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Integration of Local Culture in the Search, Solve, Create and Share (SSCS) Learning Model to Improve Scientific Literacy: A Literature Review

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Abstract

Scientific literacy is an essential competency for students in the 21st century, yet its development in Indonesia remains a challenge. One of the contributing factors is the lack of contextual learning models that connect scientific concepts with students' daily lives. This study explores the integration of local culture into the Search, Solve, Create, and Share (SSCS) learning model as a potential approach to improving students' scientific literacy. A Systematic Literature Review (SLR) was conducted by analysing relevant studies published between 2021 and 2024 in Sinta 1, Sinta 2, and ERIC databases. The articles were selected based on predefined inclusion and exclusion criteria and analysed using thematic analysis. The findings indicate that while science literacy and local culture have been widely discussed separately, research explicitly integrating the SSCS model with local culture remains limited. The results highlight the potential of this integration in enhancing students' engagement and conceptual understanding while addressing challenges in its implementation. This study provides recommendations for developing contextual and culturally relevant science education, which not only fosters scientific literacy but also contributes to the preservation of local wisdom.

Keywords: Science literacy, Local culture, SSCS model

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INTRODUCTION

Scientific literacy skills are one of the main competencies that students must have in the era of globalisation. According to Alfiah & Miftahul (2024), Scientific literacy not only includes an understanding of basic scientific concepts but also involves students' ability to think critically, solve problems, make decisions based on evidence, and apply scientific concepts in everyday life. Science literacy involves multiple dimensions and has a multilevel hierarchical structure (Holbrook et al., 2009; Laugksch, 2000; Miller, 1983; Shen, 1975 in Zhang et al., 2023). This competency is becoming increasingly important in the context of the rapid development of technology and science and the need for a generation that is able to face complex challenges. However, according to the Programme for International Student Assessment (PISA) report OECD (2019), the scientific literacy of students in Indonesia is still far from satisfactory. According to PISA 2022 data from Kemendikbudristek, the level of scientific literacy has increased by 5-6 positions compared to PISA 2022, and the average score for scientific literacy has fallen by 13 points to 383. This shows a significant gap between students' scientific literacy skills and the demands of 21st-century competencies. Suparya et al. (2022) explain that the less significant role of the environment in determining the selection of teaching material and learning models that are less relevant to the context of students' lives makes the interest of students in learning

science weak one of the causes of weak scientific literacy in Indonesia. Other studies also indicated that a significant number of students experience difficulties in understanding scientific concepts related to their daily lives (Fuadi et al., 2020).

Applying an innovative and effective learning model is one solution that can be practised. By definition, a learning model is a framework that becomes a reference in the learning process, such as the methods and techniques used to achieve learning objectives (Purnomo et al., 2022). If the proper model of learning is applied, students can learn easily and grasp the concept of science well and their practical application in real life (Erlilestari et al., 2020). On the other hand, new types of learning models like the Search, Solve, Create, and Share (SSCS) possess great promise to enhance science literacy skills. The learning model consists of 4 stages, namely: (1) Search, at this stage, students look for problems (2) Solve, this stage is used to plan solutions (3) Create, this stage is where the solution is created (4) Share, students share the results of the solution that has been found (Pizzini & Shepardason, 1992 in (Luthfiyah et al., 2021)). This model, however, goes beyond concept-based learning and incorporates several elements of science literacy, including collaborative thinking and communication. The results that were studied by Ihsan et al. (2023) revealed a significant increase in knowledge of science concepts and critical thinking skills when this model was applied to the students. It is also a case that the SSCS model is superior in the aspect of improving science literacy when compared with other learning models (Sanaky & Magfirah, 2023). The SSCS learning model can be integrated with local culture to create a more contextual and relevant learning experience, as expressed in research by (Falah et al., 2018).

One emerging approach that has started to gain traction is local culture integrated into learning science. However, based on research by Pertiwi and Firdausi (2019), science literacy can increase through an approach to local culture. The local culture has great potential for increasing student participation in learning, considering that culture is an inseparable part of the life of students (Sary et al., 2023). Students' cultural identity can also be strengthened by local culture (Foa et al., 2024). Not just a more relevant context to make sense of its stories but also a way to sustain and elevate indigenous values that are becoming more and more alienated by globalisation. According to Karmila et al. When the approach is incorporated into local culture, which is evident in (2021), it can increase the relevance of learning and student engagement. Learning through localised materials is expected to create conditions to understand science concepts more deeply and create better science learning (Ayu et al., 2024). Furthermore, this integration of local culture into science learning could also enhance these students' identity towards their own culture and relate them to the real world (Syazali & Umar, 2022).

