

## **ANALYSIS OF CHEMISTRY LEARNING ISLAMIC INTEGRATED CHEMISTRY LEARNING IN SENIOR HIGH SCHOOL**

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### **Abstract**

The purpose of this study is to analyse research trends regarding the effectiveness of Islamic values-integrated chemistry learning in achieving learning outcomes as well as students' attitude development in senior high schools (SMA). This literature study will adopt a Systematic Literature Review approach based on the PRISMA model. The researcher has analysed articles that discuss the effectiveness of chemistry learning media integrated with Islamic values in the high school environment that have been published within the last five years, namely 2018 to 2023. The article search will focus on Google Scholar and ResearchGate databases. Researchers will use keywords related to learning outcomes and student attitudes in the context of chemistry learning. Furthermore, the author will collect journals that have received accreditation from Sinta and review journals to conduct in-depth analysis in the hope of producing meaningful findings. The results of the journal review on analysing Islamic integrated chemistry learning are: 1) Knowing the types of materials that have been used such as chemical bonding materials, thermochemistry, reaction rates, salt hydrolysis, atomic structures, molecular shapes, and buffer solutions. 2) Knowing the learning outcomes and attitude outcomes of the Islamic integrated learning analysis through positive responses. However, this research also shows that the effectiveness of the material from Islamic integrated chemistry teaching that occurs in high school is quite effective in its application in the field.

Keywords: Chemistry, effectiveness, integration, material, PRISMA

## **1 INTRODUCTION**

The objectives of a country's national education generally cover several important aspects that contribute to character building, the improvement of people's quality of life, and the overall development of the country [1], [2] and to develop attitudes, acquire skills and learning experiences in order to be able to think logically, critically and creatively so that they can be applied to everyday life [3].

This goal can be achieved if through a process where there is interaction between educators and students [4]. In addition, the National Education System Law (Sisdiknas) No. 20 of 2003 states that education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character and skills needed by themselves, society, nation and state [5].

To realise a good interaction process between educators and students and to develop their potential, character education is needed in the process of achieving these goals.

Furthermore, character education has conceptually and practically been included in the content of the national curriculum [6]. In line with that, the Islamic education system also integrates and harmonises the interests of the world and the hereafter in achieving the principle of educational goals listed in the Qur'an in Surah Al-Qashash verse 77.

وَابْتَغِ فِيمَا آتَاكَ اللَّهُ الدَّارَ الْآخِرَةَ وَلَا تَنْسَ نَصِيبَكَ مِنَ الدُّنْيَا وَأَحْسِنْ كَمَا أَحْسَنَ اللَّهُ إِلَيْكَ وَلَا تَبْغِ الْفُسَادَ فِي الْأَرْضِ إِنَّ اللَّهَ لَا يُحِبُّ الْمُفْسِدِينَ

Meaning: And seek (the reward) of the Hereafter with what Allah has bestowed upon you, but do not forget your share in this world, and do unto others as Allah has done unto you, and do not cause corruption in the earth; indeed, Allah dislikes those who cause corruption [7].

The national curriculum includes character education. The theme of character education will be derived into studies. This study will be found in teaching materials. Teaching materials as one of these learning tools are presented by educators. The existence of teaching materials makes the implementation of learning activities innovative and varied, so that students can be interested and reduce boredom and curiosity will arise [8]. Furthermore, the use of learning media can make students' participation, motivation, thinking ability and learning outcomes increase [9]., [10].

In addition, there are also teaching materials that have the disadvantage of requiring costs to reproduce them. The more material, the thicker the module, making it difficult to carry around [11]. Furthermore, the teaching materials that have been published with various materials are difficult, boring and scary, so students lack mastery of the concepts. Finally, chemistry lessons are no longer interesting for students [12].

Teaching materials will be more meaningful if the learning process uses the environment as a learning resource so that there is continuity between the material and daily life activities [13]. The use of teaching materials owned by students is generally a printed textbook that is monotonous or already available and just needs to be used [14]. Interesting and fun teaching materials will be able to eliminate boredom in students when receiving the learning process [15].

Interesting teaching materials are needed in learning activities so that students do not feel bored with the material taught by the teacher [16]. In line with that, efforts that can be made to make learning effective are using interesting teaching materials [17]. The effectiveness of teaching materials can be seen from three aspects, namely student activeness during learning, student response, and student mastery of learning materials [18]. Furthermore, the teaching material that will be analysed is learning chemistry.

