Feasibility Analysis of Inquiry-Based Learning Design*Socio-Scientific Issues* (SSI) to Improve Students' Halal Literacy and Critical Thinking Skills on Additives and Addictive Substances

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Article Info	Abstract
	This study aims to analyze the feasibility of an inquiry-based Socio-Scientific Issues (SSI) learning design developed to enhance halal literacy and critical thinking skills among junior high school students on the topic of additives and addictive substances. The research employed a descriptive quantitative approach with a Research and Development (R&D) method, focusing on the product validation stage. Data were collected through validation sheets completed by three expert validators, covering 11 assessment components with a total of 57 aspects. The data were analyzed by calculating the feasibility percentage of each component. The validation results indicated an average feasibility score of 97.6%, categorized as excellent. These findings suggest that the developed learning design meets the criteria of content completeness, clarity of objectives, appropriateness of approach, and assessment feasibility, making it suitable for implementation in subsequent learning stages.

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1. INTRODUCTION

21st-century education requires students to master competencies that encompass not only conceptual knowledge but also higher-order thinking skills and value literacy relevant to everyday life (Laksono & Wibowo, 2022). One important form of value literacy introduced in science education is halal literacy, which is students' understanding of the halal status of a material or product from a scientific and ethical perspective, thereby fostering responsible consumption behavior.

In science learning, halal literacy plays a role in fostering critical awareness and moral responsibility in students regarding food safety, additives, and their impacts on health and social life (Navilah et al., 2024). However, halal literacy is rarely explicitly integrated into contextual science learning designs, even though this has the potential to increase the relevance of the material to students' real lives.

Approach *Socio-Scientific Issues* (SSI) provides opportunities to connect science topics to controversial social issues relevant to everyday life, thus encouraging students to think critically, discuss issues, and make informed decisions (Safwatun Nida et al., 2021). SSI-based learning models have been shown to improve scientific literacy, critical thinking skills, and data-driven decision-making (Hestiana & Rosana, 2020).

In the context of halal literacy, SSI can be utilized as a learning tool that integrates halal issues into scientific discussion topics, thereby encouraging students' cognitive and affective

engagement (Ummas Genisa et al., 2020). This integration also aligns with the principle of meaningful learning, where students learn scientific concepts through issues that have a real social impact.

Although various studies have demonstrated the effectiveness of SSI in improving critical thinking skills and scientific literacy, few studies have specifically analyzed the feasibility of SSI-inquiry-based learning designs that integrate halal literacy at the junior high school level (Faisal & Martin, 2022). Feasibility analysis is a crucial step before implementation to ensure the quality of content, language, presentation, and appropriateness of the learning context (Anggraini et al., 2020).

Based on these needs, this study aims to analyze the feasibility of designing an inquiry-based science teaching module on additives and addictive substances, designed to improve halal literacy and critical thinking skills in junior high school students. The results are expected to serve as a reference in developing adaptive, relevant, and contextual learning designs for science learning that integrates halal values.

2. RESEARCH METHODS

This study uses a quantitative descriptive approach with a Research and Development (R&D) method focused on the product validation testing stage (Sugiyono, 2019). This stage was chosen because the research objective was limited to testing the feasibility of the learning design, not its full implementation in the classroom. The validated product was a learning design based on *Socio-Scientific Issues* (SSI) which was developed to improve halal literacy and critical thinking skills of junior high school students on the material of additives and addictive substances.

The validation process involved three expert validators with competencies in science education, learning tool development, and halal studies. The assessment was based on eleven eligibility components, including completeness of content, clarity of learning objectives, appropriateness of models and approaches, integration of activities, meaningfulness of the SSI context, readability of language, and quality of worksheet (LKPD) preparation. The research instrument, a validation sheet, was designed based on indicators of learning tool eligibility according to educational evaluation standards (Putri & Qosyim, 2021).

