The Influence of Printed Teaching Material on Students' Cognitive Learning Outcomes

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ABSTRACT
Printed teaching materials are still relevant to be used as learning resources for students. Through this research we analyze the effect of printed modules on students' cognitive learning outcomes in plant physiology courses. We used the one-shot case study method involving 12 students taking plant physiology courses in the 2024/2025 academic year. The cognitive learning outcomes used as data are mid-semester and final semester exam scores. Data analysis was carried out by sign test. The significance level used is 5%, H_0 is rejected if the calculated value is smaller than the table value. H_0 in this research is that there is no effect of using printed modules on student cognitive learning outcomes. The sign test results show that the calculated h value is greater than the table h value, so H_0 is accepted. The use of printed modules did not affect students' cognitive learning outcomes in this study.

Keywords: Printed teaching material; Students; Learning Outcomes; Cognitive.

INTRODUCTION

Teaching materials can be interpreted as all forms of material that are arranged systematically which enable students to learn independently and designed according to the curriculum (Magdalena et al., 2020). Teaching materials can be divided into two, namely printed and non-printed teaching materials (Hasanah et al., 2024). In this research, we used printed teaching materials in the form of modules as a learning resource for students taking plant physiology courses. A module is a learning tool that contains material, methods, limitations, written by the educator himself and designed systematically and attractively to achieve the expected competencies according to the level of complexity and can be studied independently by students (Puspitasari, 2019). The printed module used in this research was a module prepared by the lecturer who taught the plant physiology course. This module contains learning materials, practical instructions, and quizzes to test students' understanding of concepts. The printed module was chosen because it is easy and does not require other equipment to use.

The use of modules in learning is known to have a positive impact on student achievement of learning outcomes (Rosmiati et al., 2019). Students are expected to find it easier to access and understand the learning material provided by the lecturer if they use modules (Harianja & Utami, 2023). The results of observations we made in learning plant physiology during the 2022/2023 and 2023/2024 academic years in the biology education study program at Universitas KH. A. Wahab Hasbullah pointed out that lecturers had never used modules as teaching materials. The learning media used are power point slides and English textbooks. This causes students to be less enthusiastic in reading the material. As a result, students' cognitive learning outcomes in this course tend to be low. This is what then underlies lecturers to compiling modules to become reading sources for students. This research examines the effect of using printed modules on students' cognitive learning outcomes in plant physiology courses.

METHOD

Number of students taking plant physiology courses in the 2024/2025 academic year at Universitas KH. A. Wahab Hasbullah was 12 people, making it impossible to carry out experimental research. Therefore, we use pre-experimental methods that focus treatment and observation on one sample group (one shot case study). Student cognitive learning outcomes were obtained from midterm and final semester exam scores. We used a sign test to analyze the effect of using printed modules on students' cognitive learning outcomes. This analysis is stated in form positive and negative signs on the difference between pairs of observations, hypothesis testing done with compare the calculated h value with the table h with an error level of 5% (Suryani & Andajani, 2014). The h count represents the fewest number of + or – signs and h table is the value of h obtained from the list with the selected real level. If the calculated h ≤ h table, it can be concluded that there is a significant influence from the use of printed modules on student cognitive learning outcomes.

RESULT AND DISCUSSION

Result

Table 1 shows the results of the sign test carried out on student cognitive learning outcomes. The calculation results show that the number of positive signs is less than the negative signs, so the calculated h value is determined from the number of positive signs. The calculated h value in this study was 3, while the table h value is 2, so the hypothesis is rejected. In other words, the use of printed modules has no influence on students' cognitive learning outcomes.

Table 1 Sign Test Results

No.	Mid Semester Test Score (X)	Final Semester Test Score (Y)	Sign (X – Y)
1	48	81	-
2	62	65	-
3	42	41	+
4	34	66	-
5	39	31	+
6	29	27	+
7	25	50	-
8	55	66	-
9	41	73	-
10	27	58	-
11	32	59	-
12	29	42	-

∑ negative sign = 9
∑ positive sign = 3
h count = 3

Discussion

This research was conducted during one semester in a plant physiology class attended by 12 students. Students were given printed modules at the beginning of the semester and given instructions to read them at home as a form of preparation for learning in class. The lecturer did not provide intensive supervision of student activities in using the module during the first half of the semester. In the middle of the semester, students were given an exam to determine the initial score (X). After taking the mid-semester exam, students return to using the printed module as a learning resource. Lecturers supervise students' reading activities by asking questions related to the material in the reading during class. At the end of the semester, students were given an exam to determine their learning results after using the module (Y). The difference between the X and Y values is then calculated to determine the positive or negative sign in the sign test. The number of positive signs is less than the negative signs, so the calculated h value is determined from the number of positive signs. The calculated h value is 3, while the table h value with sample size of 12 is 2 (Panjaitan & Cantica, 2022), so h count > h table. These results indicate that the use of printed modules has no effect on students' cognitive learning outcomes.

The discussion regarding the research results that the use of modules does not affect students' cognitive learning outcomes can be started with the characteristics of the module. The module used in this

research is a printed module that contains colorful text and images. Material descriptions are prepared concisely but in accordance with learning outcomes and sourced from relevant and up-to-date scientific references. This module also contains practical instructions which are packaged in a video link in the form of a QR code, so that it is easier for students to design practical activities. At the end of each learning activity there are also practice questions to test students' understanding of the material they have studied. The size of the printed module also meets UNESCO standards with a total of 90 pages. Use of modules in learning in higher education aims to make students can learn independently without or with minimal from the lecturer (Srimulat, 2019). We assess that the module used meets its suitability as teaching material for students.

The weakness of this research is that it did not collect student responses to the printed modules used, so students' perceptions of the modules are unknown. Meaningful learning correlates positive with student perceptions of the educational environment, this will have an impact on student learning experiences and outcomes (Pratiwi et al., 2022). If a student's perception of learning media, for example printed modules, is included in the good category, it can be assumed that their learning experience and learning achievement will also be good. Previous research revealed that students who responded positively to the module felt that learning used the module more effective, easier to understand and can improve motivation to learn so that learning outcomes are maximized (Safitri & Adinugraha, 2022).

The research results show that the printed module has no effect on students' cognitive learning outcomes, however if we look at the difference between scores X and Y it reveals an increase in scores. Based on known signs, the number of students who experienced a decline in grades was 3 people or 25% of all students. This can be an assumption that there is an effect of the use of printed modules on student cognitive learning outcomes. Because student exam scores increase at the end of the semester when lecturers provide intensive supervision of students' use of the module. This assumption is relevant to previous research which revealed that the use of modules can improve student learning outcomes (Faridah & Afridiani, 2021). However, this assumption needs to be tested further to find out its truth.

CONCLUSIONS

Printed modules are teaching materials that are still relevant to be used as learning media, including for college students. Using printed modules as a learning resource is quite easy to do because it doesn't require other devices which could be a hassle for the user. The research has examined the effect of using printed modules on students' cognitive learning outcomes in plant physiology courses. The research results show that there is no effect of using printed modules on student cognitive learning outcomes. However, the use of printed modules can still be applied in learning because it provides a means for students to develop their literacy.

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