Chemistry as a science that deals with the nature, structure, changes in matter, laws, principles that describe matter and concepts and theories [19]., [20]. When associated with the values contained in Islam, chemical science materials contain many values of beauty and order. In the end, the values of beauty and order lead to the glorification of the creator [2].

Therefore, the teaching materials to be analysed are chemistry learning materials whose material can be integrated with Islamic values [21]. That is, students are directed into the scope of education based on God Almighty, moral and noble character and the integration

of science and Islam, because when there is a meeting point between the areas of science and Islamic [22]., [23].

Integrating Islamic values in the chemistry learning process can be done by linking religious and social attitudes, knowledge, and skills, as well as applying them in life at school and society with learning materials [24]. In learning chemistry, the integration between religion and science can be applied by connecting the verses of the Qur'an with the concepts that students are learning [25].

An evaluation of the extent of the analysis of chemistry teaching materials integrated with Islamic values revealed that the use of Learner Worksheets (LKPD), E-Modules, and animations proved to be a very effective approach in supporting learning [17]. Carefully designed LKPDs are able to connect chemistry concepts with Islamic moral principles, providing students with a deeper understanding of not only science but also ethical values [3].

Furthermore, in the e-module material, the use of animation in chemistry learning provides an interesting visual dimension and can stimulate students' thinking [11]. Animation is able to illustrate chemical concepts in a way that is easy to understand, increasing students' grasp of the subject matter [22]. Overall, the integration of LKPD, E-Module, and animation in chemistry teaching materials has proven to be a very effective approach to forming a comprehensive understanding as well as Islamic values can be digested well by students in the context of chemistry learning.

Based on the problems that have been described, the researchers are interested in wanting to go deeper in the form of an analysis of chemistry learning from teaching materials with Islamic values integrated.

## 2 METHODOLOGY

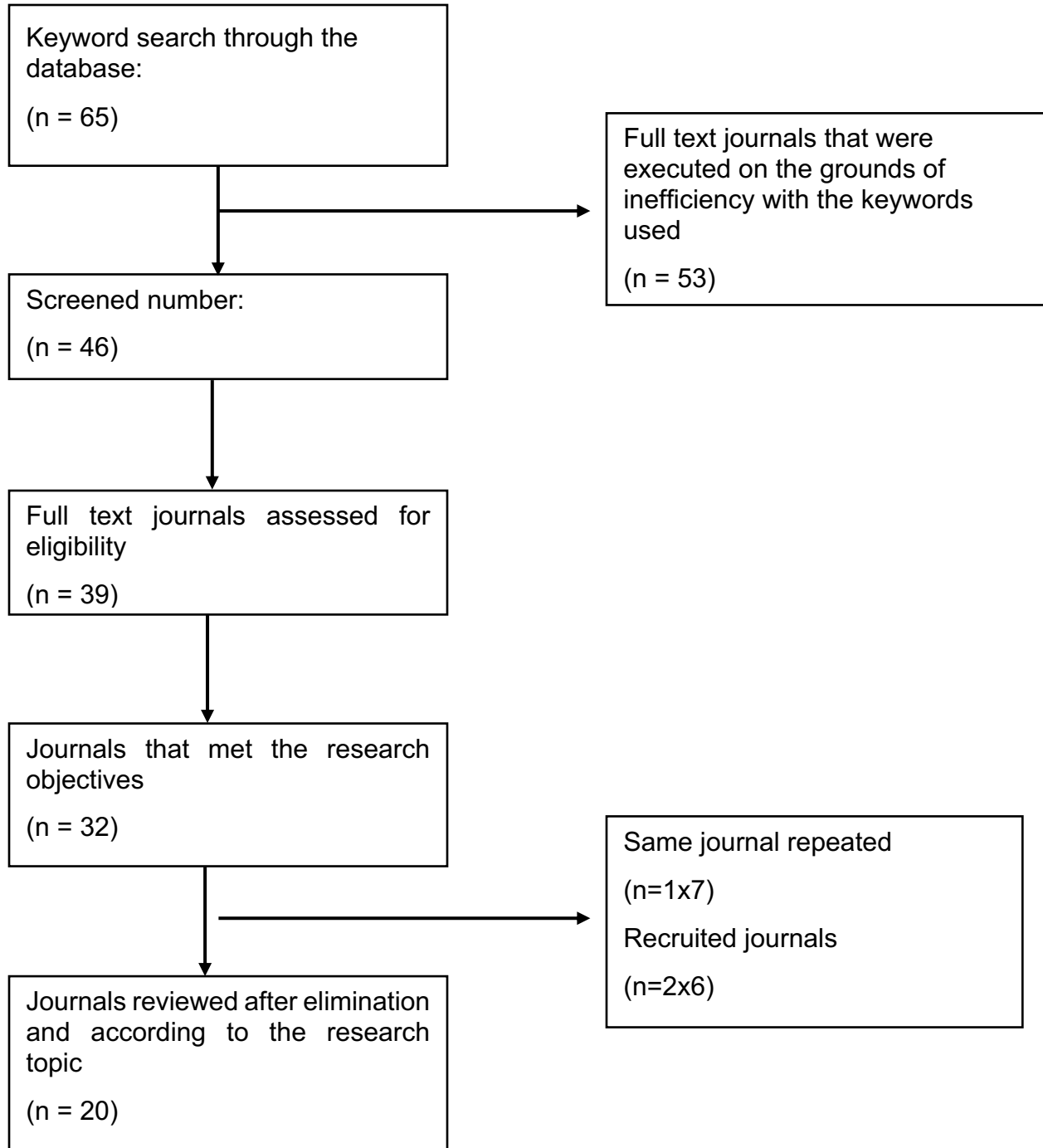
The literature that researchers discuss is about reviewing articles in journals about Islamic integrated chemistry learning in high school, by limiting the year of articles or journals in 2018-2023. For literature, researchers use accredited journal literature. Literature references are taken from literature search engines, namely Google Scholar and Research Gate. Researchers did not limit certain publishers [26]. Thus, researchers only use literature published from 2018 to the present to get the latest literature.

