

# The Influence of E-Book Based on Local Wisdom on the Cognitive Learning Outcomes of Science Junior High School Students Through Outing Class Method

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**Abstract:** This study measures the learning outcomes of the cognitive domain to obtain accurate information about aspects of student domain ability. Cognitive learning outcomes were researched to implement science learning through outing classes using e-books based on local wisdom. This study aims to determine the effect of e-books based on local wisdom on the cognitive learning outcomes of Junior High School students. This study is a quasi-experiment in two groups, namely experimental class (E) and control Class (K), using a direct learning model with a sample of students in class 7K of 33 students and class 7I of 35 students. Data collection techniques using Pretest-Posttest Control Group Design. The study was conducted by inviting students to do outing class learning using e-books, and tests were conducted using pretest and post-test sheets. The research Instrument used consisted of cognitive questions totaling 20 multiple choice questions with data analysis using inferential statistics with a T-test (independent samples t-test) on SPSS version 26. Results research shows no significant effect on the use of e-books based on local wisdom on the classification of living things, where the learning outcomes of experimental classes with e-book treatment are higher than the control class without e-book treatment. Thus, using e-books based on local wisdom is quite influential in improving cognitive understanding and student learning outcomes.

**Keywords:** Classification; E-Book; Local Wisdom; Outing Class.

## Introduction

Natural Sciences (IPA) is a science that studies a series of scientific processes that provide learning outcomes in the form of conceptual and theoretical knowledge [1]. Conceptual understanding is the level of student mastery achieved in the learning process following the designed objectives. Understanding concepts is important in the teaching and learning process and is the basis for achieving learning outcomes [2]. These learning outcomes will be achieved if students emphasize independent learning activities as knowledge of cognitive learning outcomes [3]. Cognitive learning outcomes are the value of the student's ability to face the subjects they are studying in the form of knowledge through learning outcomes tests [4]. Bloom and Purwanto separate levels of cognitive learning outcomes, including the ability to remember (C1), understand (C2), apply (C3), analyze (C4), conclude (C5), and create (C6) [5]. Conceptually, the cognitive domain prioritizes relevant knowledge as a learning outcome [6]. In line with Sudijono, the cognitive domain includes mental activities of the brain, which are related to the mental process of how the senses record and store in the brain [7].

Cognitive domain learning outcomes are measured to obtain accurate information regarding aspects of cognitive domain abilities, including knowledge, understanding, and thinking skills. The importance of measuring learning outcomes is based on Nurbudiyani's research as a means of improving the quality or achievement of student learning [8]. Learning strategies are

student behavior in influencing what is learned, including memory and metacognitive (abstract). Cognitive learning strategies involve the transformation and manipulation of learned material to help retain information in memory [9]. Complex learning allows students' cognitive abilities to become the foundation for the emergence of students' skills in making decisions based on students' understanding [10].

The learning process will run according to the learning objectives if it has previously been designed in a structured manner. If it is observed that the reality of the students in the class is that not all of them have good academic abilities, more attention needs to be paid so that learning can facilitate the learning needs of all students. There are still various problems that have an impact on students' low cognitive learning outcomes, which are very worrying [11]. Wisudawati and Sulistyowati's research results stated that the science cognitive learning outcomes achieved by students in Indonesia were relatively low due to many factors, including student characteristics and the environment, learning motivation, interest and self-concept, and learning strategies. The absorption of science subject matter in the National Examination at SMPN 14 Banda Aceh in recent years has been in the low category, below the average for junior high schools in Banda Aceh [12]. In 2017 at SMPN 2 Kopang, Central Lombok, daily test scores for the material "Classification of Living Creatures" in class VII showed an average of 55.2, with ten students (43%) completing and 13 students (57%) not completing, which means that students' cognitive learning outcomes are still low [13]. It was also found that the cognitive science

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learning results of students at SMPN 1 Juwangi, Central Java, in 2022 were still relatively low; namely, only 7 out of 32 students (21.88%) achieved the Minimum Completeness Criteria (KKM) with a test average of 43.71 which was classified as very poor [14].

