5% in the very worthy category and the results of the design expert assessment obtained a score of 86.6% in the very worthy category. After the book is declared worthy, the fourth stage is carried out. Dissemination (dissemination) is carried out by individual product trials obtaining a score of 87% in the very worthy category, the small group test obtaining a very worthy score of 89%, and the limited group test obtaining a score of 87% in the very worthy category. To prove whether the developed supplement book is effective for use in the Lower Level Organism Taxonomy course, the N-Gain test obtained a score of 63% in the category of quite effective.

Keywords: Development, Supplement Book, Mycorrhizae, Science Literacy, Medan State University

1. INTRODUCTION

Scientific literacy according to PISA is defined as "the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions to understand and help make decisions about the natural world and the changes made to it through human activity". Based on this explanation, scientific literacy

can be defined as the ability to use scientific knowledge, identify questions, and draw conclusions based on evidence, to understand and make decisions regarding nature and changes made to nature through human activities [18].

Learning is the most important part of determining the achievement of mastery of scientific literacy, Permendiknas RI No. 41 (2007: 6) [12] explains that the learning process in each primary and secondary education unit must be interactive, inspiring, fun, challenging, and motivating students to participate actively. Scientific literacy assessment is to assess students' understanding of science content, scientific processes, and the context of science applications. Content in scientific literacy includes material contained in the curriculum and material that is cross-curriculum with an emphasis on understanding concepts and the ability to use them in life. The scientific process refers to the mental processes involved when students solve problems. While the context is the area of application of scientific concepts. By this view, the assessment of scientific literacy is not merely a measurement of the level of understanding of scientific knowledge but also an understanding of various aspects of the scientific process as well as the ability to apply knowledge and scientific processes in real situations faced by students. especially in lesson mycorrhizae [18]. Mycorrhizae is a mutualistic symbiosis between fungi and plant roots. Various environmental conditions in Indonesia, such as soil type, can allow the diversity of mycorrhizal types on a land [10].

Based on the results of initial observations of student needs in the Lower Level Organism Taxonomy course to 32 Unimed Biology student respondents, 46.9% of students only used 1 learning resource for Low-Level Organism Taxonomy, 56.3% of students stated that the book Taxonomy of Low-Level Organisms The low level used is incomplete and requires improvement, 65.2% of students stated that the Low-Level Organism Taxonomy supplement book is very important, 62.5% of students need to supplement book of mycorrhizal spores and 69% of students need supplement book of mycorrhizal spore based on science literacy. From the results of this analysis of the needs of the general public, it is necessary to develop a mycorrhizal spore supplement book based on scientific literacy at the campus forests in the State University of Medan.

The lack of books on mycorrhizal spores and research on the development of supplement books is evidenced by observations in the Unimed, UMA, USU libraries, and several bookstores in Medan City, this is obtained from observations month June 2021. By because that, a need conducted to develop a book on mycorrhizal spores at the campus forest in the State University of Medan so that the community and students know the benefits of mycorrhizae and can recognize the types of mycorrhizal spores found in the campus forest of the Medan State University.

2. METHOD

2.1 Location and Time of Research

This research was conducted at State University of Medan which is located on Jalan Williem Iskandar, Medan Tembung, Medan City from August 2021 to May 2022.

2.2 Subject and Object of Research

The subject of this research consisting of: 1) Biology education student whose taking low-level plant taxonomy course in State University of Medan; 2) Material expert lecturers, learning expert lecturers, design expert lecturers and Instrument expert lecturers.

2.3 Type and Design of Research

This research uses the 4-D Model development model by Thiagarajan, et al (1974) which consists of 4 stages, namely: define, design, development, and dissemination. The development of this supplement book was made based on direct observations made. The research procedures carried out in product

development research can be seen in the picture following :

2.3.1 Define Stage

This stage aims to determine and define the needs in the learning process and collect various information related to the product to be developed. The product developed is aimed at Biology students at Medan State University in the Low-Level Organism Taxonomy course. This stage begins with an analysis of student needs, RPS analysis, and field observations.