Although considerable research exists in each development field (scientific literacy, local culture and the SSCS model), no-mentioned studies explored the inter-relatedness of the variables. A systematic literature review is required regarding the possibility of incorporating innovative learning types, such as the SSCS model and local culture, to aid in developing scientific literacy among students. This study seeks to analyse various relevant studies to obtain potential and strategies for the integration of local culture with the SSCS model in science education. The study employs a literature review methodology and focuses on opportunities as well as challenges in integrating the SSCS model with local culture. In addition, this study provides initial recommendations that can be used as a basis for further application in designing more relevant and contextual learning. Thus, this study is expected to contribute to efforts to improve students' scientific literacy while supporting the preservation of local culture, which is the identity of the Indonesian nation. The research questions posed in this study are as follows:

1. RQ1 How is the application of the SSCS learning model integrated with local culture in improving students' science literacy?

2. RQ2 What are the challenges and opportunities faced in implementing the SSCS learning model integrated with local culture in the context of science learning?
3. RQ3 How can local culture strengthen science learning in the context of students in Indonesia and increase the relevance and engagement of learners?

METHODS

Research Design

This study aims to explore the potential of integrating the SSCS model and local culture in improving students' science literacy, as well as identifying opportunities and challenges of implementing the model, the results of which can be used as a basis for designing more relevant and contextualised learning, using the Systematic Literature Review (SLR) method with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) approach. SLR is a scientific study that focuses on a specific question and uses predetermined explicit scientific methods to identify, select, assess and summarise findings from similar studies (Handayani, 2017). The PRISMA approach is used to ensure that the SLR process is transparent, complete, and standardised so as to improve its quality, reproducibility, and usefulness for policymakers and further research (Simamora et al., 2024). The stages in this study include identification of data sources, article selection, eligibility assessment, and data extraction.

Inclusion Criteria

Articles selected for this study must meet several inclusion criteria, namely articles published in English or Indonesian between 2021 and 2024 and available in full-text PDF. The articles selected must be relevant to the research focus on the integration of local culture, science literacy, and the application of the SSCS model. In addition, the articles should not be abstracts, books, theses, dissertations, or seminar proceedings. Articles listed in journals indexed in Sinta 1, Sinta 2, and ERIC, using the keywords “Science Literacy”, “Local Culture”, and “SSCS Model”, as well as those addressing topics related to the review's research questions, were also included in the inclusion criteria.

Exclusion Criteria

Articles that fail to meet the inclusion criteria, such as those published prior to 2021, that are not available in full-text PDF, or that are only abstracts, books, theses, dissertations, or seminar proceedings, will be excluded from this study. Articles that are irrelevant to the research topics of local culture, science literacy, and the application of the SSCS model, as well as learning that is not in the scope of science, will also be excluded. Then, studies whose subjects are advanced students will be excluded. In addition, articles that are meta-analysis studies or research that have not reached the development stage will also not be used in this research.

Data Sources

The data sources used in this study are articles from journals indexed in Sinta 1, Sinta 2, and ERIC. These databases were chosen due to their credibility in providing high-quality scientific articles relevant to the research focus.

Search

The search strategy was conducted by determining the following steps: searching using specific keywords such as "Science Literacy", "Local Culture", and "SSCS model"; using databases such as Sinta, ERIC, and Google Scholar. Google Scholar was used to determine whether all relevant articles had been found, and the articles were filtered based on the suitability of the title, abstract, and content to the research focus. Based on the search results using these keywords, the number of articles obtained is shown in Table 1.

Table 1. List of Selected Articles Based on Database Criteria

No	Database	Count
1	Sinta 1	82 Article
2	Sinta 2	404 Article
3	ERIC	144 Article
	Total	630 Article

At this stage, screening of literature findings was carried out on December 4-16, 2024. Literature screening was conducted on the aspects of title, abstract, and keywords. Different keywords determine the determination of keywords such as "Science literacy, local culture, and SSCS" in the search. From the search results, there were 82 articles from Sinta 1 data, 404 articles from Sinta 2 data, and 144 articles from ERIC data, all of which were published in 2021-2024. This timeframe was chosen to ensure relevant and up-to-date research. For search results with the keywords "Science Literacy" 305 articles; "Local Culture" 308 articles; "SSCS" 17 articles, for a total of 630 articles. There were no duplicated articles at this stage of the search.

