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# DEVELOPING STAGES FOR THE SCIENTIFIC CUES CONCEPT IN THE INTEGRATED SCIENCE-TAFSEER LEARNING MODEL

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## ABSTRACT

This study aimed to determine the applicability of the scientific cues concept in developing the integrated science-Tafseer learning model. This was a Research & Development study. The subjects of this study were Tafseer lecturers and students of the Science Education Department of IAIN Salatiga. The data collection instruments were Likert scale questionnaires, discussion note formats, observation sheets, and pretest and integrated science-Tafseer post-test questions. The validity test results of scientific cues concept instruments showed that all items were valid (rxy> 0.3)and the instrument reliability was 0.73> 0.6 (reliable). The result findings of the needs assessment research on the scientific cues concept showed that the average (42) interpretation lecturers in Indonesia were = 3.62 with "Badly Needed" category. Scientific cues of integrated science-Tafseer materials on the food theme in QS. Al-Baqarah 168, QS. Al-Maidah: 88, and QS. An-Nahl: 114 as follows: *kuluu* (eat) and *mimmaa* (food). Scientific cues are the universal keywords of the integration of scientific facts of the Qur'an. The normality test result of the pretest and posttest data using Shapiro-Wilk obtained the significance of the pretest = 0.026 (p) <0.05 and the posttest = 0.00 (p) <0.05 (the data were not normally distributed). The effectiveness test of the scientific cues concept stages using the Wilcoxon test obtained a t-count of 4.790 with p = 0.000. Thus, the p-value was<0.05, meaning that the presentation of the concept of useful scientific cues can improve the learning outcomes and contribute to the stages of the concept of scientific cues in developing the integrated science-Tafseer learning model.



Keywords: integrated science-tafseer, learning model, scientific cues concept, stages

## INTRODUCTION

Interpretation Learning at Science Department of Islamic Higher Education is generally aimed at making students able to explore and formulate concepts of science interpretation according to the Qur'an. The definition of science according to the Qur'an becomes the basis (philosophy) in developing knowledge, values, attitudes, and skills in shaping Islamic individuals and society. The Science Education Teacher Training and Education Faculty atSalatiga State Institute for Islamic Studies (IAIN Salatiga) is one of the

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Islamic colleges that have made changes based on research on the development of an integrated science-Tafseer learning model in 2018.

Fujiyanti et al. (2018) conducted a preliminary study with findings suggesting that interpretation learning was as follows: (1) the determination of scientific cues had not referred to the syllabus of the previous semester's IntroductoryNatural Sciences (Introductory Physics, Introductory Chemistry, and General Biology); (2) it had not involved science lecturers; (3) science materials were still conditional yet there was no potential determination of the materials to be combined; (4) the potential for the materials to be integrated had not been attached to the Semester Learning Plan (RPS) because there was no standard materials determination; and (5) learning evaluation had not involved science lecturers. In line with the results of the preliminary study stated that the interpretive subjects are not fully integrated between the Qur'an, Hadiths, and Science. This is in line, the interpreter of Science Education, that only a few interpretive lecture materials have been integrated with the Qur'an.

The stages of presenting the scientific cues concept are important in integrated science-Tafseer learning because of its urgency as the primary stage of the learning model which one verse of the Qur'an has several scientific cues. Scientific cues have relevance with one another and can potentially be combined by looking at equality and meaning. Scientific cues in the development of empirical models of science-Tafseer integration are tested in advance so that they can be implemented effectively during the learning process.

The presentation of scientific cues can be considered as a form of knowledge representation activity. It is one of the stages of learning integrating Islamic values and science in the context of human experience. This representation is carried out through the construction of knowledge derived from the verses of the Qur'an based on students' cognitive schemes. Scientific cues are used to study empirical science, especially scientific perspectives in discussing the verses of the Qur'an. Learning activities at this stage are directed at making the Qur'an contain cues about the secrets of nature explored through the views of modern science. What makes it attractive to present this scientific cue is the tendency of its activities to make the Qur'an contain the science (IPA) and make it direct evidence of the truth of the Qur'an. The presentation of scientific cues is constructed from several educational theories, such as constructivist theory, the cognitive theory about information processing, and communication theory.

Learning according to constructivist theory is the process of building knowledge through interaction with the environment (Arends, 2007; Harasim, 2012; Cobern, 2012). Learning will be meaningful if students can develop their knowledge, attitudes or skills through interaction with the learning environment. Based on this view, the interpretation of the development of presenting the concept of scientific cues stages in an integrated science-Tafseer learning model is built on the interaction among students, students with lecturers, and students with an environment in integrated science-Tafseer learning. The stages of scientific cues concept presentation in the integrated science-Tafseer learning model as the result of the focus group discussion of this research to build students' knowledge, attitudes, and skills consist of four elements: (1) the lecturer divides the study group as needed,(2) students attend teaching in study groups,(3) the lecturer guides the dynamics of group scientific cues in integrated science-Tafseer learning, and (4) students collaborate in their respective groups. The four elements of the stages of presenting the scientific cues concept can influence students' thinking and learning outcomes. This is consistent with findings of the research by Alfana et al. (2015) that integrated science learning that uses constructivist-based student activity sheets has a positive effect on the development of creative thinking skills and student learning outcomes.

The secondary theory of the application of other scientific cues is cognitive learning theory, which views the learning process from information processing activities. This information processing starts with the way information is received in various senses and then transferred to short-term and long-term memories. Data undergoes a flow of transformation in the human mind until it is permanently stored in the long-term memory in the form of knowledge packets. In the pattern of cues learning, students use specific themes which are then searched for information sources from the Qur'an. Here the verses of the Qur'an functions references in discussing those particular themes.