2.3.2 Design Stage

After completing the definition stage, the next stage is the design stage. This design stage aims to select a medium that can be used as a source of additional knowledge about mycorrhizal spores for students and instrument compilers. The media chosen as a source of additional knowledge for students is a supplementary book. After selecting the media, an initial draft of the supplement book was developed. The initial design was in the form of an outline of the developed supplement book.

According to the Ministry of National Education [4], quality teaching materials are teaching materials that have a content component whose material can be used to answer student problems in achieving goals. Based on the authority of the body that performs standardization, there are two kinds of books, namely textbooks and non-text books. Supplementary books are included in the type of non-text books because they are reference books. Non-text books have the following characteristics: 1) Books that can be used in educational institutions but are not mandatory reference books for students; 2) books that provide material to enrich learning textbooks; 3) non-text books are not published in series based on level class or level education; 4) Books nontext lesson containing material that is not related by directly with the part of one of the competency standards contained in the content standards; 5) the material or content of non-textual textbooks can be used by readers from all levels of education and grade levels, so that they can be used in general [15].

Based on the characteristics of the non-textbook, which in this case is the supplementary book above, a scientific literacy-based mycorrhizal spore supplement book was developed in the forest of the Medan State University campus with the book cover, book identity, preface, table of contents, introduction, development of mycorrhizae in the region. tropical, method of observing mycorrhizal fungi, mycorrhizae on mahogany trees in the forest campus Unimed, glossary, bibliography and biography author. For instrument used in the research, is a book validation scale questionnaire for language, material, and *design*. Then used multiple-choice questions as many as 30 questions in the product trial, to determine the effectiveness of the book and test its feasibility of the book with a questionnaire.

2.3.3 Development Stage

After the design stage is completed, the next stage is the development stage. This development stage aims to produce a revised scientific literacy-based supplement book based on suggestions from expert language, material, and *design*. Stage composing book scientific literacy-based mycorrhizal spore supplements obtained from observations in the Medan State University campus forest with the following research *design :*

a. Plot Determination Sampling

The research plot was made purposively based on the condition of the campus forest which was dominated by mahogany trees and with observation carried out on the condition of season rain. The observation plot size is 10 m x 10 m and repeat 6 times so the total is 6 plots. The direction of the plot is made the same. Soil samples with mycorrhizal spores were taken from a depth of 10 cm under the host *Swietenia macrophylla* from each plot, put in a plastic bag, and given a label, location, and time. taking.

b. Observation Spores Mycorrhizae

Subsequent observations were made at the Plant Morphology Laboratory, State

University of Medan. The soil was dissolved with water, and the roots were separated, then using the pour-filter method (Pacioni 1992) and continued with the centrifugation technique (Brundett *et al*, 1996) using a microscope with a magnification of 40x the identification of mycorrhizal spores could be carried out and documented.

c. Expert Validation

This expert validation serves to validate the scientific literacy-based mycorrhizal spore supplement book in the forest of the Medan State University campus before the trial is carried out and the validation results will be used to revise the initial product. Supplementary books that have been compiled will then be assessed by material *expert lecturers*, namely lecturers who teach the taxonomy of low-level organisms, learning *expert lecturers, and design expert lecturers* so that it can be seen whether the book is feasible or not. Each validator is an expert in their field with a minimum educational qualification of S2 and a minimum of 5 years of experience.

