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Development of a Practical Guidebook for Digestive System Material to Assist the Laboratory Management Process

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Abstract

The results of observations at SMA N 16 Semarang have not yet been available book guide practical work adequate biology. Students not enough understand use tools and materials practicum. Management laboratory not optimal and activities practical work Not yet effective. Research objectives This fot analyze feasibility, practicality, and effectiveness Book Practical Guide Biology S MA Negeri 16 Semarang. Research This use method Research and Development (R&D) model ADDIE (Analyze, Design, Develop, Implement, Evaluate). Study held at SMA N 16 Semarang in 2016 2023/2024 lesson. Development Book started with analysis need through observation and interview with teachers and students. Stage design involving design concept and content book. Media and material suitability determined use questionnaire feasibility assessed by media and material experts. The practicality of the media is determined based on questionnaire teacher and student responses. The effectiveness of the media is determined based on completeness mark practical work digestive system and interests Study students. Results study show that Book Practical Guide Biology is very worthy. The teacher thinks that The book is very practical. 87% of students rated it very practical and 13% of students practical. 92% of students class XI 1 and 89% of students class XI 5 completed learning. 94% of students rated very interested and 6% of students were interested. Book Biology Lab Guide on the material of the digestive system is feasible, practical, and effective.

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INTRODUCTION

School is institution formal education plays a role in formation character and develop potential as well as knowledge someone . School on duty manage education For teach knowledge, skills and values life to somebody. Learning oriented skills done with do activity practicum. Activities practical work give more impression meaningful Because student can do observation and experiment in a way directly in the laboratory. Based on duties and responsibilities answer school , curriculum made into as guidelines For do activity Study teaching. The curriculum used at SMA N 16 Semarang is curriculum independent learning. Curriculum independent Study invite student Study with calm , relaxed , happy , knowing talent natural owned students to be able to delve deeper interests and talents (Susilowati, 2022) . According to Minister of Education and Culture Regulation Number 56/M/2022 explained that curriculum independent Study high school level emphasizes implementation learning inquiry on load science and social studies lessons.

Learning inquiry is learning that encourages student For make question as well as find conclusion from activity practical things to do like activity practical. At the time do practical work student can observe in a way direct phenomena that occur, training think scientific, instilling attitude scientific and complete problem with method scientific (Emda, 2017) . Activities practical work walk effective supported with existence management or management good laboratory. Management laboratory is the process of using source Power in a way effective and efficient For reach purpose and guarantee continuity its function. Management laboratory need done so that laboratory can functioning in accordance with objective procurement.

Obstacles that occurred at SMA N 16 Semarang in activity practical work is difficulty understand use tools and materials laboratory; Procedure practical work No understood student with ok; No report format available practicum and supervision from officer laboratory No maximum. Problems the cause time learning exceeding maximum hours, decrease interest Study students, and results under - learning maximum. This is because of Not yet available book guide Standard practicum at SMA N 16 Semarang. Procedure practical work and report format practical work obtained student via the internet. Based on constraint the need existence development book guide practicum so that activities practical work walk effective.

Practical Guide Book is compiled book with objective For assist the management process laboratory in activity practicum. According to (Darmayanti & Haifaturrahmah, 2019) book guide practical work For make it easier student in do activity practicum, so that activity practical work can walk effective. Book guide practical work biology consists of from three part that is opening, body, and closing. The opening section Practical Guide Book Biology namely: 1) Book cover; 2) Rights page creation; 3) Foreword; 4) Table of contents. Contents section Practical Guide Book Biology namely: 1) Vision and mission of SMA N 16 Semarang; 2) Structure organization laboratory Biology of SMA N 16 Semarang; 3) Rules and regulations use laboratory Biology SMA N 16 Semarang; 4) Laboratory plan Biology of SMA N 16 Semarang; 5) Safety Work laboratory; 6) Teaching aids practicum; 7) Tools laboratory; 8) Chemicals based on nature; 9) Procedure practical work material system digestion; 10) Report format practicum. Closing section Practical Guide Book Biology that is *glossary* and reference list. Based on description on expected book guide practical work system digestion feasible, practical and effective used For assist the management process laboratory.

RESEARCH METHOD

Study This use method research and development (*Research and Development)* with ADDIE development model. According to (Sugiono.2019) the ADDIE development model consists of of five stages that is *analyze, design, develop, implement,* and *evaluate.* Stages *analyze* potential and problems done with interviews and observations at SMA N 16 Semarang. Observation conducted in the laboratory Biology SMA N 16 Semarang. Interview done with teachers and students of SMA N 16 Semarang. Stage *design* covering compilation instrument research and design product Practical Guide Book use application *Microsoft Word* and *Canva* . Stage *develop* the results book guide practical work that has been done Feasibility testing is carried out by media expert validators and experts material. Stage *Implementation* was tested on teachers and students class XI 1 and 5 SMA N 16 Semarang on the material system digestion. Students follow learning material

system digestion for two weeks , then fill in questionnaire response. At the stage This aiming For know practicality and effectiveness book guide practical work biology. Stage *evaluation* is done revision product which aim For produce suitable product with objective beginning do development product.