According to the view of communication theory in learning, optimal success can be achieved in learning activities when a process is established to build effective and affective communication relationships between teachers and

students (Peck Richmond et al., 2009; Powell & Kalina, 2009). In the process, to develop effective communication, problems related to a theme to discuss the need to be presented. The theme can be studied by reading up divine instructions on one of the verses in the Qur'an. The theme associated with these divine instructions can motivate human reason, reflect on the truth from the perspectives of scientific processes, and be able to bring the principles of Islamic teachings closer to the human soul. Besides, one's communicative relationship in studying these divine instructions will strengthen the delivery of Islamic treatises to Muslims.

In connection with learning science and Tafseer in an integrated manner, the principle of implementing integrated learning by combining materials that can potentially be incorporated. According to Forgaty (2009), the integrated learning model starts from planning with interdisciplinary discussions in the field of expertise. Whereas according to Trianto (2010), the three basic principles of grouping integrated learning are: (1) exploration of themes; (2) management of learning; (3) evaluation; and (4) reaction. Integrated learning in the science of interpretation is the method of Maudhu'i. The Maudhu'i method is a thematic method that discusses the verses of the Qur'an according to themes (Iqbal, 2010). Shihab (2007) stated that the Maudhu'i method has two meanings, which are: first, interpretation involves one letter in the Qur'an and explains its objectives in general and which is a theme of variety in the letter between one another and also with that theme, and,second, it is done by compiling the verses of the Qur'an which are discussed (with one particular problem reviewed from various verses or letters of the Qur'an) and, wherever possible, sorted in descending order, then explaining the overall understanding of these verses, in order to attract the whole Qur'anic instructions about the problem being discussed. According to Farmawi (1977), the characteristics of the Maudhu'i method is to highlight the theme (topical). Faizin (2017) stated that Ilmi's interpretation was an example of deductive-confirmative implementation of religious and scientific integration to present the majesty of Allah SWT. The values of monotheism, science, and the caliphs have an integral relationship and become an instrument for the birth of ethical values.

Presentation of scientific cues is a form of expression representation to find solutions to a problem (Suhandi & Wibowo, 2012; Prain et al., 2009). Illustration of this expression is a way to communicate ideas to a discussion (Ertikanto et al., 2018). Thus, the interpretation of scientific cues as a form of expression in learning can be viewed from empirical research on representation. The study conducted by Hayati (2015) and Fahrurrozi (2015) showed that description plays a significant role in processing information. This is because, with representation, one can quickly change unrealistic thoughts into reality. The interpretation of scientific cues for the verses of the Qur'an which serve as sources of information in the form of knowledge cues can be performed using a representation approach (Akbar, 2017; Yalcinkaya, 2011). This representation approach can be implemented by making changes to thinking that are relevant to scientific theory/scientific thinking and then adjusting them according to development and dynamics of the times from the text of the verses of the Qur'an. Another way is to justify and verify scientific theories with the Qur'an.

Research conducted by Chusni (2017) examining the relationship between reasoning abilities and learning outcomes showed that representation could help one express, describe, and analyze problems, thereby helping expand his thinking skills. Based on the results of this study, reasoning in the integrated science-Tafseer learning model can be expressed in the form of ideas to find, describe, and analyze the stages of presenting the concept of scientific cues. In other words, the expression given by a student to one of the verses is a way of interpreting that is tailored to the student's knowledge and experience. By providing room for expression, students will be trained to make critical reasoning to present the scientific cues concept from the verses of the Qur'an, which in turn can improve their understanding and integrated science-Tafseer results.

Asrizal et al. (2018) on their research concluded that integrating science materials using a scientific approach help improve knowledge and digital literacy aspects, including scientific, functional, and visual literacy at 95 percent of confidence level. The research also showed that integrated science instructional materials were useful to solve the problems of integrated science teaching and improve students' aspects of digital literacy.

From the construction of several relevant theories and research described above, some important points can be taken from the activity of presenting scientific cues. The scientific presentation activities can be realized in the forms of (1) making the Qur'an reference to discuss a the-

me; (2) making presentation in the way of visual interpretations to be studied scientifically in accordance with the nature of science; (3) expressing an understanding of a verse of the Qur'an through the process of critical reasoning from the perspective of science; (4) communicating Islamic treatises contained in the verse which is discussed effectively with others.

The purpose of presenting the concept of scientific cues in the development of this integrated science-Tafseer learning model is to find the universal and comprehensive keywords of the scientific facts of the verses of the Qur'an for all people. Meanwhile, scientific keywords aim to facilitate information search to avoid inaccurate mention of scientific cues in the Qur'an. The presentation of the concept of scientific cues is an initial stage in the synthesis of the development of an integrated science-Tafseer learning model. The idea of scientific cues is used as the basis for compiling themes for integrated science-Tafseer leaning. The stages of presenting the concept of scientific cues are empirically tested and serve as the basis for integrated science-Tafseer learning model development stages. The exploration of integrated science-Tafseer materials is the second stage after the presentation of the scientific cues concept, followed by the step of delivering and discussing integrated science-Tafseer materials, and, as the final stage of the integrated science-Tafseer learning model, instructional impact.

