



THE EFFECTIVENESS OF ATOMIC STRUCTURE AND CHEMICAL ELEMENT (ISLAMIC PERSPECTIVE) BOOK

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Abstract

A book based on the integration of science and Islam can make it easier for students to understand the material and improve learning outcomes. The aim of this study is to determine the effectiveness of the book : Atomic Structure and Chemical Element (Islamic Perspective). The type of the research is field research with the design: pretest - posttest control group design. The sample is 10 Tadris Chemistry Students for the Atomic Structure and Chemical Element Class, Odd Semester 2022/2023 selected to ensure a representative group. Data collection techniques are interview, documentation, and test question. The data are analyzed by using the N-Gain test. The average N-Gain score of students is 0.6 in the moderate category. The results of the N-Gain of students show that the book developed can improve students' knowledge and understanding. This explains that the learning outcomes of the cognitive aspect have increased. The results of the study on a small scale prove that the book developed is suitable in chemistry learning on the material Atomic Structure and Chemical Element and can be effective in improving student understanding.

Keywords: Atomic Structure, Islamic Perspective, effectiveness

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INTRODUCTION

Understanding chemical concept is important in learning chemistry. (Marzuki & Astuti 2017). One of the chemical materials is Atomic Structure and Chemical Element which is closely applied in everyday life. It requires high reasoning and creative idea from students. (Annisa et al., 2018; Marfu'ah & Meristin, 2022).

Atomic Structure and Chemical Element is a compulsory subject taught at the Chemistry Education Department, UIN (State Islamic University) Antasari . After interviewing the students of the department, the authors found that students considered this material quite difficult because it was abstract and they were less motivated in learning. In addition, the chemistry books that they often encounters, either purchased or available in the library, rarely connect them with aspects of Islam (Qur'an). Most books only discuss the science of chemistry without any wisdom and knowledge values as if chemistry has nothing to do with religion.

The achievement of chemistry learning requires facilities and learning tools as well as aids that support the learning process, so that learning will run effectively and efficiently. Lecturers are highly required to have good references or teaching materials because they must be able to provide opportunities for students to think openly through a programmed learning process (Hidayah et al., 2020). Books can facilitate teaching and learning activities because effective interactions can be formed between students and teachers and can increase student activity in improving learning outcomes (Miranda, 2018).

Learning outcomes are the result of an integration of learning and teaching activities. This is useful for measuring the success of the learning process. Hamdan and Khader (2018) say that learning outcomes are the basis for measuring and reporting student academic achievement and as a key in developing learning designs. There are several indicators in measuring student learning outcomes. The most famous opinion is Bloom's opinion which divides the classification of learning outcomes into 3 domains, namely cognitive, affective and psychomotor. (Bryram and Hu, 2018). According to Moore (2016), the three domains of learning outcomes are described as follows: Cognitive domain, namely knowledge, understanding, application, analysis, creation, and evaluation, Affective domain, namely acceptance, answering, assessment, organization, and determination of value characteristics, Psychomotor domain, namely fundamental movement, generic movement, ordinative movement, and creative movement.

The lack of understanding of the context of the sentence is the play problem encountered in understanding books (Aisyah, 2016). Therefore, educators are supposed to create attractive learning both in teaching methods or developing communicative and applicable teaching materials that are close to everyday life. UIN Antasari is an Islamic university that teaches religion and general knowledge (science). This university also functions to instill noble values for students.

Comprehensive learning in the context of general science learning in schools should always be complemented by learning the principles of faith and good behavior. In today's era, Islamic educational institutions have a very important strategic role in answering various problems faced by Muslim communities (Savitri et al., 2022). Integrative learning by integrating Islamic values into all lessons both in and outside the classroom, supported by professional buildings, laboratories, computers, libraries, employees and teachers is considered effective and capable of supporting student learning success (Faruk, 2016). Thus, the integration of education and Islamic values in the teaching and learning process must be carried out without dichotomizing science (Ikhwan, 2014) because basically every general subject matter can be integrated into religious lessons (Ramli, 2014).

RESEARCH METHODS

The type of research used is field research with the pretest - posttest control group design. The sample is 10 Tadris Chemistry Students for the Atomic Structure and Chemical Element Class, Odd Semester 2022/2023 selected to ensure a representative group.