Assess Quality

In the next stage, researchers assessed the quality of the articles. Previously, from a total of 630 articles, 508 articles did not meet the inclusion criteria, and the remaining 122 articles met the inclusion criteria. In the next reduction stage, the screening process was carried out. A total of 65 articles were not related to science learning but general subjects and only 88 articles would continue with the quality assessment. In this stage, researchers used the Critical Appraisal Skills Programme (CASP) checklist, which is used to organise and synthesise the results of the assessed research, taking into account the quality and relevance of the existing studies (Long et al., 2020). The assessment includes validity, reliability, and relevance of the research to the questions asked. The criteria used according to CASP are shown in Table 2.

Based on the criteria in Table 2, out of 88 articles, 65 articles did not fulfil CASP. Articles that met CASP included seven articles focused on science literacy and local culture, eight articles focused on local culture, three articles focused on science literacy with contextual learning, and five articles focused on the SSCS model, so the final result is 23 articles.

Next is the PRISMA flowchart used by researchers to detail the systematic process of identifying, screening, and selecting studies in this study. The PRISMA flowchart is also used to make it easier to read the results of the article selection. The results of the PRISMA selection are presented in Figure 1.

Table 2. Article Selection Criteria Based on CSAP

Section	Question
Are the results valid?	• Was there a clear statement of the research objectives? • Is the qualitative/quantitative methodology appropriate? • Was the research design appropriate to achieve the research objectives? • Was the recruitment strategy appropriate to the research objectives? • Was the data collected in a way that is appropriate to the research issue? • Has the relationship between the researcher and the participants been properly considered?
What was the result?	• Have ethical issues been considered? • Was the data analysis sufficiently rigorous? • Is there a clear statement of the findings?
Will the results help locally?	• How valuable is this research?

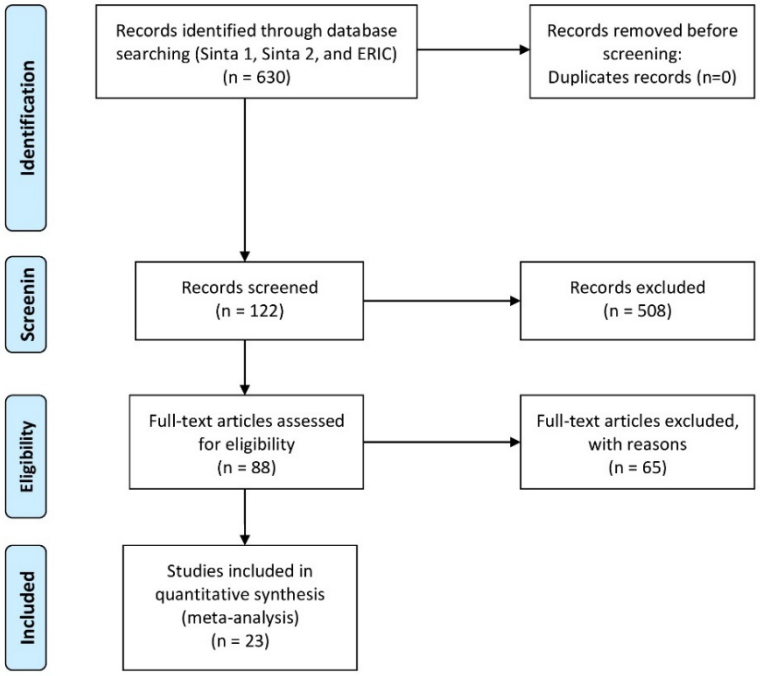

Figure 1. PRISMA Article Selection Process Diagram

Data Extraction

Data extraction was done after the articles were selected. At this stage, relevant data from each study was extracted. This data includes information such as index, journal name, title, author name, year, research method, and findings.

RESULTS & DISCUSSION

Results

This section presents the results of the systematic literature review (SLR) that has been conducted. The data obtained from 23 articles were analysed to answer the research questions that have been set. The following are the results of data extraction from research on the integration of local culture in the SSCS model to improve science literacy, as shown in Table 3. The language listed in the title corresponds to the original language of the article title in the journal.