## METHODS

In this study, the Research and Development (R&D) method was used. The research subjects were Tafseer lecturers and students of the Science Education Department at IAIN Salatiga, Indonesia. Data were comprised of qualitative and quantitative data. Quantitative data were obtained from the percentage of needs analysis questionnaires (needs assessment), prototype assessment, scientific cues for science-Tafseer integration(Likert scale questionnaire), and observations. Qualitative data were obtained from answers to open-ended inquiries about the scientific cues of science-Tafseer integration and the opinions of scientific experts and product interpretations in the form of description results of critics and evaluators' suggestions. The tools used to collect data were Likert scale questionnaires, open-ended questionnaires, discussion note formats, observation sheets, and observation of professional expertise in science-Tafseer instruction.

Procedures for the development of the scientific cues concept stages in integrated science-Tafseer learning are illustrated in Figure 1.

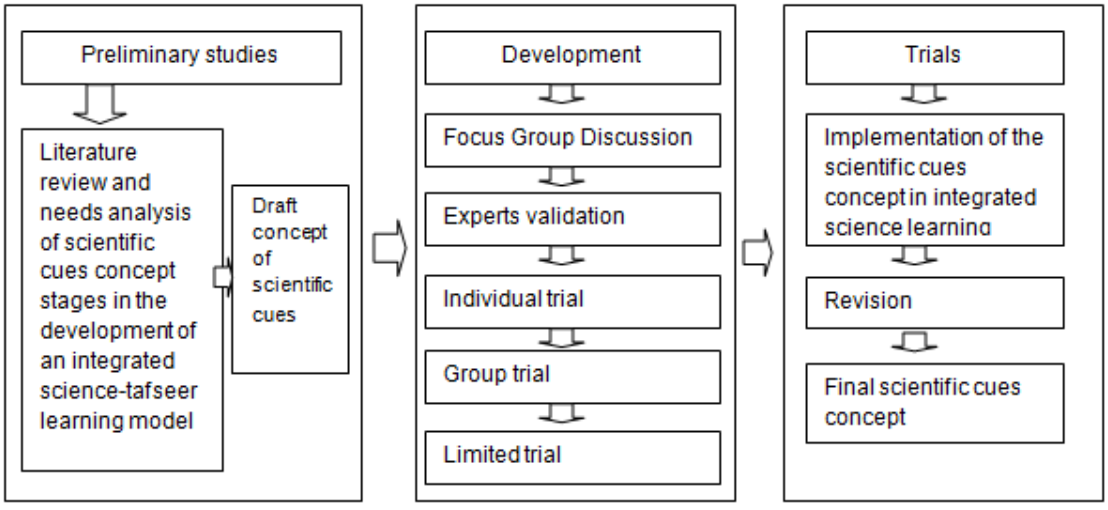


**Figure 1.** Procedures for Developing Scientific Cues Concept Stages in the Integrated Science-Tafseer Learning Model (Adapted and Modified from Gall et al., 1996)

Based on Figure 1, the scientific cues concept stages in the development of the integrated science-Tafseer learning model stages were developed through three steps, they were: (1) preliminary study, (2) development of scientific cues for science-Tafseer integration, and (3) trials of science-Tafseer integration. The trial design stage of the development of scientific cues for science-

Tafseer integration was carried out through four steps, which were: (1) Expert and Practitioner test: it was aimed at determining the feasibility of developing scientific cues for science-Tafseer integration that could be used by lecturers. The experts in question were comprised of science experts and interpreters; (2) Individual Trial: the draft scientific cues developed for integrated science revisions from experts and interpreters were tested out to individuals (individual trials), which aimed to apply the developed scientific cues for integrated scientific interpretations; (3) Group Trial: this group trial was conducted with a view to applying the developed scientific cues for integrated scientific interpretations that had been examined from the individual test; and (4) Limited Field Trials: the draft scientific cues for science-Tafseer integration developed based on the revised own trials, and group trials were piloted in a limited field trial using an experimental research approach, and the results were edited and used as scientific cues for the final science-Tafseer integration to be applied in an extensive field trial.

Testing the effectiveness of scientific cues for science-Tafseer integration in developing students' understanding ability using the "One-Group Pretest-Posttest Design" is illustrated in Figure 2.

$$O_1 \quad X \quad O_2$$

**Figure 2.** One-Group Pretest-Posttest Design (Sugiyono, 2008).

Based on Figure 2, the variables of the study were pre-test scores (Q1) obtained from the results of the food theme-related scientific cue test before learning science and Tafseer in an integrated manner. On the other hand, the post-test scores (Q2) obtained from results of the food theme-related scientific cues test after studying science and Tafseer in an integrated manner whereas X is the treatment, which was the implementation of food theme learning in the integrated science-Tafseer learning model. The pre-test and post-test data obtained were used to carry out the data normality test. If the examination suggests that the data are normally distributed, it will be followed by a parametric t-test, but if it does not, it will be followed by a non-parametric test (Wilcoxon test).

## RESULTS AND DISCUSSION

The study on scientific cues concept applicability began with the preliminary study as follows:

### Needs Assessment of Scientific Cues in the Development of the Integrated Science-Tafseer Learning Model

The needs assessment on the presentation of the scientific cues concept in the development of the integrated science-Tafseer learning model began with a preliminary study by distributing Likert-scale questionnaire. The analysis criteria were adapted from the 4-point Likert scale scores. Description of the needs for scientific cues in the development of the integrated science-Tafseer learning model was obtained from 42 Interpreterslecturers working Islamic universities all overIndonesia. Results of the needs assessment in the form of the needs for scientific cues in the development of the integrated science-Tafseer learning model were listed in table 1.

