



# Journal of Educational Sciences

Journal homepage: <https://jes.ejournal.unri.ac.id/index.php/JES>



P-ISSN  
2581-1657

E-ISSN  
2581-2203

## Validity of Al-Qur'an-Based Integrated Inquiry-Based Electrolyte and Nonelectrolyte Solution Module for Class X Madrasah Aliyah (MA)

Rosa Karlina\*, Iryani

Department of Chemistry, Padang State University, Padang City, 25132, Indonesia

### ARTICLE INFO

#### Article history:

Received: 15 Aug 2022

Revised: 28 Sept 2022

Accepted: 04 Oct 2022

Published online: 24 Oct 2022

#### Keywords:

Electrolyte and Nonelectrolyte Solution

Guided Inquiry

Al-Qur'an Integration

Module

Validity

### ABSTRACT

This study aims to develop and determine the validity of the Al-Qur'an integrated guided inquiry-based electrolyte and nonelectrolyte solution module for class X Madrasah Aliyah (MA). This research uses the Plomp development model, which consists of three stages: preliminary research, prototyping stage, and assessment phase. Research instrument validity test in the form of a questionnaire given to lecturers and teachers. The validity value is calculated using the Aiken formula, and the study results get a product validity value of 0.87, which can be categorized as valid. Based on the analysis of the validity data, it can be concluded that the electrolyte and nonelectrolyte solution module based on the integrated guided inquiry of the Qur'an for class X Madrasah Aliyah (MA) is valid and can be tested further, namely, the practicality and effectiveness of the module.

## 1. Introduction

The 2013 curriculum requires students to have the competence and skills to become productive individuals (Kemendikbud, 2014). The 2013 curriculum encourages students to discover, process actively, and build their knowledge in learning activities (Asda & Iryani, 2020). For this reason, the 2013 curriculum applies a scientific approach to learning activities, one of which is the guided inquiry learning model.

The guided inquiry will support activeness in the learning process (Ikhwan, 2020; Safitri & Iryani, 2021; Andromeda et al., 2018). West Sumatra Regional Regulation Number 2 of 2019 Chapter V regarding the local content curriculum states that the curriculum is a study material that is integrated into relevant subjects, namely Al-Qur'an and character education (Article 89 paragraph 3) West Sumatra Regional Regulation Number 2 of 2019 Chapter V regarding the local

\* Corresponding author.

E-mail: [iryaniachmad62@gmail.com](mailto:iryaniachmad62@gmail.com)

Doi: <https://doi.org/10.31258/jes.6.4.p.687-696>

content curriculum states that the curriculum is a study material integrated into relevant subjects, namely Al-Qur'an and character education (Article 89 paragraph 3)(Peraturan Daerah Sumatera Barat, 2019). Based on this, they are aligning it with the demands of the 2013 curriculum by making teaching materials related to the verses of the Qur'an. By linking learning with verses in the Qur'an, Core Competence (KI) 1 regarding the spiritual demands of the 2013 Curriculum is also achieved so that the teaching materials developed not only increase students' cognitive knowledge and skills but also increase students' sense of faith and devotion.

Based on interviews with two chemistry teachers at Madrasah Aliyah Negeri 1 Solok Selatan and Madrasah Aliyah Negeri 2 Solok Selatan and the distribution of questionnaires to 40 students: 1) Teaching materials have not fully covered three levels of chemical representation so that students still have difficulty understanding the electrolyte solution material and nonelectrolytes which are abstract. This statement is also supported by data obtained from the distribution of questionnaires, that as many as 67.5% stated that students had difficulty understanding the material of electrolyte and nonelectrolyte solutions. 2) Worksheets, textbooks, and videos are teaching materials used by teachers. The teaching materials have not supported students in learning independently. From the questionnaire data distribution results, it was also known that 75.0% of students stated that the teaching materials for electrolyte and nonelectrolyte solutions used could not help study the material for electrolyte solutions and nonelectrolyte solutions without a teacher. 3) The teacher has used guided inquiry in the learning process but the teaching materials used have not supported the process. 3) Teaching materials that have not been linked to the verses of the Qur'an according to the guidance of Regional Regulation No. 2 of 2019.

The literature study found that the guided inquiry-based module on chemistry had been developed previously, and the results showed that the module could increase the academic value of students.(Iryani et al., 2021; Bahri & Iryani, 2020). However, teaching materials integrated with the Quran are not yet available. So the researchers have developed an electrolyte and nonelectrolyte solution module based on an integrated guided inquiry of the Qur'an for class X Madrasah Aliyah (MA).