Data collection techniques include interviews, documentations, and test questions, then the data are analyzed by using the N-Gain test.

The data analysis of this study is a test of the effectiveness of the book . The results of the pre-test and post-test scores are calculated on average to determine the comparative results before and after applying the developed book in small group learning activities. Then the results are calculated by using N-Gain Heke's formula in Meltzer:

$$N\text{-Gain} = \frac{S_{\text{post}} - S_{\text{pre}}}{S_{\text{max}} - S_{\text{pre}}}$$

Information:

S_{post} : Post-test Score

S_{pre} : Pre-test Score

S_{max} : Maximum of ideal score

N-Gain score can be seen in table 1 below:

Table 1. N-Gain Categories

| Score | Classification |
|--------------------|----------------|
| $G > 0.7$ | High |
| $0.3 < G \leq 0.7$ | Moderate |
| $G \leq 0.3$ | Low |

RESULT AND DISCUSSION

Before learning using book based on the integration of islam and science on the material of atomic structure and chemical element, students first work on pre-test questions . During the process of working, students look confused because they do not understand the material. After finishing the work/test, the researcher divides the students into several groups. The group division runs well, students sit based on their groups. After that, the researcher gives directions regarding the learning process.

The use of books is expected to help students in learning to more easily understand learning materials. As explained by Rachmawati et al., 2023 : the use of learning media in

the learning process can increase the effectiveness and quality of learning which can ultimately improve the quality of student learning outcomes. Furthermore, the use of learning media can also arouse new desires and interests, increase motivation and stimulation of learning activities, and provide psychological influences on students.

Learning activities using this book make students not only understand the sub-material but also foster a high sense of curiosity to discover their own concepts.

In line with Abdullah, 2017, he says that learning that involves physical and mental activities will create optimal learning activities. Students have found the concept of the material being studied by themselves.

The learning outcomes of students in this study are measured from the evaluation results based on pre-test and post-test . The results of the pre-test and post-test using the *N-Gain* score can be seen in the table 2 below.

Table 2. Student Score Results

| Number | Pre-test | Post-test | N-Gain | Category |
|--------|----------|-----------|--------|----------|
| 1 | 60 | 95 | 0.9 | High |
| 2 | 60 | 95 | 0.9 | High |
| 3 | 70 | 95 | 0.8 | High |
| 4 | 70 | 80 | 0.3 | Low |
| 5 | 70 | 95 | 0.8 | High |
| 6 | 80 | 90 | 0.5 | Moderate |
| 7 | 70 | 75 | 0.2 | Low |
| 8 | 70 | 75 | 0.2 | Low |
| 9 | 60 | 90 | 0.8 | High |
| 10 | 60 | 90 | 0.8 | High |

Based on table 2, data analysis is carried out. it is found that the average score of the test work before using the teaching material is 67 with a maximum score of 80 and a minimum score of 60, while after using the teaching material the average score of the post-test work is 88 with a maximum score of 95 and a minimum score of 75. The pre-test and post-test score data are then calculated as an average value to determine the comparison before and after using the book. The results of the pre-test and post-test scores are calculated using N-Gain. The average N-Gain score obtained by students is 0.6

in the moderate category. The results of the N-Gain students can conclude that the book developed can improve students' knowledge and understanding. The results show that the learning outcomes of the cognitive aspect have increased. This is in line with research conducted by Nasution (2024) that the use of modules that integrate Islam and science can improve student learning outcomes. Febrinita (2022) also explains that the use of modules in learning is effective in improving learning outcomes in the moderate category.

CLOSURE

The pre-test and post-test score data are calculated as an average value to determine the comparison before and after using the book. The pre-test and post-test score results are calculated using N-Gain. The average N-Gain score for students is 0.6 in the moderate category. The results of the N-Gain students can be concluded that the book developed can improve students' knowledge and understanding. These results indicate that the learning outcomes of the cognitive aspect have increased. The book based on the integration of Islam and science on the material of atomic structure and chemical element by testing on small groups produces positive values and responses, so it is hoped that further research will be needed to be re-tested on a large scale and the book can be disseminated.

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