**Table 1.** Needs Assessment Results for Scientific Cues at the Development Stage of the Integrated Science-Tafseer Model

| | Indicator | Mean (42) | Description |
|---|---|---|---|
| 1 | Scientific cues based on themapping results oftafseerand introductory-science syllabuses | 3.6 | Badly Needed |
| 2 | Scientific cues results from the Interdisciplinary Forum Focus Group Discussion (FGD) of tafseerlecturers and science lecturers | 3.7 | Badly Needed |
| 3 | Scientific signals expressed in the Semester Learning Plan for science-tafseer integration | 3.5 | Badly Needed |
| 4 | Scientific cues as the basis for the theme of integrated science-tafseer learning | 3.6 | Badly Needed |
| **5** | Scientific cues as the basis for science-tafseer learning materials | 3.7 | Badly Needed |
| | Total | 18.1 | Badly Needed |
| | Mean | 3.62 | Badly Needed |

The needs assessment of the presentation of the scientific cues concept in developing the integrated science-Tafseer learning model from the answers of respondents consisting of 42 Tafseer lecturers working Indonesian Islamic higher education institutions generated a mean of 3.62. In other words, the stages of presenting the scientific cues concept are needed in developing the integrated science-Tafseer learning model. This is consistent with findings of the research conducted by Nurjannah (2018) that the needs analysis is a valuable tool that is functional and can meet the needs of the research subjects.

**The Stages of the Scientific Cues Concept on Food Themes in Integrated Science-Tafseer Learning**

Keywords of integrated scientific facts found in Quranic verses were combined into integrated science-Tafseer learning themes. Table 2 lists the keywords for scientific facts from Al-Baqarah: 168, Al-Maidah: 88, and An-Nahl: 114 based on results of the Focus Group Discussion and validation from Tafseer and science experts for food themes.

**Table 2.** Map of the Integration of Quranic Verses and Scientific Cues on Food Themes

| Al-Baqarah 168 | Al-Maidah: 88 | An-Nahl: 114 | Primary Scientific Cues | Secondary Scientific Cues |
|---|---|---|---|---|
| O mankind, eat from whatever is on earth [that is] lawful and good and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy. | And eat of what Allah has provided for you [which is] lawful and good. And fear Allah, in whom you are believers. | Then eat of what Allah has provided for you [which is] lawful and good. And be grateful for the favor of Allah, if it is [indeed] Him that you worship. | Eat<br>Food | Sustenance<br>Halal<br>Good<br>Be cautious<br>Be thankful<br>Blessing |

Table 2. describes the mapping to find scientific cues and integrated science-Tafseer learning themes for science education instruction atIAIN Salatiga. Those scientific cues were divided into two, i.e., primary scientific cues and secondary learning themes. The first was primary keywords derived from several surahs in the Qur'an that had similar scientific cues. The latter were secondary keywords used to support the analysis of the integrated science-Tafseer learning themes. The Qur'an guided the theme analysis. This is consistent with Mujahidin (2013) that the primary purpose of Qur'an interpretation is to explain the will of Allah and the operationalization of the will in the fields of aqeedah, shariah, and ethical values and civilization. The content and analysis of Al-Maidah: 88, An-Nahl: 114 are as follows: Al-Maidah: 88 instructs humans to eat food that is not only halal but also good because the food one will be a source of energy, blood, and so on. If one eats halal food, the resulting impact will, of course, be goodness and blessing. The verse is followed by the command "be cautious to Allah", then the halal food is better to keep up with the piety of someone, which one might be able to worship if what he/she eats every day is halal. This word halal influences the spiritual/inner side while the word good influences the outer side. The phrase right does not only refer to the way one gets it but also to the fact that the food must be good at everything, namely rich in nutrition, clean, containing vitamins, not containing harmful substances, and so on. Thus, if one eats good halal food every day, it will make the person truly devoted to Allah Almighty. QS. An-Nahl: 114 has the same editorial accurate al-Maidah 88, but is closed with a different editor, namely with the commandment, thankful for the blessings of Allah SWT. When one is able to eat halal and good food everyday, it is a pleasure that must be grateful for. He is the One who gives favor, only He has the right to servitude, who has no partner for Him. The next verse explains that Allah forbids one to eat food which is neither halal nor good.

Based on results of needs analysis, focus group discussion, and assessment of tafseer lecturers, the stages of presenting the concept of scientific cues on food themes in developing the integrated science-tafseer learning modelare-described in Table 3.

**Table 3.** The Stages of Presenting the Concept of Scientific Cues on Food Themesin Developing the Integrated Science-Tafseer Learning Model

| The Stages of Presenting the Scientific Cues Concept | Description |
|---|---|
| Stage I<br>Determining the learning theme | 1. Lecturers explained the food theme to students.<br>2. Students followed lecturer instructions. |
| Stage II<br>Determinig surahs in the Qur`an related to the learning theme | 1. Lecturers gave assignments to students in groups to look for surahs in Qur`an containing food themes.<br>2. Students worked in group identifying surahs in the Qur`an. |
| Stage III<br>Determining primary scientific cues | 1. Lecturers guided students in discovering the primary keywords obtained from several surahs in the Qur'an which have similar scientific cues on the food theme.<br>2. Students followed lecturer instructions and discussed in groups how to find the primary keywords from several surahs in the Qur'an sharing the same scientific cues on the food theme. |
| Stage IV<br>Determining secondary scientific cues | 1. Lecturers guided students in finding the secondary keywords from several surahs in the Qur'an having similar scientific cues on the food theme.<br>2. Students followed lecturer instructions and discussion group to see the secondary keywords from several surahs in the Qur'an having similar themes on food to support the analysis of the integrated science-Tafseer learning themes. |
| Stage V<br>Determining the meanings of the surahs in the Qur`an, primaryclues, and secondarycues based on the theme | 1. Lecturers guided students in discovering the meanings of the surahs in the Qur'an as well as primary and secondary scientific cues on the food theme.<br>2. Students looked for the purpose of the surahs in the Qur'an as well as primary and secondary scientific cues on the food theme. |