2.3.4 Dissemination Stage

After the development stage is complete, then the distribution stage is carried out, the purpose of this stage is to disseminate books and test their effectiveness of books. After expert validation was carried out, a limited field trial was conducted to determine the results of applying mycorrhizal spore supplement books based on scientific literacy in learning. The trial of this supplement book was carried out in 1 class of Biology undergraduate students at Medan State University who took the 2nd-semester low-level organism Taxonomy course. then the data is analyzed with *N-Gain*. Trial this uses question choice multiple as many as 30 questions following mycorrhizal spores. This matter is used to get *Pretest* data results and *Posttest* students. Test conducted as much twice, namely before treatment and after treatment. *Pretest* was given to students (O1). After that, they were given treatment in the form of independent reading of mycorrhizal spore supplement books based on scientific literacy in the forest campus in the State University of Medan to students (X) for 7 days. In the final stage, a *posttest was carried out* on students (O2) with the same test questions as the *pretest*.

2.4 Collection Instrument Data

The instruments used in this development research consist of 3 instruments, namely validation sheet instruments for *expert validators* to validate scientific literacy-based books, questionnaires, or questionnaires for student needs and on the topic of *mycorrhizal spores*, multiple-choice test questions for Biology Undergraduate Students, the State University of Medan as product testing. The validation sheet instrument is used to determine the feasibility of the supplement book developed by the *expert validator* which contains research results, input or suggestions for the developed supplement book. Book validation sheets by *expert validators* consist of 3 types that are sheet validation *expert* materials, learning, and design.

2.5 Data Analysis

The data analysis tehcniques used in this research are descriptive qualitative data and quantitative data analysis techniques that describe the results of the validity test and student responses.

2.5.1 Validity Analysis

All of these data were analyzed for knowing the exact category of books by each validator along with his response. Each validator is an expert in their field with Minimum educational qualification of S2 and 5 years of experience. Data obtained in this research can be calculated by the formula [17]. The formula used to calculate validation data based on the questionnaire is as follows:

$$\text{Percentage of validity} = \frac{Obtained\ score}{Maximal\ score}\ x\ 100\%$$

The value the percentage of the scale of feasibility or product validity carried out by material experts, learning expert and design expert is as follows.

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Tabel 1. Criteria for the percentage of validity

Interval (%)	Feasible Criteria
<21%	Very unworthy
21-40%	Not worthy
41 – 60%	Decent enough
61 -80%	Eligible
81 -100%	Very worthy

2.5.2 Effectiveness Analysis

The N-gain test was carried out to determine the effectiveness of the use of the supplement book developed in improving students' cognition of mycorrhizal spores. The category of student cognitive improvement can also be determined by calculating the pretest and posttest scores using the Normalized gain formula by Metzer (2002) as follows:

$$<g> = \frac{postest\ score - pretest\ score}{maximum\ score - pretest\ score}$$

The calculation results will be interpreted into the classification of gain index <g> which can be seen in the table according to Hake [6] as follows.

Tabel 2. Kategori N-Gain

Interval	Categories
g > 0,70	High
0,30 < g ≤ 0,70	Medium
g ≤ 0,30	Low

The results of the percentage effectiveness of the N-gain value can be percentage using the same formula, according to Hooke (1998) the results of the calculation of the gain are interpreted into the classification of the percentage of effectiveness of the N-gain can be seen as follows.

Tabel 3. Category for the percentage of Effectiveness N-gain

Interval (%)	Categories
<40%	Ineffective
40 – 55%	Less effective
56 – 75%	Effective enough
>75%	Effective

3. RESULT

Framework The OECD's PISA (Program for International Student Assessment) work (2019) defines literacy scientific as the ability for involved related problems with science and with the idea of science as a reflective citizen. Therefore, people who have literacy of scientific ready for involved in communication scientific about science and technology that requires competence to explain phenomena by scientific, evaluate and design investigation scientifically, as well as interpret data and evidence by scientific. Information theoretical this clarify fact that the direction of idea literacy scientific is the effort to use science outside practice scientific [16].