Based on the results of observations through interviews with class VII science teachers at SMP Negeri 2 Pandaan, the achievement of students' cognitive learning outcomes is also not following the targeted achievements, which can be proven by the students' daily assignment scores, where only 20% of the 394 students scored above the KKM. Namely 75. This value is the cause of students' lack of understanding in domains C1-C5 and is the reason that measuring cognitive learning outcomes is only carried out in domains C1-C5 because, in C6, high skills are needed to create [15]. Students understand the material better when actively involved in learning in a practical context that influences their cognitive understanding. However, these activities tend to create classroom conditions that are not conducive and lack direction. According to Henningsten and Stein, to develop students' knowledge abilities, learning can be an environment for students to be actively involved in many useful exploration activities. Students must be more active in learning and not just copy or imitate examples without understanding their meaning [16]. Students also get bored and sleepy easily because teachers apply lecture methods based on textbooks or PowerPoint in delivering material, causing students to only listen, not pay attention, and not respond. The teaching media used does not guide students' independent learning. On the part of teachers and schools, there is a lack of student learning activities outside the classroom (outing classes) and a lack of opportunities for students to interact with the environment.

Scientists agree that high levels of science-cognitive learning outcomes have been achieved and that learning should be integrated with learning experiences involving the five human senses [17]. Puspitorini stated there is the idea that science is a difficult and complex subject that is very boring without using creative learning methods, resulting in students being lazy about studying, which affects their cognitive learning outcomes [18]. When studying, it is often found that students are more interested in looking at pictures than reading explanations of texts that are difficult to understand, especially junior high school students [19]. The textbooks received make it difficult for students because the explanations are too long and are not specific to one field of science [20]. Iswatun also stated that the cause of the low science learning outcomes was a lack of understanding by teachers in developing the role of teaching materials that lead to understanding concepts [21]. There needs to be ongoing updates along with the development of science. Achievement of student knowledge in learning can be realized through high learning outcomes [22].

Based on the problems found, the researcher believes that the problem of using teaching materials centered on textbooks can be overcome by integrating technology into learning media such as e-books [23]. E-books are flipbook-based, supported by background design, navigation menus, and hyperlinks, facilitating students to read a physical book because it has an animation effect when opening each page. Flipbook services can change the

appearance of a PDF to make it more attractive, like a digital book, which makes it easier for students [24]. Of the many advantages and positive values of e-books, there is a need for renewal and innovation in teaching materials to support learning, one of which is e-books based on local wisdom. The weakness of material in teaching materials that are separate from local wisdom is that educators need time to introduce local wisdom. A book must contain elements of local wisdom to clarify the material to improve students' thinking abilities [25]. Digital books or e-books are generally electronic digital versions of printed books, so in terms of content, they are not much different from textbooks [26]. The opportunity for e-books to support learning has now been recognized. However, the problem of the availability of e-books that meet the demands of an independent curriculum that must integrate material into project practice is still limited [27]. This happens because there is a lack of readiness on the part of teachers or schools to implement the independent curriculum in teaching and learning activities. Knowledge of local wisdom is a prerequisite for teachers. According to Tilaar, the meaning of local wisdom in education is still very lacking [28]. This problem is interesting to apply concretely. Learning that raises the value of local wisdom can stimulate students' ability to increase knowledge of local wisdom to build a relationship between education and the introduction of local wisdom [29].

Media innovation in the form of e-books based on local wisdom used to realize the implementation of the independent curriculum in science learning based on local wisdom is very important to be implemented to increase knowledge and understanding of the cognitive domain contextually in science learning [30]. E-book media based on local wisdom further stimulates students' understanding because it utilizes the potential of the natural environment as a source of student learning. According to Dewi and Primayanti, integrating local wisdom into learning materials Science is able to increase students' cognitive understanding of the local wisdom of an area so that students' cognitive learning outcomes can develop well [31]. Lina's research argues that education based on local wisdom is believed to create and provide meaning to the educational process in the living environment [32].