Based on Table 3, specifications of the stages are: (1) it is the primary stage in developing the integrated science-Tafseer learning model; (2) it aims to find keywords for the integration of universal scientific facts during integrated science-Tafseer learning; (3) it facilitates information search to avoid inaccurate mention of scientific cues in the Qur'an during integrated science-Tafseer learning; and (4) it is the basis for the stages of developing the next integrated science-Tafseer learning model.

**Results of Expert Evaluation for the Scientific Cues Concept on the Food Theme in Science-Tafseer Integration**

Based on the assessment results for the scientific cues concept on food themes in science-tafseer integration byscience experts from Semarang State University,science experts from IAIN Salatiga, andlecturers and interpreters from IAIN Salatiga,the mean obtained was equal to 4.15, which fell into the Good category.

**Table 4.** Assessment Results for the Scientific Cues Concept on the Food Theme in Science-Tafseer Integration

| | Aspect | Mean (n=3) | Explanation |
|---|---|---|---|
| 1 | Compatibility between scientific cues on the food theme with the Semester Learning Plan | 4.50 | Very Good |
| 2 | Suitability of the mapping ofscientific cues on the food theme | 4.00 | Good |
| 3 | Compatibility of scientific cues on the food theme with integrated science-tafseer-materials | 4.25 | Good |
| 4 | Compatibility of scientific cues on the food theme with evaluation tools | 3.84 | Good |
| | Mean | 4.15 | Good |

Table 4. shows that thescientific cues concept generated a mean of 4.15, whichfell intothe Good category. This meansthat the stages of the scientific cues concept are feasible to be used in developing the integrated science-tafseer learning model. Afterwards, the concept was assessed by science experts and interpreters by testing its instruments and conducting field trials.

**Results of the Validity Testingfor Scientific Cues Concept Instruments as the Development Stage of the Integrated Science-Tafseer Learning Model**

The trial of scientific cues instruments in the development stage of the integrated science-Tafseer learning model aims to determine the validity and reliability of the instruments. The instruments are said to be valid if they can measure what will be measured. Instrument validity testing was undertakenusingKarl Pearson's product-moment test. This validity test used SPSS for Windows 22, and the results were confirmed with a constant score of 0.3. If the results of the item validity test (rxy)> 0.3, it means that the scientific concept instrument is valid, and vice versa. The following Table 5 presents the results of the validity test for the Instrument Compatibility of Scientific Cues with Semester Learning Plans

**Table 5.** Validity Testing Result for the Instrument Compatibility of Scientific Cues with Semester Learning Plans

| Item | 1 | 2 | 3 |
|---|---|---|---|
| Rxy | 0.81 | 0.61 | 0.65 |
| Interpretation | Valid | Valid | Valid |

**Table 6.** Validity Testing Result for the Instrument of *Scientific Cues Mapping* and *Contribution of Scientific Cues*

| Item | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| *Scientific Cues Mapping* | | | | |
| Rxy | 0.50 | 0.77 | 0.69 | 0.61 |
| Interpretation | Valid | Valid | Valid | Valid |
| *Contribution of Scientific Cues* | | | | |
| Rxy | 0.80 | 0.58 | 0.43 | 0.43 |
| Interpretation | Valid | Valid | Valid | Valid |

Tables 5 and 6 show that results for all instruments of the scientific cues concept indicate that those instruments are valid.

Reliability testing aims to measure the level of confidence. In this study, it was conducted using Cronbach's Alpha. Results for the reliability testing of scientific cues concept instruments with a total of 28 respondents are listed in Table 7.

**Table 7.** Reliability of Scientific Cues Concept Instruments.

| Cronbach's Alpha | N of Items |
|---|---|
| 0.734 | 12 |

The instrument items undergoing reliability testing included: (1) Compatibility of Scientific Cues with Semester Learning Plans, (2) Scientific Cues Mapping, and (3) Contribution of Scientific Cues. The reliability testing results using Cronbach's Alpha generated a score of 0.73 > 0.6, meaning that the instruments of the concept of scientific cues are reliable.

**Field Application Tests for the Applicability of Scientific Cues in Developing the Integrated Science-Tafseer Learning Model**

Testing of scientific cues was undertaken to apply the stages of the integrated science-Tafseer model, which discovered three findings.

First, dual trial results for the application of the scientific cues concept stages in developing the integrated science-tafseer learning model.

During individual testing activities involving a total of 6 participants, the materials for scientific cues were delivered by lecturers during integrated science-Tafseer learning. The results were listed in Table 8.

**Table 8.** Summary on the Applicability of Scientific Cues Based on Individual Testing Results

| | Aspect | Mean (n=6) | Description |
|---|---|---|---|
| 1 | Compatibility of Scientific Cues with Semester Learning Plans | 3.94 | Good |
| 2 | Scientific Cues Mapping | 3.83 | Good |
| 3 | Contribution of Scientific Cues in the Model Stage | 3.88 | Good |
| | Mean | 3.88 | Good |

The summary of the assessment on the applicability of scientific cues concept stages in developing the integrated science-Tafseer learning model in individual trials with a total of 6 respondents generated a mean of 3.88, which fell into the "very good" category. After this individual testing, group testing was undertaken.