Products that have been developed in the form of book supplement spore mycorrhizae based on scientific literacy in the campus forest in State University of Medan can use as ingredient study addition to courses Taxonomy Low-Level Organisms. This book developed based on from observation spore mycorrhizae in the area campus forest in State University of Medan and developed with composing following aspect scientific literacy, namely, as stem body knowledge (*a body of knowledge*), science as a method for think (*a way of thinking*), science as a method for investigating *(a way of investigating*), and interactions between science, technology, and society (*interaction between science, technology, and society*) that can use as book study addition for eye studying that. Book supplement spore mycorrhizae based on scientific literacy in the forest Medan State

University campus is supporter learning for subject Taxonomy Low-Level Organisms. From analysis needs to get that students need source study addition about spore mycorrhizae based on scientific literacy for giving information by scientific and apply scientific concepts and perspectives. Book supplement spore mycorrhizae based on scientific literacy in the campus forest in State University of Medan designed as attractive possible as ingredient relevant references for find something new thing for applied for the student.

3.1 Result of Define Stage

The determination of the basic problem was carried out as the background for the creation of research on the development of Book supplement spore mycorrhizae based on scientific literacy in the campus forest in State University of Medan. The basic problems found were: (1) The results of the 2018 Pisa found that Indonesia was still weak in understanding information (literacy). Literacy is one of the abilities that must be possessed by every party to understand information and reflective ideas related to scientific issues. (2) The lack of reference books on mycorrhizal spores and research on the development of scientific literacy-based mycorrhizal spores, is evidenced by observations in the Unimed, UMA, USU libraries and several bookstores in the city of Medan obtained from observations in June 2021.

After determining the basic problem, the analysis of student needs is then carried out. This analysis was carried out on 32 respondents, students of the Biology Department, State University of Medan, who had taken the Low-Level Organism Taxonomy course. From the results of the needs analysis, 46.9% of students only used 1 learning resource on Taxonomy of Low-Level Organisms, 56.3% of students stated that the book on Taxonomy of Low-Level Organisms was not complete and needed improvement, 65.2% of students stated that the supplement book Taxonomy of Low-Level Organisms is very important, 62.5% of students need Mycorrhizal supplement books and 69% of students need scientific literacy-based Mycorrhizal Spores to supplement books.

3.2 The Result of Design Stage

The initial step taken at the design stage is to design the initial product. At this stage, the book is designed according to the characteristics of the book to be developed. The book that will be developed is a supplement book, where the supplement book is part of a non-textbook. As for the characteristics of supplement books, namely: (1) The use of supplement books, can be used in schools or general educational institutions, and is not a mandatory reference book for students participating in learning activities; (2) Supplementary books provide material to enrich textbooks, or as information about science and technology in-depth and broadly, or guidebooks for readers; (3) In its publication, supplementary books are not published in series based on grade level or education level; (4) The material or content of the supplementary book can be used by readers from all levels of education and grade levels or across readers; (5) For its presentation, supplementary books are loose, creative, and innovative so that they are not bound by the provisions of the learning process and systematics that are determined based on the science of education and teaching.

After obtaining the characteristics of the supplementary book, a book outline design was drawn up consisting of (1) Book Cover; (2) Book Identity; (3) Preface; (4) Table of Contents; (5) List of Images; (6) List of Tables; (7) Introduction; (8) Mycorrhizal development in the tropics; (9) Mycorrhizal Fungi Observation Method; (10) Mycorrhizae on Mahogany (10) Mycorrhizae on Mahogany Trees in Unimed Campus Forest; (11) Glossary; (12) Bibliography; (13) Author's Biography.

3.3 Result of Development Stage

3.3.1 Result of Observation Spores Mycorrhizae

After conducting field research, 6 sampling plots with a size of 10 x 10 m were obtained which were taken by random sampling of the soil taken from under the *Swietenia mahogany* L tree. Random sampling was carried out because the land area in the Unimed campus forest was rocky and there was a lot of plastic waste in the area. in the ground.