The potential of local wisdom in Coban Binangun's natural environment is utilized and presented in an interesting and explorable manner, which is the positive value of this e-book material, training students to recognize the diversity of living things around them. Coban Binangun has the potential for educational tourism development that has not yet been explored of its natural beauty with environmental characteristics highlighted as something interesting from the rest [33]. One of the unique characteristics of Coban Binangun is that it has a large diversity of plants that grow abundantly and is supported by its location in a mountainous area with little pollution, which is a unique distinction [34]. The form of a digital e-book that attracts creative and imaginative ideas, complete with animations and real images of the diversity of plants in the Coban Binangun environment, encourages students to understand the material more easily. Contains complete material on the Classification of Living Creatures specifically about meeting students' learning needs. Supported by Daryanto, teaching media that is completely

and systematically arranged contains a set of planned and structured learning experiences to help students master learning objectives. In line with Suarsana, an e-book that presents images, photos, animations, and interactive quizzes creates active learning [35]. E-Books based on interactive local wisdom in the form of a flipbook tIt has been proven to have a positive impact on achieving better student cognitive learning outcomes. Precise and practical because its use does not require additional tools, so it effectively supports independent learning activities [36]. Overall, students' needs are met in this local wisdom-based e-book. Compared to e-books in general, which only present material without images or images that are not sourced from real reality, it does not stimulate students' cognitive understanding.

Science learning using e-books based on local wisdom can be implemented through outing classes as the implementation of P5 or the Project for Strengthening the Pancasila Student Profile from the independent curriculum is a guide to the learning activity system. The focus of this independent curriculum is freedom, and in the future, students will be able to study outside the classroom throughout classes [37]. According to Nugroho and Nur's theory, students are more active when learning directly involves nature as a learning resource to make learning more meaningful [38]. Classification of Living Creatures material studies grouping, classification processes, taxonomy, and the key to a determination that is difficult to understand [39]. Kakouris and Georgiadis' research supports that learning through experience is important in environmental simulations that help students understand real natural situations. This research uses an e-book based on local wisdom, which is implemented through outing classes by utilizing the local wisdom of Coban Binangun, where students will experience the real state of science by enabling students to understand the science of living things [40] fully. Opportunities for science learning through outing classes are experiencing rapid development and are increasingly recognized as an integral part of science education. The main aim is to open up students' experiences as proof that outing class opportunities positively impacts cognitive improvement [41].

Based on this background, research on cognitive learning outcomes was conducted to implement science learning through outing classes using e-books based on local wisdom. The research was carried out by inviting students to an outing class in Coban Binangun using e-books based on local wisdom by including real objects of local wisdom potential to create meaningful learning between science and local wisdom. So, research was conducted to determine the effect of e-books based on local wisdom on cognitive science learning outcomes in junior high schools as a solution to the problems found.

### Research Methods

This study aims to determine the effect of e-books based on local wisdom on the cognitive learning outcomes of Junior High School students. This study uses the type of quantitative research with a quasi-experimental method (quasi experiment) conducted in two classes, namely experimental class (E) and control Class (K). This study uses Pretest-Posttest Control Group Design, according to

Sugiyono. The research was carried out in Grade 7 of SMP Negeri 2 Pandaan in the odd semester of the 2023/2024 academic year. The study population of all students in Grade 7 SMP Negeri 2 Pandaan amounted to 394 students, with a sample of 68 students. Data collection techniques using written tests in the form of pretest and post-test in the form of cognitive questions totaling 20 multiple-choice questions adapted to Bloom's theory with indicators C1-C5 on the test sheet that have been tested for validity and reliability. Instrument validity tests conducted by experts obtained an average value of 4 with valid categories. According to Ghozali, the reliability test in research, where a variable is said to be reliable if it gives a Cronbach alpha value > 0.6, a value of 0.705 > 0.6 is obtained, then it is declared very reliable [42].