The second finding was the group trial results for the application of the scientific cues concept stages in developing the integrated science-tafseer learning model. During group testing activities involving a total of 12 participants, the materials for scientific cues weredelivered by lecturers during integrated science-tafseer learning. The results were listed in Table 9.

**Table 9.** Summary on the Applicability of Scientific Cues Based on Group Testing Results

| | Aspect | Mean (n=12) | Description |
|---|---|---|---|
| 1 | Compatibility of Scientific Cues with Semester Learning Plans | 4.47 | Very Good |
| 2 | Scientific Cues Mapping | 4.57 | Very Good |
| 3 | Contribution of Scientific Cues in the Model Stage | 4.67 | Very Good |
| | Mean | 4.57 | Very Good |

The summary of the assessment on the applicability of scientific cues concept stages in developing the integrated science-Tafseer learning model in group trials with a total of 12respondents generated a mean of 4.57, which fell into the "very good" category. To understand scientific cues, the understanding of any matters relating to the verses under discussion is a prerequisite, including scientific discoveries related to them. After this group testing, limited testing was performed.

The third finding was the limited trial results for the application of the scientific cues concept stages in developing the integrated science-tafseer learning model. During limited testing activities involving a total of 30 participants, the materials for scientific cues weredelivered by lecturers during integrated science-tafseer learning. The results were listed in Table 10.

**Table 10.** Summary on the Applicability of Scientific Cues Concept Stages Based on Limited Testing Results

| | Aspect | Mean (n=30) | Description |
|---|---|---|---|
| 1 | Compatibility of Scientific Cues with Semester Learning Plans | 4.31 | Good |
| 2 | Scientific Cues Mapping | 4.37 | Good |
| 3 | Contribution of Scientific Cues in the Model Stage | 4.47 | Good |
| | Mean | 4.38 | Good |

The summary of the assessment on the applicability of scientific cues concept stages in developing the integrated science-Tafseer learning model in limited trials with a total of 30 respondents generated a mean of 4.38, which fell into the "good" category. After limited testing, the next research stage was to test the effectiveness of the scientific cues concept stages in integrated science-Tafseer learning.

**Pre-Post Difference Test of Food Theme Scientific Cues Mastery**

Based on the results of the pretest and posttest of Science Education students of IAIN Salatiga's Faculty of Teacher Training and Education about scientific cues on the food theme, the descriptive data obtained are listed in table 11.

**Table 11.** Descriptive Pretest and Posttest Data on Integrated Science-Tafseer Learning Mastery

| | | Pretest | Posttest |
|---|---|---|---|
| **N** | **Valid** | **30** | **30** |
| Mean | | 24.5000 | 80.4333 |
| Median | | 20.0000 | 80.0000 |
| Mode | | 20.00 | 80.00 |
| Std. Deviation | | 15.99299 | 11.80790 |
| Minimum | | .00 | 40.00 |
| Maximum | | 60.00 | 98.00 |
| Sum | | 735.00 | 2413.00 |

Table 12. presents results obtained from30 respondents with descriptive details of the pretest data as follows: mean = 24.50; median = 20.00; mode = 20.00; minimum = 15; and maximum = 74. While the descriptive details of the posttest data are as follows: mean = 80.43; median = 80.00; mode = 80.00; minimum = 0.00; and maximum = 98. The descriptive histogram of the pretest data is illustrated in Figure3, while the descriptive histogram of the posttest data is illustrated in Figure 4.

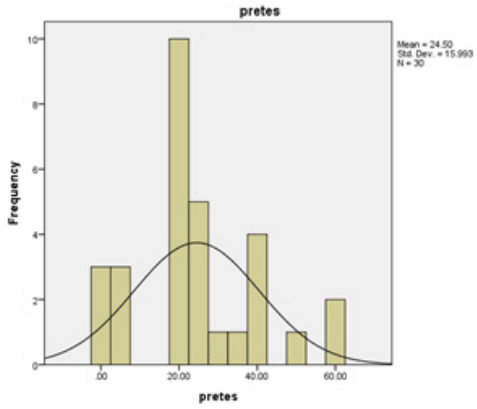


**Figure 3.** Descriptive histogram of pretest data

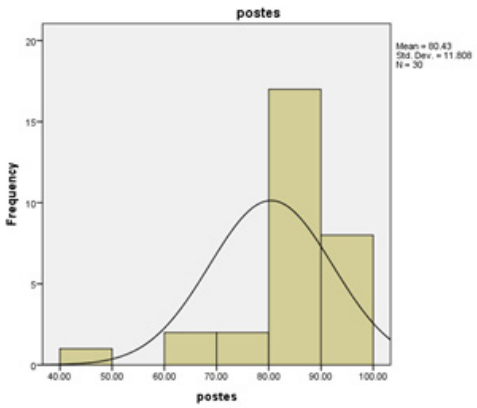


**Figure 4.** Descriptive histogram of posttest data

Interpretation of the description in Table 12 as well as in histograms illustrated in Figures3 and 4 shows that the resulting mean for the integrated science-Tafseer learning ability during the protest was significantly lower than that during the posttest (Pretest = 24.50, posttest = 80.43). The average difference between the posttest result with that of the pretest was 55.93. The pretest and posttest data obtained were presented in the concept of scientific question the food theme; before the t-test, the data normality test was carried out with results presented in Table 12.