The reference of this research is a type of literature review from various research sources collected from review articles in journals from each chemistry learning that has been integrated into Islamic values applied in high school chemistry teaching materials [27]

The results of the review are summarised to facilitate the comparison process. The summary includes: 1) Knowing the type of material that has been used 2) Knowing the learning outcomes and attitudinal results of the analysis of Islamic integrated learning through positive responses. contains research results that are outlined in tabular form which will be a reference for comparison of the literature used so as to produce specific data from each literature on the efficiency of using the PRISMA method in Islamic values

integrated chemistry learning media in high school and can support students' learning interests and attitudes.

The PRISMA diagram on SRL research on the effectiveness of Islamic integrated chemistry learning is as follows:



**Figure 1.** Work flow diagram from the literature review study

The possibility of misinterpretation by researchers is due to the different use of datasets from each literature. Therefore, the key focus in this systematic review is the results obtained from Islamic integrated chemistry learning to support students' learning interest and attitude.

### 3 RESULTS

The discussion about Islamic integrated chemistry learning in Senior High School (SMA) opens new insights related to the material aspects of chemistry. In this curriculum, materials such as Chemical Bonding, Thermochemistry, Reaction Rate, Salt Hydrolysis, Atomic Structure, Molecular Shape, Buffer Solution, Elemental Chemistry, Electrolyte Solution, Petroleum, Equilibrium, Stoichiometry, and Acid-Base are associated with Islamic principles. The results of the discussion show that the integration of Islamic aspects in chemistry learning can provide a deeper and more contextualised understanding of these concepts.

In Chemical Bonding, for example, students not only understand molecular bonds chemically, but also reflect on how these bonds reflect harmony in Allah's creation. Thermochemistry and Reaction Rates are linked to the Islamic concepts of time and energy, while Salt Hydrolysis is narrowed down by detailing the environmental and human health impacts in accordance with Islamic values.

Atomic Structure and Molecular Form are not only studied from a scientific perspective, but also considered as manifestations of the complexity of God's creation. Buffer Solutions and Electrolyte Solutions are integrated with an understanding of diversity and virtues in Islam. Petroleum is studied as a gift from God that needs to be managed wisely for the welfare of mankind.

The importance of Equilibrium in chemistry is reflected in the principle of life balance in Islamic teachings. Stoichiometry is taught by emphasising human responsibility towards the management of natural resources. Acid-Base is not only understood as a chemical concept, but also linked to ethics and behaviour in accordance with Islamic teachings.