Soil samples that have been taken were brought to the Laboratory of Plant Morphology, the State University of Medan for extraction and identification of the types of mycorrhizae obtained. There were 3 types of mycorrhizal spores found, namely Glomus sp. with 28 types of spores, Gigaspora sp. with 4 types of spores, and Acaulospora sp. with 3 types of spores. The results of this observations are displayed in the suplement book that has been developed.

3.3.2 Material Expert Validation

The feasibility of the supplement book being developed was obtained based on the assessment of the material expert validator. The developed book is tested for feasibility by material expert validators to improve the quality of the material. In the process of due diligence, the book is assessed by the validator by providing scores and suggestions on each sub-assessment indicator from the material aspect. The following percentage of assessments carried out by material experts can be seen in the table below

Tabel 4. Percentage Material Expert

Assessment Component	Average Percentage (%)	Criteria
Material Suitability	89	Very worthy
Accuracy and Strength Theory	71	Eligible
Systematics of Learning	75	Eligible
Supplementary Book Efficiency in Learning	95	Very worthy
Language	76	Eligible
Average	81	Very worthy

Tabel 5. Percentage of Material Experts Assessment of Scientific Literacy

Assessment Component	Average Percentage (%)	Criteria
Science as a torso knowledge (A body of knowledge)	100	Very worthy
Science as a way to investigate (Way of investigation)	81	Very worthy
Science as a way of thinking (Ways of thinking)	100	Very worthy
Science, technology interaction with the community (Interaction of science, technology, and society)	100	Very worthy
Average	95	Very worthy

3.3.3 Learning Expert Validation

The validation of learning experts he percentage of assessments carried out by learning experts, which can be seen in the table below.

Tabel 6. Percentage Learning Expert Assessment

Assessment Component	Average Percentage (%)	Criteria
Appropriateness Contents	85,7	Very worthy
Kelayakan Penyajian	84,7	Very worthy
Appropriateness Serving	85,8	Very worthy

The validation assessed by learning experts is from the feasibility of the content and the feasibility of the presentation. Obtained an average rating of 85.5% with very good criteria. Thus the supplement book of mycorrhizal spore based on science literacy at the campus forest in state university of Medan has met the eligibility requirements so that it can be used as reading material for students.

3.3.4 Design Expert Validation

The expert validation of the mycorrhizal spore supplement book design. The validation assessed by the design consisted of the appropriateness of the graphic (book size, book cover design, and book content design). The following is the percentage of assessments carried out by design experts, which can be seen in the table as follows.

Based on the results of validation by design experts, namely from the feasibility of graphics (book size, book cover design, and book content design) an average rating of 86.8% was obtained with very good criteria. Thus the Supplement Book of Mycorrhizal Spore Based on Science Literacy at The Campus Forest in State University of Medan has met the eligibility requirements so that it can be used as reading material for students.

Tabel 7. Percentage Design Expert Assessment

Assessment Component	Average Percentage (%)	Criteria
Supplementary book size	91.7	Very worthy
Supplementary book cover design	87.5	Very worthy
Supplement book content design	81.3	Very worthy
Average	86.8	Very worthy

3.4. Result of Dissiminate Stage

Based on the results of the N-Gain test carried out from the results of the pretest and post-test students in the control class obtained 0.053 (5.3%) for the N-Gain test in the Low category (Ineffective). Meanwhile, in the experimental class, 0.63 (63%) was obtained for the N-Gain test with the Medium category (Effective enough). The data on the results of the pretest and post-test with N-Gain can be seen in table 8 as follows.

Table 8. Score Average of Pretest and Postest assessments with N-Gain

Subject (X)	Pretest (O1)	Posttest (O2)	N-Gain
Control class	12,2	10,2	0,053 (Low) 5,3% (Ineffective)
Experiment class	7,84	21,8	0,63 (Medium) 63% (Effective enough)

4. DISCUSSION

The research presented in this book motivates students to develop their ideas, thoughts, and insights as well as creativity. The result of research developed into a book product is a good implementation in the field of educational development [1].