**Table 12.** Pretest and Posttest Data Normality Testing

| | Shapiro-Wilk | | |
|---|---|---|---|
| | **Statistics** | **Df** | **Sig.** |
| Pretest | 0.920 | 30 | 0.026 |
| Posttest | 0.829 | 30 | 0.000 |

Based on the results of data normality testing using Shapiro-Wilk in SPSS, the significance of the pretest was equal to 0.026 (p) <0.05 while the significance of the posttest was equal to 0.00 (p) <0.05. Based on the results of these tests, it can be concluded that pretest and posttest data were distributed abnormally. Thus, the Wilcoxon test was used to examine the effectiveness The Wilcoxon test results are presented in table 13.

**Table 13.** Wilcoxon Test Results on the Effectivenessof the Scientific Cues on the Food Theme

| | Posttest – Pretest |
|---|---|
| Z | -4.790[b] |
| Asymp. Sig. (2-tailed) | .000 |

Based on the Wilcoxon test results, the t-count obtained was equal to 4.790 (significance of the Wilcoxon test results is p = 0.000). Thus, p <0.05, which means that Ha was accepted, and Ho was rejected, suggesting that the presentation of the concept of useful scientific cues can improve the integrated science-Tafseer learning outcomes (the ability on scientific cues stages) on the food theme of science Education students and can contribute to the applicability of scientific cues concept stages in developing the integrated science-Tafseer learning model. The result is corroborated by Nursa'adah et al. (2018) that the Model of Educational Reconstruction is an effective design of learning to develop students' conceptual knowledge. According to Dwianto et al. (2017) in their research, science domain-based learning tools integrated with local wisdom are

effective in improving students' science process skills and scientific attitudes. In the aspect of science-Tafseer integration, Laila (2014) concluded that an in-depth understanding of the Qur'an helps one discovers scientific evidence therein. Armainingsih (2017) suggested that scholars use scientific interpretations. In line with Ardianto & Rubini (2016), they concluded that integrated sciences learning through guided discovery models and problem-based learning could improve students' scientific literacy. In line with previous research, Zubaidah et al. (2017) showed that the highest creative thinking skills are demonstrated by students taught using Differentiated Learning Science Inquiry Integrated with Mind Map (DSIMM).

## CONCLUSION

The results of the study concluded that the stages of the scientific cues concept could contribute to its applicability and feasibility in developing an integrated science-Tafseer learning model. The feasibility of the scientific cues concept stages in developing the integrated science-Tafseer learning model has been tested in its development, with results, first, stages of the scientific cues concept according to needs assessment in developing the integrated science-Tafseer learning model. Needs assessment results of the scientific cues concept from Tafseer lecturers of Indonesian Islamic higher education institutions as many as 42 respondents generated a mean of 3.62, which fell into the "badly needed" category. Second, feasibility of the scientific cues concept according to scientists and interpreters. Results of expert validation suggest that the concept of scientific cues on the food theme generated a mean of 4.15, which fell into the "good" category. Third, the scientific cues concept instruments are valid. Results of instrument validity testing using the indicator of compatibility of scientific cues with Learning Implementation Plans, scientific cues mapping, and contribution of scientific cues generated r (xy)> 0.30, meaning that all instruments of the scientific cues concept are valid, with Cronbach's Alpha reliability = 0.73, implying that those instruments are also reliable. Feasibility of the cues concept stage in the field test. Results for testing on the application of the stages of the scientific cues concept during the individual test generated a score of 3.88, which fell into the"good" category; during the group test generated a score of 4.57, which fell into the "very good" category; and during the limited test generated a score of 4.38, which fell into the "good" category. The final concept of scientific cues *kuluu* (eat) and *mimmaa* (food). on integrated science-Tafseer learning under the theme of food is found in QS. Al-Baqarah 168, QS. Al-Maidah: 88, and QS. An-Nahl: 114. Scientific cues are keywords universally integrated scientific facts derived from the verses of the Qur'an. The concept of useful scientific cues can improve the integrated science-Tafseer learning outcomes on food themes of Science Education students of IAIN Salatiga's Faculty of Teacher Training and Education, Indonesia. The effectiveness was obtained from the Wilcoxon test, with a t-count of 4.790 and significance (p) = 0.000, p <0.05.

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## REFERENCES

Akbar, A. (2017). Kontribusi Teori Ilmiah terhadap Penafsiran. *Jurnal Ushuluddin*, *23*(1), 31-45.

Alfana, M., Dewi, N. R., & Sukaesih, S. (2015). Pengembangan Lembar Kegiatan Siswa IPA Terpadu Berbasis Konstruktivisme Tema Energi dalam Kehidupan untuk Siswa SMP. *Unnes Science Education Journal*, *4*(1), 720-727.

Ardianto, D., & Rubini, B. (2016). Comparison of Students' Scientific Literacy in Integrated Science Learning through Model of Guided Discovery and Problem Based Learning. *Jurnal Pendidikan IPA Indonesia*, *5*(1), 31-37.

Arends, R. I. (2007). Learning to Teach: Jilid Dua (Terjemahan). *Yogyakarta: Pustaka Pelajar*.

Armainingsih, A. (2017). Studi Tafsir Saintifik: Al-Jawahir fi Tafsir Al-Qur'an Al-Karim Karya Syeikh Tantawi Jauhari. *At-Tibyan*, *1*(1), 94-117.

Asrizal, A., Amran, A., Ananda, A., Festiyed, F., & Sumarmin, R. (2018). The Development of Integrated Science Instructional Materials to Improve Students' Digital Literacy in Scientific Approach. *Jurnal Pendidikan IPA Indonesia*, *7*(4), 442-450.