Data analysis techniques using inferential statistics with N-Gain Test and T-test. The N-Gain test calculates the increase in the learning outcome score between the pretest and post-test. T-test (Independent Samples t-Test) in SPSS version 26 to determine whether there is a difference in the value of cognitive learning outcomes in both classes, which means that if there is an increase between before and after treatment means the treatment of the use of e-books with outing class method declared effective effect on cognitive learning outcomes of students [43]. T-test (Independent Samples t-Test) is carried out with the prerequisite that the data must meet the normality and homogeneity tests.

### Results and Discussion

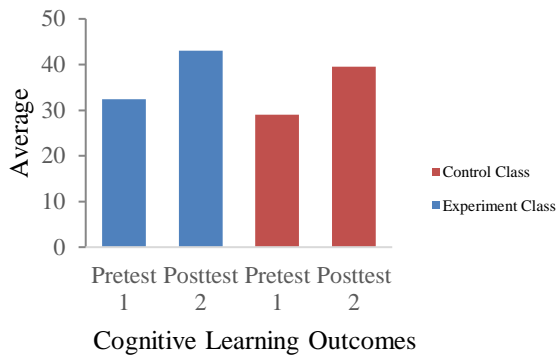
The research was conducted to analyze the level of influence of local wisdom-based e-books on students' cognitive learning outcomes. It is expected to facilitate student learning resources through e-books that integrate science material with local wisdom supported by the outing class method. Based on the validity score above, it is stated that the instrument's feasibility is at a good stage and can be used for research. Data processing and analysis were carried out from the pretest and post-test results to see the effect of local wisdom-based e-books on students' cognitive learning outcomes. The average pretest and post-test scores in the experimental and control classes can be seen in Table 1.

**Table 1.** Class Average Score Category

Class	Value		Average Score	Category
	Pretest	Post-test		
Experiment Class	32.42	43.03	0.4	Medium
Control Class	29.00	39.57	0.4	Medium
Average	31.21	41.30	0.4	Medium

Table 1 shows that both classes' pretest and post-test scores have increased. In the pretest score, the experimental class average was 32.42, and the control class was 29.00. When the pretest, students were not given any treatment, so the score obtained was relatively low. In the post-test score, the experimental class average was 43.03, and the control class was 39.57. This value increased significantly and was classified as a moderate category. This can occur because there is treatment in the form of using learning media in the form of local wisdom-based e-books with outing class

methods in experimental classes. This good increase can be seen in the graph in Figure 1 of the average score of cognitive learning outcomes.



**Figure 1.** Class Average Score Category

Based on Figure 1, the average pretest and post-test scores have increased significantly. Where the experimental class score from 32.42 rose to 43.03. While the control class score from 29.00 rose to 39.57. The difference that occurred between the experimental class and the control class was not much different because when the research took place, there were several obstacles, one of which was the condition of students in the experimental class tended to pay less attention during learning. In contrast, the condition of the control class paid attention to the learning process.

Reinforced by prerequisite tests, namely normality and homogeneity. The normality test is used to test whether the data obtained is normally distributed. Based on the results of the normality test calculation assisted by spss version 26, the significance value in the experimental class was  $0.200 > 0.05$ , and in the control class was  $0.161 > 0.05$ . It was concluded that the data was normally distributed. Then the homogeneity test is carried out to test whether the variance of the two data groups is the same or not. Based on the homogeneity test results obtained  $0.751 > 0.05$ , it is concluded that the two groups come from homogeneous or equal populations. The data above is reinforced by the SPSS-assisted Independent Samples t-test results in Table 2 below.

**Table 2.** Independent Samples Test

Result	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.
Pretest	4.33	.041	1.519	66	.134	3.42424	2.25413
Posttest	0.03	.859	1.773	66	.081	3.45887	1.95065

The most important thing in the paired sample T-test is to determine the increase in the influence of local wisdom-based e-books with outing class methods on cognitive learning outcomes, where the results show whether the data has a significant difference in the signed score. 2-tailed  $< 0.05$  or does not experience a significant difference if the sign score. 2-tailed  $> 0.05$ . From the sign value data. (2-tailed) the score is known to be 0.134 on the pretest and 0.081 on the post-test  $> 0.05$ , so it can be concluded that the difference in the value of cognitive learning outcomes of the experimental class and control