Table 3. Final research results from 23 Articles

No	Index and Journal Name	Title, Author Name, and Year	Research Methods	The findings
1	Sinta 1, Edulearn	How does the ethnoscience-students' worksheet (ESW) influence science learning? (Nisa' et al., 2024)	The survey method used a questionnaire as a data collection instrument.	• Learners' responses are more significantly affected by science education than by ethnoscience. • Worksheets based on ethnoscience have an indirect impact on students' responses. • The LKS has a greater influence than science learning and ethnoscience.
2	Sinta 1, Edulearn	Enhancing mathematical reasoning: role of the search, solve, create, and share learning (Putra et al., 2024)	Quasi-experiment with a pre-experimental design, which does not use a control group	• The SSCS model had a notable positive impact on students' mathematical reasoning. • The results of the t-test indicated a significant effect ($p < 0.05$). • Effect size is 0.97, indicating a substantial impact. • SSCS is effectively used in learning linear equations.
3	Sinta 1, IJERE	Indonesian National Assessment Support: Can RE-STEM Does the Android app improve students' scientific literacy skills? (Subali et al., 2023)	Quasi-Experiment with One-group pretest-posttest design	• Learners' science literacy increased by 61.33% in the moderate category. • RE-STEM App effectively helps teachers improve learners' science literacy. • Ethno-STEM can be an important strategy in developing science literacy. • Learners can understand science concepts better through an ethnoscience approach.

4	Sinta 1, IJERE	Improve critical thinking skills using traditional musical instruments in science learning (Rahmat et al., 2023)	Quasi-Experiment with One-group pretest-posttest design	• Experiments with Flute and Phypox improved learners' critical thinking. • There were notable differences between the pre-test and post-test scores. • Students demonstrated a better understanding of the concepts related to frequency, open organ pipes, and the speed of sound. • This method proved effective in enhancing comprehension of scientific concepts through hands-on experimentation.
5	Sinta 2, JPPPF	Exploring Learning Physics Concepts Through the Local Wisdom of East Kalimantan Culture: Traditional Weapons, Sumpit (Putri et al., 2024)	Descriptive qualitative with the explorative approach.	• The use of chopsticks involves various physics concepts (mechanics, fluid, and wave) • Exploration of physics concepts in local culture can enrich the reference of physics teaching materials.
6	Sinta 2, Journal of Innovation in Educational and Cultural Research	Improving Students' Scientific Literacy and Cognitive Learning Outcomes through Ethnoscience-Based PjBL Model (Rusmansyah et al., 2023)	Quasi-experiment with non-equivalent control group design.	• Significant differences were observed in scientific literacy and cognitive learning outcomes between the experimental and control groups. • Students responded very positively to the ethnoscience-based project-based learning (PjBL) model. • The ethnoscience-based PjBL approach has been shown to enhance students' scientific literacy and cognitive learning outcomes. • This model plays a key role in enhancing the quality of chemistry education.
7	Sinta 2, Journal of Innovation in Educational and	The Development of Science Module Integrated with Ethnoscience of Singo Barong	Development research using the Borgh and Gall model	• The science module that incorporates the Singo Barong mask ethnoscience has proven effective in enhancing scientific literacy and

	Cultural Research	Mask to Improve Scientific Literacy and Cultural Preservation Attitudes (Jihannita et al., 2024)		fostering attitudes toward cultural preservation. • The increase in science literacy and cultural preservation attitudes is indicated by a gain value of 0.7 (medium category). • The module is considered feasible and very practical based on validation by experts and practicality assessment of students.
8	Sinta 2, Journal of Innovation in Educational and Cultural Research	Implementation of Ethnoscience-Based PjBL on Science Literacy Learning Outcomes (Hidayah et al., 2024)	Qualitative descriptive	• Ethnoscience-based PPA learning improves learners' science literacy. • PPA helps learners develop process skills, scientific attitudes and communication skills in the context of local culture. • Ethnoscience-based projects motivate students to create, address challenges, make decisions, and develop products that integrate culture with science.
9	Sinta 2, Journal of Innovation in Educational and Cultural Research	Culturally Wetland Responsive Teaching to Improve Science Literacy and Wasaka Character (Syahmani et al., 2024)	ADDIE development research method	• The findings of the study indicate that the e-module grounded in Culturally Wetland Responsive Teaching is valid, practical, and effective for instructing students on the colligative properties of solutions.
10	Sinta 2, Journal of Innovation in Educational and Cultural Research	Implementation of Character Education through Project Activities Expo in the Emancipated Curriculum Based on Sundanese Culture at Junior High Schools (Aziz et al., 2024)	Phenomenological approach with interpretive qualitative research	• Sundanese culture-based expo projects are effective in character education in junior high schools. • The development of projects, roles, and exhibition of works form a holistic character.