## **2. Methodology**

The type of research is Educational Design Research (EDR). This research was conducted to design and make teaching materials in the form of modules on electrolyte and nonelectrolyte solutions using a guided inquiry learning model for class X Madrasah Aliyah (MA) to measure the results of students' academic scores. (Iryani, Mawardi, 2016; Andromeda et al., 2018; Rahayu & Iryani, 2020). This research was conducted at MAN 2 Padang City. The research subjects were two chemistry lecturers, namely a material validation lecturer and the validation of the verses of the Qur'an, three teachers at MAN 2 Padang City, and students in class X IPA MAN 2 Padang City. The development model used is the Plomp

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development model, which has three stages: 1. *Preliminary research*, 2. *Prototyping stage*, 3. *Assessment stage* (Nielsen et al., 2020).

### ***Preliminary Research***

- 1) Needs analysis identifies problems that exist in schools by interviewing teachers and distributing questionnaires to students in MAN 1 and MAN 2 Solok Selatan.
- 2) The implementation of identifying, analyzing, and systematically compiling the primary materials that are mandatory for electrolyte and nonelectrolyte solutions
- 3) A literature study is done by looking for references related to the research conducted.
- 4) The conceptual framework refers to all the ideas that underlie developing the product.

### ***Prototyping stage***

- 1) Formation of Prototype I, namely designing the module, designing the module based on the syntax of guided inquiry, and integrating the module with the verses of the Qur'an.
- 2) Formation of Prototype II. At this stage, a formative evaluation is carried out as a self-evaluation.
- 3) At this stage, validation of expert review and One to one evaluation. The expert review stage is validation carried out by experts in their fields, namely in the material field and the integration of the Qur'an in the module. Meanwhile, one to one evaluation is a product evaluation by students. The initial stage is the selection of students with high, medium, and low abilities recommended by the teacher.

Technical data analysis using the Aiken formula. In this data analysis, the product designed and produced is submitted to the validator then the validator will provide criticism or suggestions on the validation sheet for product improvement. Then, the data results from the validation questionnaire are processed with the Aiken V index in Formula 1 and Formula 2 below:

$$v = \frac{\sum s}{[n(c - 1)]}$$

Formula 1

$s = r - lo$  ...Formula 2

The explanation of the above equation is  $v$  = validity index;  $s$  = The score given by the validator minus the lowest score in the study;  $r$  = score given by the validator;  $lo$  = the lowest score of the assessment;  $c$  = Number of categories used; and  $n$  = Number of validators (Lewis. R. Aiken, 1985).

### 3. Results and Discussion

#### *Preliminary research*

##### 1) *Needs Analysis*

The data obtained by interviewing teachers and distributing questionnaires in MAN 1 and MAN 2 Solok Selatan, namely the teacher still uses LKS and textbooks to teach, students have not been able to understand the material of electrolyte and nonelectrolyte solutions without teacher guidance because the material is complex because it is abstracts and teachers have applied guided inquiry in learning activities on electrolyte and nonelectrolyte solutions, but teaching materials for the 2013 curriculum and integrated Al-Quran demands West Sumatra Regional Regulation Number 2 of 2019 are not yet available.

##### 2) *Context analysis*

The results of the context analysis conducted by the researcher are Basic Competencies of the material, namely, 3.8. Analyze the properties of electrolyte and nonelectrolyte solutions based on their electrical conductivity. 4.8 Distinguish the electrical conductivity of various solutions through the design and execution of experiments.

Learning indicators that can be derived based on the essential competencies above are as follows: 3.8.1 Explaining the meaning of solution, solvent, and solute; 3.8.2 Analyzing the properties and types of solutions through experiments or observations based on their electrical conductivity; 3.8.3 Grouping strong electrolyte solutions and weak electrolytes through experiments or observations based on their electrical conductivity; 3.8.4 Classify electrolyte and nonelectrolyte solutions based on their degree of ionization; 3.8.5 Conclude the cause of the electrolyte solution can conduct electric current; 4.8.1 Designing experiments to investigate the properties and types of solutions based on electrical conductivity. 4.8.2 Carry out experiments to investigate the properties and types of solutions based on electrical conductivity.

##### 3) *Literature review*

The results obtained after the literature study are 1. the components that must be contained in the module refer to the 2008 Ministry of National Education; 2. Guided inquiry refers to books and journals, the internet; 3. Development research refers to the book Plomp part A developed by Tjeed Plomp; 4) module content/content refers to university and high school/MA chemistry textbooks.

Previous studies have carried out this research, data obtained that the electrolyte and nonelectrolyte solution modules developed previously were valid (Sari & Yermadesi, 2021; Jasahuldia et al., 2021). However, it has not been linked to the verses of the Qur'an based on the demands of the West Sumatra Regional Regulation Number 2 of 2019, there is no reason to strengthen the answers to the

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questions on the evaluation questions, and there are no scoring and scoring guidelines in the module so that students cannot determine its achievements on electrolyte and nonelectrolyte solution materials.