Eligibility Practical Guide Book measured with non- test techniques use questionnaire media and material suitability. Practicality Practical Guide Book measured with non- test techniques use questionnaire practicality as assessed by biology teachers and students. Effectiveness Practical Guide Book measured with technique test and non- test using. Testing techniques seen from completeness mark practical work material system digestion. The completion of the practical value is measured from the practical report value and the student's test value (40% + 60%). Non- test techniques measured use questionnaire response interest Study students. The results analyzed use technique descriptive presentation.

RESULTS AND DISCUSSION

Developer product in research This is Practical Guide Book for System Material Digestion For High School Students. Practical Guide Book equipped with page laboratory rules and regulations; laboratory layout; laboratory work safety; practical demonstration equipment is equipped QR code containing PPT material and videos; laboratory equipment, chemicals based on their properties, material practicum procedures system digestion, format of practical report.

Eligibility Practical Guide Book

The feasibility of the Practical Guidebook was assessed by material experts and media experts. The results of the book's feasibility are presented in Table 1.

Table 1. Feasibility of Practical Guidebooks by material experts and media experts

No	Validators	Total score	(%)	Criteria
1.	Subject matter expert	73	96%	Very worthy
2.	Media expert	74	97%	Very worthy

In Table 1, it is known that both experts gave a value of 96% and 97%, meaning that the Biology Practical Guidebook developed in this study is very feasible. In terms of content, material experts argue that the material in the book is correct, complete and in accordance with learning objectives. According to Hasanah & Nulhakim, (2015) The suitability of the material with the learning objectives must be in line. Material experts strongly agree that the use of images is in accordance with the proper procedure. The practicum procedures in the Practical Guidebook help facilitate practicum activities.

In terms of construction, material experts strongly agree that the presentation of text and images is appropriate on the same page, the order of chapters and book components are appropriate. In terms of language, material experts argue that the choice of words and writing of scientific names are in accordance with the standards. The sentences used are clear and easy for students to understand. In terms of media benefits, it is considered very appropriate by both validators. Both validators are of the opinion that the Practical Guidebook can be used by students, teachers and educators. In addition, the book is useful for introducing the laboratory environment, increasing students' interest in learning, and helping students learn independently. Both strongly agree that the book can improve learning effectiveness and help students complete practical report assignments.

The assessment by media experts showed that in terms of display design, the use of *background illustrations* and the selection of images on the cover and contents were appropriate. The use of color, size, and *font type* were appropriate and easy to read. In terms of media quality, media experts argued that the readability of the text, clarity of the images, and selection of margins were appropriate. The results of the validation of the graphic aspect showed that the size of the book was in accordance with the standard, the quality of the print results was precise and neat, and the quality of the binding strength was good. Based on the assessment of the validator, both provided suggestions which would then be evaluated to improve the Practical Guidebook for the digestive system material.

Practicality Practical Guide Book

The results of the teacher's assessment of the practicality of the Practical Guide Book are presented in Table 2.

Table 2. Teachers' assessment of the practicality of the Practical Guidebook

No	Teacher	Total score	(%)	Criteria
1.	Biology teacher 1	46	96%	Very Practical
2.	Biology teacher 2	44	92%	Very Practical

In Table 4.4, it is known that both teachers gave scores of 96% and 92%, meaning that the Practical Guidebook is said to be very practical. In terms of effectiveness, both teachers think that the Practical Guidebook has greatly helped teachers in delivering the digestive system material. The QR code of the teaching aids has greatly helped students in understanding the digestive system material. In the image and format indicators of the practical report, teacher 1 strongly agrees that the images on the PPT for the digestive system material make it easier for students to understand the text. The format of the practical report makes it easier for teachers to learn the practical. Teacher 2 agrees that the images provided make it easier for students to understand the text. The format of the practical report makes it easier for teachers to learn the practical.

In the creative aspect, the Biology Practical Guidebook was assessed differently by the two teachers. In the book design presentation indicator, teacher 1 agreed that the book design presentation was very interesting, while teacher 2 strongly agreed that the book design presentation was very interesting. Both teachers agreed that the completeness of the digestive system material in the book helped teachers motivate students to do scientific activities. The presentation of tables in the digestive system practical report format helped students in the observation process. The images presented supported the contents of the book.

In terms of efficiency, the book was assessed differently by both teachers. In statement 10, teacher 1 strongly agreed that this book can be used by all levels of high school education, while teacher 2 agreed that this book can be used by all levels of high school education. Both teachers strongly agreed that the completeness of the book's contents helps students in getting to know laboratory equipment and this book can be carried and stored easily.