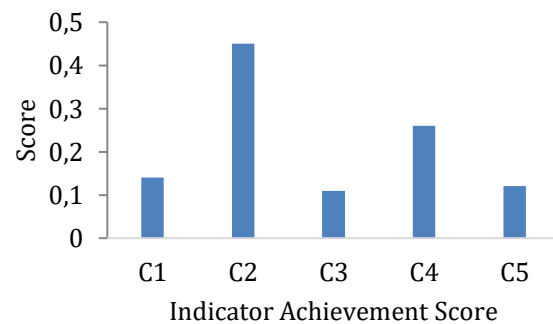
class is not much different, and there is no significant effect in the difference in treatment.

The analysis that has been explained shows that the cognitive learning outcomes of the experimental class are higher than the control class. The increase in cognitive learning outcomes of the experimental class was influenced by local wisdom-based e-books with outing class methods and was not influenced by other factors. The above improvement is strengthened by analyzing the achievement of learning outcomes indicators in Table 3.

**Table 3.** Achievement of Cognitive Domain Learning Outcome Indicators

Cognitive Aspect	Achievement Score	Category
C1	0.14	Low
C2	0.45	Medium
C3	0.11	Low
C4	0.26	Low
C5	0.12	Low

Based on Table 3, the achievement of indicators of cognitive learning outcomes can be summarized in the following bar chart.



**Figure 2.** Achievement of Cognitive Learning Outcome Indicators

Figure 2 above shows the achievement of cognitive learning outcomes of students classified as low category, and increased C2 indicators indicate a medium category. Thus, providing treatment in the form of e-books based on local wisdom with outing class methods affects the cognitive learning outcomes of junior high school students. In line with Ardianti's research, teaching media can guide students to learn independently because teaching media facilitates systematic explanations of learning materials. This is one of the efforts to overcome the weaknesses of print teaching media, where the material presented is abstract [44]. The presentation of the material in the smartphone-based e-book is expected to increase the interest and desire of students to learn on the material presented in the form of text and image media and, of course, have an impact on the achievement of student learning [45].

The indicators of learning outcomes in all cognitive domains, namely C1-C5, increased from measurements on the pretest. Cognitive learning outcomes indicator C1 (remember) obtained a value of 0.14 and is classified as a low category, which means that students in the experimental class are less able to remember the material presented in the e-book based on local wisdom. This

happens because of the constraints experienced when outing classes in Coban Binangun take place, and students tend to be engrossed in their activities, less conditioned, and often crowded alone. The factors that cause this are also because students are still in the transitional stage from elementary school (SD) to junior high school (SMP). Ahmadi said that students have learning difficulties due to the learning activities of each individual who does not run normally [46]. Abnormalities occur due to difficulties in conditioning students when learning and learning time management cause the target learning goals not to be achieved optimally, especially in the cognitive assessment of students [47].

Cognitive learning outcomes indicator C2 (understand) obtained a value of 0.45, classified as a medium category among other indicators. This means that students in the experimental class can understand the material presented in the e-book based on local wisdom. This can happen because when the material is delivered, students can follow and understand the meaning of learning with them understanding the content of the material on each page of the e-book and respond to questions given, supported by the interaction of students with nature through outing classes in Coban Binangun causing higher C2 among other indicators [48]. The stage of delivering learning materials is the main factor in learning activities that determine the achievement of student cognitive learning outcomes. When the learning process runs smoothly, it may provide good cognitive learning outcomes [49].

Cognitive learning outcomes indicator C3 (apply) obtained a value of 0.11, classified as a low category. This means that students in the experimental class are less able to apply the concept to the material delivered in the e-book based on local wisdom. This can happen because, in the e-book, there is a practical task of observing plants in the Coban Binangun environment according to the classification of living things. However, the obstacles experienced when the outing class in Coban Binangun took place were that the e-book link was not conveyed to students, so students did not study the contents of the e-book in advance, and the difficulty in applying the concept according to the observations made. Behavior such as actively learning or simply not paying attention to the students shown during learning is very influential on the achievement of student education in school [50].