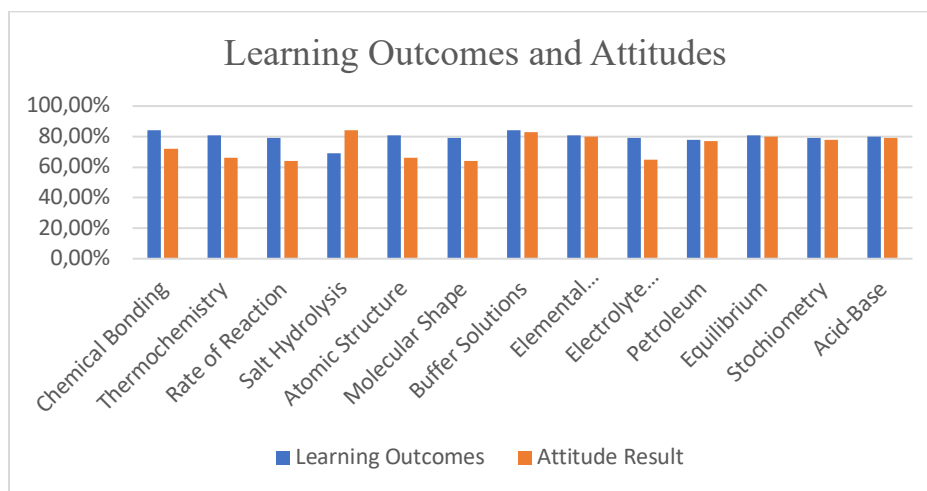
Thus, Islamic integrated chemistry learning in high school not only creates an academically solid understanding of concepts, but also instils Islamic values in every aspect of learning. This provides students with a strong foundation to apply chemistry in the context of everyday life in accordance with Islamic moral and ethical values.

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**Table 1.** *Islamic integrated chemistry learning materials*

Material	Total
Chemical Bonding	2
Thermochemistry	2
Rate of Reaction	1
Salt Hydrolysis	1
Atomic Structure	2
Molecular Shape	1
Buffer Solutions	1
Elemental Chemistry	2
Electrolyte Solution	2
Petroleum	1
Chemical Equilibrium	2
Stoichiometry	2
Acid-Base	1

The table above, shows that the journal describes the number of Islamic integrated chemistry materials that have links to learning outcomes and attitudes as follows:



**Figure 2.** *of Learning Outcomes and Attitude Outcomes*

Content learning outcomes relate to students' knowledge and understanding of course content, such as facts, concepts and cognitive skills. These are measured through tests and evaluations that aim to gauge students' academic understanding. Attitudinal learning outcomes, on the other hand, focus on changes in students' attitudes, values and behaviour as a result of learning. This involves the development of character, ethics,

moral values, and social skills, which are measured through behavioural observation and assessment of students' grades.

So, the fundamental difference between the two is that the material aspect deals with academic knowledge, while the attitudinal aspect focuses more on the development of students' values and behaviour. We can explain these two points as follows:

1. Material Aspect Learning Outcomes:
  - a. Relates to students' knowledge and understanding of the subject content or material being taught, such as facts, concepts, theories, and cognitive skills.
  - b. Usually measured through tests, exams, assignments, or projects that assess students' understanding of the subject matter.
  - c. The main objective is to measure the extent to which students understand, recall and can apply the knowledge and skills taught in an academic context.
2. Attitude Learning Outcomes:
  - a. Relates to changes in students' attitudes, values and behaviour resulting from the learning process.
  - b. The focus is more on developing students' character, ethics, moral values and social skills.
  - c. Measured through behavioural observation, self-assessment, reflection, or questionnaires that assess changes in students' attitudes, values, and behaviour.
  - d. The main objective is to promote positive attitudes, morality, empathy, tolerance, and interpersonal skills that can be used in everyday life.

#### **4 CONCLUSION**

The reviewed journal on analysing the effectiveness of Islamic integrated chemistry learning reveals a variety of methods and approaches that have been used in an effort to understand the impact of integrating religious values, particularly Islam in chemistry learning. Integrating Islamic values in chemistry teaching materials for Senior High School (SMA) is very important to develop from a strong moral foundation to prevent negative influences from the rapid development of today's modern world. It helps students understand and absorb the subject matter more deeply and comprehensively. The integration of Islamic values in education should not be limited to philosophical discussions but should be incorporated into the body of knowledge to provide a holistic understanding of Islamic values in educational materials. The integration of Islamic values in teaching materials has been shown to improve learning outcomes and student engagement. It also contributes to the overall quality of education and the moral and spiritual foundation of a nation.

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