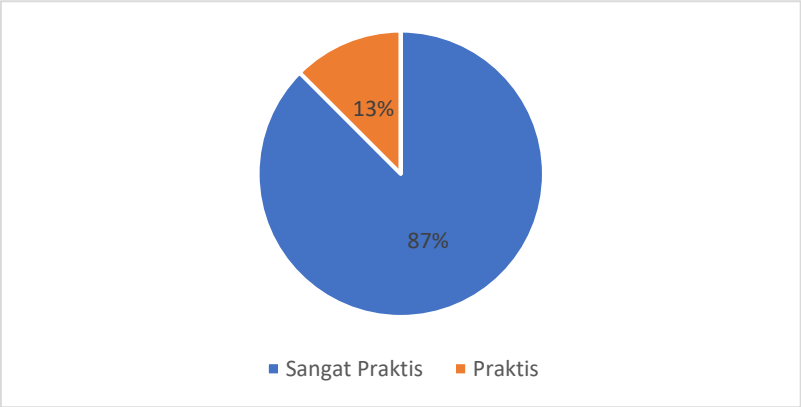

Figure 1. Number of student assessments of the practicality of the Practical Guide Book

Assessment results student to practicality Practical Guide Book presented in Figure 1. Based on Figure 1, it is known that 87% of students gave a very practical assessment and 13% of students gave a practical assessment. Based on results analysis questionnaire response students on aspects effectiveness, known that 50% - 75% of students to argue material and images on the tool's QR code props system digestion easy understood students. Report format practical work has really made student in finish task. QR code tool

props it's been very helpful student in understand material system digestion and can accessible to all type of smartphone.

On the aspect creative, 53%-81% of students to argue images and colors in PPT design material system Digestion is very interesting. The material on the digestive system digestion in books guide practical work biology is very complete. The results table observation it's been very helpful student in do activity practical work system digestion. In the aspect efficient, 61%-75% of students totally agree Practical Guide Book Biology can used by all high school level. Books guide practical work biology it's been very helpful student in understand function tool practical work system digestion. Book guide practical work biology is very easy carried and stored.

Effectiveness Practical Guide Book

Effectiveness Practical Guide Book Biology analyzed based on results completeness mark practical work system digestion and analysis interest Study students. Results of the analysis completeness mark practical work student presented in Table 3.

Table 2. Results of Practical Work Completion Value Analysis

No	Class	Average	Presentation completed	Presentation not complete
1.	XI 1	89	92%	8%
2.	XI 5	86	89%	11%

Completeness mark practical work student class XI 1 more tall compared to with class XI 5 namely 92% and 89%. This is can interpreted that Practical Guide Book effective For assist the management process laboratory. In the research Sumarmin & Roza (2019) obtained on average results Study cognitive student classified as effective. There are 28 students achieved KTTP while 6 students Not yet achieve KTTP with completeness classical by 82.35%.

Analysis results interest Study student known that all student rate very interested and interested. Amount response interest Study student presented in Figure 2.

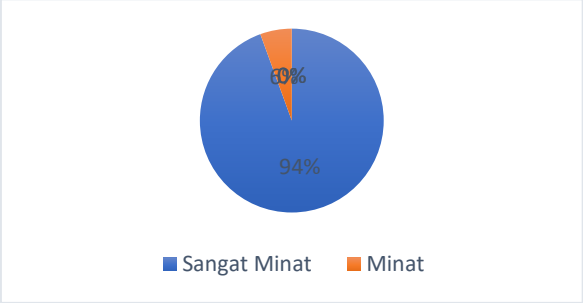

Figure 2. Number of student learning interest responses

Based on Figure 2, it is known that 94% of students considered very interested and 6% of students were interested. This means that the Biology Practical Guidebook is very effective to use. This show that use book guide practical work interesting interest and motivation student during activity practicum. All students were enthusiastic about participating in practicum activities according to procedures. This can be seen from the students being present right in the biology laboratory. Students brought the tools and materials needed and followed the practicum orderly. In line with the opinion of (Fitri et al., 2021) students who are enthusiastic about participating in teaching and learning activities are a characteristic of students who are interested in learning because they are interested in the learning. 99% of students understand the organs of the digestive system. Students complete the practicum and practicum report assignments on time. This can be seen from students scanning the QR code and reading the contents of the material. Students collect practicum reports three days after learning. 98% of students comply with the rules and contribute to writing

practicum reports. 97% of students contribute to making observations according to procedures without any coercion. This is evidenced by the fact that students do not feel disgusted when taking intestinal samples. More than 85% of students try to take notes, ask questions, and answer the teacher's explanations. According to (Prasetyo et al., 2022) students' interest in participating in practicum activities can be seen from their direct participation in participating in practicums.

CONCLUSION

Based on results research and discussion can concluded that book guide practical work material system digestion feasible, practical and effective used in the management process laboratory.

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