Today, with the rapid and sophisticated development of the age, teachers, lecturers and students are not enough to use only one handbook as a learning reference but are required to read and study various relevant reading sources to be taught and learned. Most students only use the Textbook of Low-Level Organism Taxonomy as a learning material to learn about mycorrhiza where the discussion of mycorrhiza is only discussed in one piece. A quality book should be a book that has a content component whose material can be used to answer students' problems in achieving goals [5].

The developed supplement book is also equipped with mycorrhizal spore observation methods, starting from soil sampling, several stages of spore extraction, and identification of mycorrhizal spores. The book is also equipped with pictures and photographs of research results. Of course, this can clarify the results of the research contained in the study, the function of the pictures presented in the supplementary book is to attract and motivate students to develop an interest in learning something new. The presentation of material in the book must meet several requirements, namely (1) the material must be relevant to the competencies achieved; (2) material appropriate to the topic; (3) the presentation of material must be logical, systematic, communicative, and interactive; (4) pay attention to the characteristics and conditions of students, and (5) use techniques and use interesting presentation methods [9]. A good book when book is written using easy-to-understand and good language, its presentation is equipped with pictures and descriptions and illustrated following the author's ideas [4].

The chapters contained in the product developed as follows: (1) Introduction: This section contains the introduction of mycorrhizae, general characteristics of mycorrhizae, a grouping of mycorrhizae, and factors that affect the growth of mycorrhizae. (2) Development of mycorrhiza in the tropics. This section contains an explanation of the benefits of mycorrhiza and plant growth, the role of mycorrhiza in critical land improvement, and mycorrhiza as a business opportunity narrated in the form of narratives and various examples of previous research. (3) Method of observation of mycorrhizal fungi. This section describes the steps of soil sampling, five working steps that can be selected for several stages of spore extraction, and a mycorrhizal spore identification guide, such as characteristics of Glomus, Gigaspora, Scutellospora, Acaulospora, Enterophospora, and Sclerocycstis. (4) Mikoriza on a mahogany tree in the forest of Unimed campus. In this section, the observation data are presented, which are characterized according to their type. In this section, the results of field research are presented in 3 types, namely: (1) Glomus sp., (2) Gigaspora sp., And (3) Acaulospora sp. which contains photo documentation of the researcher's observations as well as an explanation of, characteristics, benefits, spore shape, color, size, number of spore walls and characteristics. Revealed that interesting, contextual learning materials, that can be presented through problem-solving found in the environment will provide a good learning experience [13].

Supplement Book of Mycorrhizal Spore Based on Science Literacy at The Campus Forest in State University of Medan was developed by following the steps of Thiagarajan model consisting of four stages (four-D Models) namely Define stage, Design stage, Development stage and Disseminate and Test effectiveness. Based on the results of validation by material experts, validation of learning experts, and validation by Design experts accompanied by a field test with an individual group test of 6 students, a small group test of 10 students and a limited group test of 21 students found that this book is very suitable to be used as a material for use as additional

material in the subject of Taxonomy of Lower Level Organisms. These eligibility results are assessed from assessment and revision by the validator. Books can be declared valid and fit for use after going through the validation and testing stages [14].

The products that have been declared good by the validator still need to be improved according to the recommendations of experts [8]. Reviews by experts and students' responses to the books developed are done following the point of view of their respective expertise, as well as referring to the regulations of the Minister. Pendidikan Nasional RI Number 2 of 2008 explains that books that are eligible to be used as teaching materials must include quality criteria (standards) including, (1) Eligibility of content/material, (2) Eligibility of presentation, (3) Eligibility of language, (4) Eligibility of graphics. These criteria have been listed in the components of the validation sheet that is assessed by the validators, a good teaching material if it meets the aspects of validity those are valid and practical. The validity of the developed book can be determined by the validity test, valid criteria can be determined if the value obtained from the experts is in the percentage interval of $81\% \leq X \leq 100\%$ and $61\% \leq X \leq 80\%$ with excellent and good criteria [18].