#### 4) Conceptual Framework Development

The results of the conceptual framework development stage are research problems in the form of abstract materials, teaching materials that have not been integrated with the Koran, and the unavailability of teaching materials required by the 2013 curriculum that can help students to learn independently. Hence, the solution is to develop teaching materials based on electrolyte solution modules. Integrated Al-Qur'an guided inquiry, the jar material contains microscopic images of molecules, integrated Al-Qur'an verses, based on guided inquiry, and evaluation questions have reasons and scoring and assessment on the module so that students can know their abilities.

### Prototype Formation Stage

#### 1) Prototype I

The production of the prototype I is done by making an initial design in the form of a module design consisting of several components, namely cover, introduction, table of contents, concept map, module usage instructions, competencies, learning objectives, worksheets, concept maps, evaluations, answer keys, bibliography. And the resulting prototype I consisted of class activities and laboratory activities using guided inquiry learning stages, including; 1) Orientation, 2) Exploration, concept formation, 4) Exercise and 5) conclusion (Hanson M.D., 2006). The module cover design can be seen in Figure 1.



Figure 1. Cover of Electrolyte and Nonelectrolyte Solution Module

### a. Orientation

At this orientation stage, it contains motivation, Competency Achievement Indicators (GPA), and supporting materials. Motivation contains wisdom and verses of the Qur'an related to electrolyte and nonelectrolyte solution material, Competency Achievement Indicators (GPA) is the achievement of competencies that must be achieved by students when they have studied the material, and supporting material is material that is still related to the material to be studied. It can be seen in Figure 2.

### b. Concept Exploration and Formation

At this stage, models (graphs, tables, and pictures) are made related to the module's electrolyte and nonelectrolyte solution materials. Through the model, students can answer the key questions contained in the module then the answers to the key questions will lead students to find concepts (Perifta & Iryani, 2019). The stages can be seen in Figure 3

### c. Application

At this stage, practice questions related to concept discovery are made in the form of short and multiple choice questions to strengthen concepts for students. As can be seen in Figure 4.



Figure 2. Orientation of Electrolyte and Nonelectrolyte Solution Module

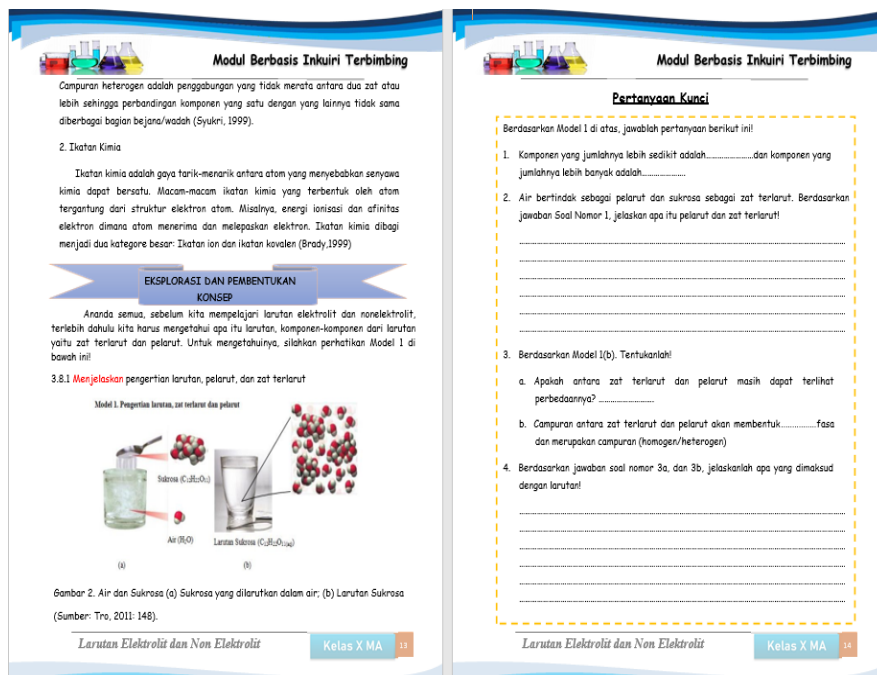


Figure 3. Exploration and Concept formation

**d. Closing**

Closing is the last stage in the guided inquiry step. At this stage, conclusions are drawn by students on the material that has been studied. This stage can be seen in Figure 5.