Chusni, M. M. (2017). Pengaruh Kemampuan Dasar Matematika dan Kemampuan Penalaran Terhadap Hasil Belajar IPA/Fisika pada Peserta Di-

dik Kelas VII SMP Muhammadiyah Muntilan, Kabupaten Magelang, Jawa Tengah. *Berkala Fisika Indoneia*, *9*(1), 16-23.

Cobern, W. W. (2012). Contextual Constructivism: The Impact of Culture on the Learning and Teaching of Science. In *The Practice of Constructivism in Science Education* (pp. 67-86). Routledge.

Dwianto, A., Wilujeng, I., Prasetyo, Z. K., & Suryadarma, I. G. (2017). The Development of Science Domain Based Learning Tool Which is Integrated with Local Wisdom to Improve Science Process Skill and Scientific Attitude. *Jurnal Pendidikan IPA Indonesia*, *6*(1), 23-31.

Ertikanto, C., Rosidin, U., Distrik, I. W., Yuberti, Y., & Rahayu, T. (2018). Comparison of Mathematical Representation Skill and Science Learning Result in Classes with Problem-Based and Discovery Learning Model. *Jurnal Pendidikan IPA Indonesia*, *7*(1), 106-113.

Faizin, F. (2017). Integrasi Agama dan Sains dalam Tafsir Ilmi Kementerian Agama RI. *Jurnal Ushuluddin*, *25*(1), 19-33.

Farmawi, A. H. (1977). Al Bidayah fi al Tafsir al Maudhu'I.

Fogarty, R. J., & Pete, B. M. (2009). *How to Integrate the Curricula*. Corwin Press.

Fujiyanti, M., Susilowati, E., & Saputro, S. (2018). Studi Komparasi Learning Cycle 5E dan Learning Together Dikombinasi Dengan Drill and Practice terhadap Prestasi Belajar Kimia Ditinjau Dari Keterampilan Proses Siswa. *Jurnal Inovasi Pendidikan IPA*, *4*(1), 104-113.

Gall, M. D., Borg, W. R., & Gall, J. P. (1996). *Educational Research: An introduction*. Longman Publishing.

Harasim, L. (2012). *Learning theory and online technologies*. Routledge.

Hayati, N. (2015). Fahrurrozi.(2015). Pengembangan Perangkat Pembelajaran Berbasis Masalah untuk Meningkatkan Kemampuan Berpikir Kritis dan Komunikasi Matematis. *Jurnal Educatio*, *10*(2), 382-399.

Iqbal, M. (2010). Metode Penafsiran al-Qur'an M. Quraish Shihab. *Tsaqafah*, *6*(2), 248-270.

Laila, I. (2014). Penafsiran Al-qur'an berbasis Ilmu Pengetahuan. *Epistemé: Jurnal Pengembangan Ilmu Keislaman*, *9*(1), 45-66.

Mujahidin, A. (2013). Epistemologi Islam: Kedudukan Wahyu sebagai Sumber Ilmu. *Ulumuna*, *17*(1), 41-64.

Nurjannah, N. (2018). Analisa Kebutuhan Sebagai Konsep Dasar dalam Pengembangan Kurikulum Bahasa Arab di MAN Curup. *ARABIYATUNA: Jurnal Bahasa Arab*, *2*(1), 49-72.

Nursa'adah, E., Liliasari, L., Mudzakir, A., & Barke, H. D. (2018). The Model of Educational Reconstruction: Students' Conceptual Knowledge on Solid State Chemistry Domain. *Jurnal Pendidikan IPA Indonesia*, *7*(2), 193-203.

Peck Richmond, V., Wrench, J. S., & Gorham, J. (2009). Communication, Affect, & Learning in the Classroom. Retrieved from http://libros.metabiblioteca.org:8080/bitstream/001/170/8/CommunicationAffectAndLearning.pdf

Powell, K. C., & Kalina, C. J. (2009). Cognitive and Social Constructivism: Developing Tools for an Effective Classroom. *Education*, *130*(2), 241-251.

Prain, V., Tytler, R., & Peterson, S. (2009). Multiple Representation in Learning about Evaporation. *International Journal of Science Education*, *31*(6), 787-808.

Shihab, M. Q. (2007). *"Membumikan" Al-Quran: Fungsi dan Peran Wahyu dalam Kehidupan Masyarakat*. Mizan Pustaka.

Sugiyono.(2008). *Metode Penelitian Pendidikan: (Pendekatan Kuantitatif, Kualitatif, dan R&D)*. Alfabeta.

Suhandi, A., & Wibowo, F. C. (2012). Pendekatan Multirepresentasi dalam Pembelajaran Usaha-Energi dan Dampak terhadap Pemahaman Konsep Mahasiswa. *Jurnal Pendidikan Fisika Indonesia*, *8*(1).

Trianto, M. P. (2010). Model Pembelajaran Terpadu: Konsep, Strategi, dan Implementasinya dalam Kurikulum Tingkat Satuan Pendidikan (KTSP). *Kuala Lumpur: Kemetrian Pengajaran Malaysia*.

Yalcinkaya, M. A. (2011). Science as an Ally of Religion: A Muslim Appropriation of 'The Conflict Thesis'. *The British Journal for the History of Science*, *44*(2), 161-181.

Zubaidah, S., Fuad, N. M., Mahanal, S., & Suarsini, E. (2017). Improving Creative Thinking Skills of Students through Differentiated Science Inquiry Integrated with Mind Map. *Journal of Turkish Science Education (TUSED)*, *14*(4), 77-91.