Data collection techniques were carried out by completing validation sheets by experts, with a specific assessment scale for each indicator. Data were analyzed using the feasibility percentage formula, which divides the total score obtained by the maximum score, then multiplied by 100 percent, to determine the product feasibility category (Riduwan, 2020). The feasibility criteria refer to the score interpretation categories, namely very feasible, feasible, quite feasible, and less feasible, as recommended in the evaluation of learning tool development (Plomp & Nieveen, 2013).

3. RESULTS

The feasibility of this Socio-Scientific Issues (SSI)-Based Inquiry Learning Design in the Teaching Module was measured using an Expert Validation Sheet. Data from the research instrument validation were obtained from three expert validators in their respective fields. The expert validators provided assessments and input, and the assessments of the three validators are shown in Table 1.

Table 1 Validator Assessment Value

No	Research Components	Validator			Rate-rate
		1	2	3	
1	Completeness of Teaching Module Components	4	4	3,7	3,9
2	Completeness of Teaching Module Information	4	4	4	4,0
3	Time Allocation	4	4	3	3,7
4	Selection of Pancasila Student Profiles	4	4	4	4,0

5	Selection of Learning Models and Approaches	4	4	4	4,0
6	Clarity of Learning Objectives	4	4	4	4,0
7	Selection of Meaningful Understanding	4	4	4	4,0
8	Selection of Starting Questions	4	4	4	4,0
9	Learning Activities	3,8	4	3,7	3,8
10	Assessment	3,7	4	3,6	3,8
11	Preparation of Student Activity Sheets (LKPD)	3,9	3,7	3,7	3,8
	Amount	43,4	43,7	41,7	42,9
	Percentage	98,6	99,3	94,8	97,6
	Rate-rate		97,6		

The data in table 1 are the results of the assessment of the inquiry-based learning design instrument of *Socio-Scientific Issues*(SSI) by three expert validators from 11 assessment components with 57 assessment aspects consisting of the completeness of the teaching module components, the completeness of the teaching module information, time allocation, selection of Pancasila student profiles, selection of learning models and approaches, clarity of learning objectives, selection of meaningful understanding, selection of trigger questions, learning activities, assessments, and preparation of LKPD. Then the results of the three validators' scores were obtained, namely for validator 1 with a score of 98.6, validator 2 with a score of 99.3 and validator 3 with a score of 94.8. So, the average score of the three validators was 97.6 (a decent category with a very good predicate).

Instrument validation is an important stage in the development of learning designs to ensure that the instruments used have met the conceptual and practical feasibility of the content (Yusoff, 2019). In this study, the feasibility of the inquiry-based learning design was assessed. *Socio-Scientific Issues* (SSI) is assessed through an expert validation sheet given to three competent validators who have expertise in the field of science education and curriculum development.

The validation results by three expert validators show that the inquiry-based learning design of *Socio-Scientific Issues* (SSI) had an average feasibility of 97.6%, with a range of values between 94.8% and 99.3%. Based on the instrument's feasibility criteria, this value falls into the "very good" category (≥90%), indicating that this learning design is highly suitable for use in the learning process (Riduwan, 2015).

The high validation value indicates that the teaching module has fulfilled important aspects such as completeness of content, clarity of objectives, suitability of approach, and feasibility of assessment. This reflects that the learning design has content validity (*content validity*) strong, namely the extent to which the instrument reflects the overall construct or concept being measured (Polit & Beck, 2007).

Good content validity is crucial in developing learning tools because it ensures that the designed materials and strategies align with the targeted competencies. SSI-based learning has been proven effective in improving students' scientific literacy, critical thinking skills, and social awareness (Subiantoro & Treagust, 2021). Therefore, these validation results support the feasibility of the design for implementation in the next phase of the research.

4. THE KNOT

The results of this study indicate that the Socio-Scientific Issues (SSI)-based inquiry learning design developed to improve students' halal literacy and critical thinking skills on additives and addictive substances was deemed highly feasible based on validation by three experts. The average feasibility percentage reached 97.6%, which is classified as very good. This learning design has met the criteria for completeness of content,

clarity of objectives, appropriateness of approach, and feasibility of activities and assessments. Therefore, this design can be used as a basis for the implementation and further development stages in science learning that integrates halal values and strengthens critical thinking skills.

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