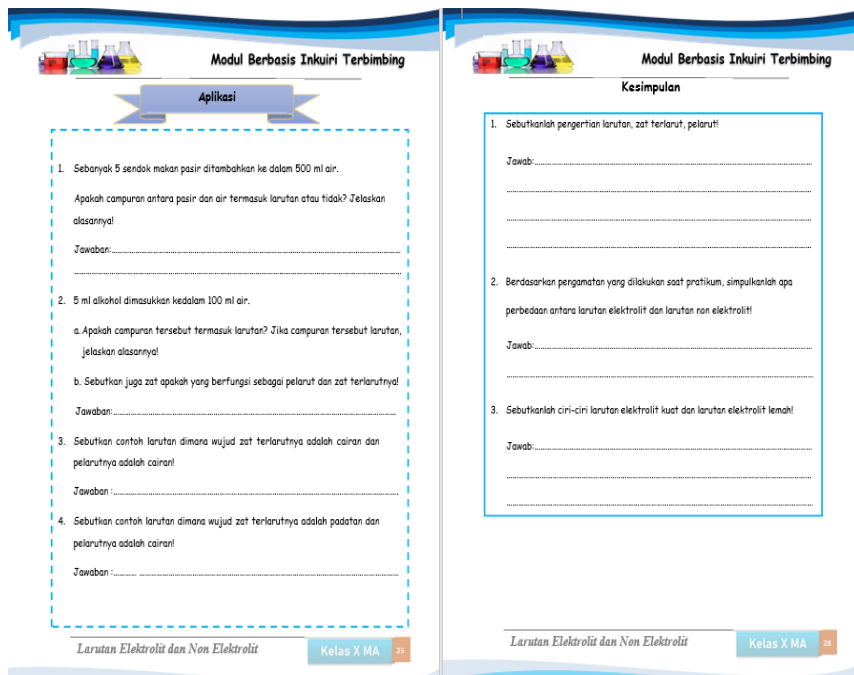


Figure 4. Applications on the Module Figure 5. Conclusion of the Module

Previous research has shown that the guided inquiry module can increase the academic value of students, namely in the buffer solution material (Iryani, Mawardi, 2016) and the basic law module of chemistry (Perifta & Iryani, 2019).

### 2) Formation of Prototype II

At this stage, a formative evaluation is carried out as a self-evaluation. Self-evaluation is carried out by researchers with a checklist system of essential parts or components that must be in the module. If still parts are lacking, then revisions are made to produce a valid prototype II.

### 3) Formation of Prototype III

There are two validation stages: Expect review by five validators, namely two UNP chemistry lecturers on the module and three chemistry teachers at MAN 2 Padang, and one to one evaluation by three students with high, medium, and low abilities selected. by the teacher.

Expect review consists of material expert validators who assess the material's relationship to the verses of the Qur'an contained in the module. Validity by material experts is assessed based on content components, construct/presentation components, linguistic components, and graphic components (Wanti & Yerimadesi, 2019), as well as an integrated component with verses of the Koran in accordance with West Sumatra Regional Regulation Number 2 of 2019.

The results of the validity analysis by the validator on the developed module can be seen in Table 1.

Table 1. Results of Module Validity Test Analysis

No	Assessment Component	Average V	Kevalidan
1	Content components	0.86	Valid
2	Components of Construct/Presentation of content	0.88	Valid
3	Language Component	0.88	Valid
4	Graphic Component	0.83	Valid
5	Modul Islamic Components in the Module	0.88	Valid
	Average	0.87	Valid

Based on the results of the analysis in Table 1, the value of V for the module content component is 0.86, the construct component according to the guided inquiry syntax is 0.88, the linguistic component is 0.88, the graphic component is 0.83, and the linkage of the material with the verses. Verses of the Qur'an of 0.88 with a valid category. The overall mean score is 0.86. There are five validators to test the validity of the module. Based on the average validity value obtained, it can be categorized that the module developed is valid. The results of the analysis are categorized as valid based on the analysis using the Aiken V formula; if the value of v is greater than 0.80 or equal to 0.80 with the Number of validators 5, it can be said to be valid. (Lewis. R. Aiken, 1985).



Three students validate one to one evaluation with high, medium, and low abilities using a questionnaire instrument. The results of the evaluation are that the module as a guided inquiry-based teaching material used has attracted students to use it so that it can generate student interest in learning, and the verses of the Qur'an contained in the module can further increase students' motivation to learn, as well as material that presented with a guided inquiry learning model can guide students in finding concepts.

During the validation test, there are several suggestions from the validator. These suggestions serve as guidelines for revising the developed oxidation-reduction reaction module. The revision resulted in prototype III as a valid oxidation-reduction reaction module.

#### 4. Conclusion

Based on the research and discussion results, it can be concluded that the guided inquiry-based electrolyte and nonelectrolyte solution module integrated with the verses of the Qur'an for class X Madrasah Aliyah (MA), which was designed and developed, was valid. It is hoped that further researchers will be able to conduct practicality tests and test the effectiveness of the modules so that the modules developed are practically used in schools and effectively improve students' academic abilities.

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How to cite this article:

Karlina, R., & Iryani. (2022). Validity of Al-Qur'an-Based Integrated Inquiry-Based Electrolyte and Nonelectrolyte Solution Module for Class X Madrasah Aliyah (MA). *Journal of Educational Sciences*, 6(4), 687-696.

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