Cognitive learning outcomes indicator C4 (analyze) obtained a value of 0.26, classified as a low category. This means that students in the experimental class can analyze the material that has been delivered in e-books based on local wisdom. In the e-book based on local wisdom, there are examples of plant classification and real images of plants according to those in Coban Binangun. In the LKPD in the e-book, students are asked to observe the characteristics of plants and then classify them according to the principle of classification of living things. Students can recognize the types of plants based on the characteristics observed by being invited directly to the nature of Coban Binangun through outing classes. However, they can quite classify plants based on their characteristics [51].

Cognitive learning outcomes indicator C5 (conclude) obtained a value of 0.12 is classified as a low category, meaning that students in the experimental class

are less able to conclude the material presented. The e-book based on local wisdom contains complete material about living things, classification, and phenomena in the form of plant images that have been grouped according to the classification principle requires students to connect the phenomenon with the concept of classification of living things. Constraints experienced when outing class took place students so enjoy the atmosphere of learning in nature that they did not realize from the activities carried out that they have studied and know the diversity of plants. According to Oka, psychological factors such as interest, learning motivation, and interest in a person affect learning outcomes [52].

The results of the study of cognitive learning outcomes get low category on C1, C3, C4, and C5 and medium category on C2 due to the constraints that have been described experienced by researchers during the research process led to changes in cognitive learning outcomes of students are not so visible. The obstacles experienced during the research process include school facilities not providing LCD projectors in each class so that researchers can not display e-books on a large screen when explaining. The experimental class has not received a printed science package book, while the control class has, experimental class conditions that tend to be difficult to condition and lack of attention cause students to not fully understand the material. The form of the pretest-posttest question is too long to confuse students, and miscommunication occurs during class outings where the e-book link has not been delivered, and students cannot learn the material first. Problems will arise when individuals do not have good study habits and self-confidence which often occurs when students are always dependent on others [53]. Outing class Activities in Coban Binangun limited time so that students do not fully understand the material presented. Implementing outing class learning requires thorough preparation and takes quite a long time. However, the classroom condition is a challenge where teachers must be able to overcome the problem of limited duration of time in the implementation of learning [54]. Even so, outing class is one of the recommended learning methods. When it can be done well, it impacts student cognitive improvement, especially in science learning related to local wisdom [55].

The use of e-books based on local wisdom can overcome existing problems. E-books based on local wisdom are mostly rarely used, the use of e-books based on local wisdom is urgently needed as an electronic learning medium that facilitates student learning needs [56]. Through self-study, using e-books trains students to follow the flow of the material presented so that students are more focused. Based on researchers' observations during the study, learning with e-books motivates students to learn with the outing class method actively. While learning to use e-books through outing classes in Coban Binangun, students' responses showed that they were very interested and enthusiastic about following the learning process, and learning was not boring because images and animations supported the material presented. Science teachers also responded positively to using e-books based on local wisdom, stating that they agree and support using e-books in continuous learning.

According to Moody's research opinion, e-books are useful in improving students' cognitive understanding [57].

In line with Hartini and Saputra's research, using local wisdom-based modules can improve student learning outcomes. Heights et al. stated that learning based on local wisdom makes students use their science skills to learn about the environment. Supported by research by Iwakuni and Yulina, the use of Learning media has an appropriate effect on student learning outcomes. Saputra and Wahyuni stated that the learning process based on local wisdom can develop students' abilities in researching and scientifically analyzing the surrounding nature [58].

## Conclusion

Based on the results of research and analysis of test data that has been done, it can be concluded that e-Book media based on local wisdom in the form of flipbooks can improve cognitive understanding and student learning outcomes. Learning is activated by inviting students to take a class outing in the Coban Binangun environment on science material classification of Living Things declared effective and appropriate to use. There are differences between the experimental and control classes before and after treatment are given in the form of e-books based on local wisdom. Where cognitive learning outcomes pretest and post-test experimental classes are higher than in the control class. Thus, it can be stated that the use of e-Book media based on local wisdom with the outing class method affects the learning process of students' cognitive learning outcomes.

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