11	Sinta 2, Aksioma	Pengembangan Perangkat Pembelajaran Model SSCS Dengan Pendekatan Rme Dan Pengaruhnya Terhadap Kemampuan Berpikir Komputasional (Batul et al., 2022)	Development research (R&D) and experimental research	• Learning tools (lesson plans, worksheets, CT tests) are declared valid, practical, and effective • Most of the learners managed to follow the learning well • Learning tools based on the SSCS model combined with the RME approach demonstrated a significant impact on students' computational thinking skills.
12	Sinta 2, JPPIPA	The Concept of Ethnoscience in the Sumbawa Traditional Barodak Wedding Procession in Science Learning (The Form of Objects in the Surrounding Nature) (Atmojo & Wafa, 2022)	Qualitative (Interview and Literature Study)	• Science learning in primary schools can be more meaningful and effective if integrated with local cultural values, such as those found in the Sumbawa traditional wedding barodak procession.
13	Sinta 2, JPPIPA	Development of Ethno-STEM-Loaded Digital Science Teaching Materials the Process of Making Traditional Sidoarjo Snacks Material of Force and Object Motion to Train Science Literacy in Elementary School Students (Juniawan et al., 2024)	ADDIE development research method	• Digital science teaching materials featuring Ethno-STEM content are effective in enhancing scientific literacy among fourth-grade elementary school students. • The digital science teaching materials received a feasibility rating of 92.42%, indicating they are very suitable for use. • The effectiveness of these digital materials has been confirmed, with n-gain results reaching 0.40, which meets the criteria for effectiveness.
14	Sinta 2, JPPIPA	Concept Attainment Model Based on Traditional Technology Organizers for Strengthening	The Borg and Gall development research method	• The model was validated and met excellent criteria. • The t-test results indicate that the concept achievement model based on traditional technology organisers is effective in enhancing global

		Global Science Literacy and Creative Character (Hadiati et al., 2024)		science literacy and fostering creative character.
15	Sinta 2, JPPIPA	Development of Science Teaching Materials Based on the Ecological Value of Mangrove Ecosystems as a Strategy to Improve Science Literacy of Junior High School Students on the South Coast of East Lombok (Santoso et al., 2022)	This research uses observation and pseudo-experimental methods.	• Students responded very positively to the teaching materials. • There was a notable improvement in students' science literacy following the use of teaching materials focused on mangrove ecology. • The percentage change in average pre-test and post-test scores indicated an increase, with the highest post-test score reaching 80.35% and the lowest at 79.44%. • The use of local resources as a learning tool is strongly encouraged.
16	Sinta 2, JPPIPA	Development of Junior High School Science E-Module Integrated with Socio-Cultural of Balinese Society to Improv Students Science Literacy (Utari et al., 2024)	Quasi-experiment and Observation	• Teaching based on mangrove ecological values has a significant effect on improving students' science literacy, especially in the coastal areas of East Lombok. • Utilisation of local potentials, such as mangrove ecosystems, as a learning resource is very effective in improving students' science literacy.
17	Sinta 2, JPPPF	Exploration of Physics Concepts in Local Wisdom of South Sumatera as an Effort to Develop Students' 21st-Century Skills (Wiyono et al., 2024)	Qualitative (observation, interview, and documentation)	• Local wisdom in South Sumatra, such as tongkang, pempek, smoked fish, salted fish, and kemplang, are closely related to physics concepts such as Archimedes' Law, temperature and phase changes, and heat transfer. • The use of this local wisdom is very relevant to the Merdeka Curriculum and helps students more easily understand physics concepts.
18	Sinta 2, EST	The Effectiveness of	Descriptive quantitative	• Collaborative learning is effective in improving the