The results of validation by material expert of supplement book of mycorrhizal spore based on science literacy at the campus forest in state university of Medan to the assessment of the material area and material depth in general obtained a percentage of 81% with the very good or worthy category. The suitability of the content of a book indicates that the content of the book is developed following the learning objectives. The results of validation by material experts related to supplement book of mycorrhizal spore based on science literacy developed related to science assessment as 100%, Science as a way to investigate 81%, science as a way to think 100%and science interaction, technology with society get 100% assessment with excellent criteria.

The challenges of the Era of Industrial Revolution 4.0 require us to prepare qualified students with qualifications and competencies with science literacy skills. Science literacy-based supplement books are very helpful in accelerating this process. Science literacy skills are used to understand science and its applications. Students with science literacy skills will be able to apply their knowledge to solve problems in everyday life situations that are the ultimate goal of education [2].

Validation by science literacy-based mycorrhizal spore supplement learningb experts obtained an average percentage of 85.5% with the category of very good or very worthy. The feasibility of the book is also done to assess the accuracy of the material, the feasibility of presentation such as book cover title, table of contents and presentation of images validation of learning also assesses the language of course in the language supplement book used must be following good and correct Indonesian language methods. Textbooks should be useful for students and teachers. The grammar used is designed according to the level of development of students. If students find it difficult to understand a term, a glossary is provided as a guide to understanding difficult terms [16].

Validation by a book design expert of mycorrhizal spore supplement book obtained a percentage of 86.8% with the category of very good or very worthy. This book is validated by a designer to know the book format, book layout, and good and correct book typography including in the evaluation of book cover images, book size, book color, font type, font order, appropriate illustrations, and consistent layout. In addition, the pictures in the supplement book can affect a person's interest in reading because most see the pictures first before reading. Meanwhile, the type and font of writing affect the readability of the book. If a book has good readability, then it can affect the reader's interest, facilitate the reader and help the reader's memory and help the speed of reader efficiency [7].

Supplement book of mycorrhizal spore based on science literacy at the campus forest in state university of Medan that has been suitable for use was followed by a Gain test to determine the effectiveness of using supplement book developed in cognitive improvement in students taking Low-Level Organism Taxonomy course.

The effectiveness test was performed by giving pretest and posttest to 25 students in the control class who did not get the supplement book and 25 students in the experimental class who got the supplement book. Both pretest and posttest use multiple choice questions as many as 30 questions that have been validated by the validator. Based on the results of the N-Gain test, students in the control class obtained 0.053 (5.3%) with a category of Low N-gain (Ineffective). While the experimental class was obtained 0.63 (63%) with the category of N-gain Medium (Fairly Effective).

A normalized gain test (N-Gain) was performed to determine the improvement of students' cognitive learning outcomes after being given treatment derived from pretest and posttest assessment. N-Gain is a comparison of the actual gain score with the maximum gain score, the effectiveness of the use of supplement books developed in improving good cognitive if the N-Gain score is greater than 0.4 [6].

5. CONCLUSION

1. Assessment results expert Theory to book supplement spore mycorrhizae based on scientific literacy in the forest Medan State University campus, obtained score percent by 81% with very decent category and 95% for evaluation aspect scientific literacy with very category worth.
2. Assessment results expert learning to book supplement spore mycorrhizae based on scientific literacy in the forest Medan State University campus, obtained score percent of 85.5% with every category worth.
3. Assessment results expert design book supplement spore mycorrhizae based on scientific literacy in the forest Medan State University campus, obtained score percent by 86.6% with every category worth.
4. The results of the N-Gain effectiveness test of mycorrhizal spore supplement books based on scientific literacy in the Medan State University campus forest were carried out from the results of the pretest and posttest of students obtained 63% with a moderately effective category.

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