		Learning Tools: Improving Students' Scientific Literacy through Collaborative Learning (Citra Dewi et al., 2021)	research with one group pretest-posttest design.	science literacy of high school students on ecosystem material, with an increase in N gain value of 0.67, sig value below 0.000, and sensitivity of 0.48.
19	ERIC, Journal of Education and Instruction	Developing Context-Based Teaching Materials and their Effects on Students' Scientific Literacy Skills (Raksun et al., 2024)	Development research with the Borg & Gall model The research design uses a quasi-experimental one-shot case study with descriptive and inferential statistical analysis (ANCOVA test).	• Students who utilised context-based teaching materials demonstrated a greater ability to interpret scientific data and evidence than in other areas, such as evaluating and designing scientific investigations and explaining phenomena scientifically.
20	ERIC, EJER	The Effect of Ethnoscience-Themed Picture Books Embedded Within Context-Based Learning on Students' Scientific Literacy (Yuliana et al., 2021)	Quasi-experiment with experimental and control group design.	• Context-based learning that integrates ethnoscience (EthCBL) is more effective in improving students' science literacy than traditional teaching.
21	ERIC, JPBI	Real action based on search solve create and share (SSCS) model to improve sustainability awareness of junior high school students (Suryawati et al., 2023)	Quasi-experiment with experimental and control group design	• The implementation of the SSCS learning model using an ESD approach has been shown to enhance students' awareness of sustainability through activities focused on solving environmental issues while also fostering knowledge, behaviours, and attitudes that promote a love for the environment.
22	ERIC, Journal of Education and Instruction	Effects of SSCS Teaching Model on Students' Mathematical Problem-solving	Quasi-experiment with experimental	• Significant differences were observed in problem-solving abilities and self-efficacy between the SSCS group and the control group.

		Ability and Self-efficacy (Zulkarnain et al., 2021)	and control group design.	• The SSCS group demonstrated superior problem-solving skills and higher self-efficacy. • The SSCS model is effective in enhancing students' problem-solving abilities and self-confidence. • Research endorses the application of the SSCS model across different educational levels.
23	ERIC, JPBI	Development of e-worksheet based on search, solve, create, and share (SSCS) Islamic context to improve science process skills on excretory system material (Elvanuari et al., 2024)	The 4D model development research	• SSCS-based e-worksheets with Islamic contexts are very feasible for use in learning the excretory system in grade XI. • Validation from design, material, and Islamic education experts showed very good results. • Limited and extended trials received highly positive responses from students.

The conclusion of the research that has been presented is based on the results of the analysis of 23 articles that have been reviewed; it was found that most of the research discussed science literacy, local culture, and SSCS learning models separately. The following are the results of the grouping of the 23 articles, shown in Table 4.

Table 4. List of Selected Articles Based on Research Subtopics

No	Subtopics	Number of
1	Science literacy and local culture	9 Article
2	Science literacy and contextual learning	1 Article
3	Local culture	6 Article
4	SSCS model	5 Article
	Total	23 Article

Based on Table 4, no studies were identified that directly integrate local culture into the SSCS model to enhance students' science literacy. This highlights a significant research gap, as previous studies have not developed or tested the effectiveness of embedding local culture into each stage of the SSCS (Search, Solve, Create, and Share) learning model. While several studies have demonstrated that local culture can enhance student engagement and comprehension in science, and SSCS has been proven effective in improving science literacy, no research has combined these two elements within a single instructional framework. Therefore, further research is necessary to develop implementation strategies for local culture-based SSCS learning and to conduct empirical studies assessing its effectiveness in improving students' science literacy.

Discussion

The findings from the literature analysis indicate that the integration of local culture within the Search, Solve, Create, and Share (SSCS) model remains limited. While several studies have examined the effectiveness of the SSCS model in enhancing scientific literacy and the role of local culture in science education, few have explicitly linked these two elements. Consequently, some of the research questions (RQs) in this study remain insufficiently addressed.

RQ1: How is the application of the SSCS learning model integrated with local culture in improving students' science literacy?

Research Gap

Based on the analysis of 23 articles, no studies were found that specifically applied the SSCS model with the integration of local culture in science learning. Most studies only examined the effectiveness of SSCS in improving science literacy (Suryawati et al., 2023; Ihsan et al., 2023) or discussed the utilisation of local culture in science without linking it to the SSCS model (Pertiwi & Firdausi, 2019; Setyorini et al., 2022). Thus, this research question cannot be answered because there is not enough empirical data to evaluate how the integration of local culture in the SSCS model can affect students' science literacy.

Further Research Recommendations

Experimental or quasi-experimental research is needed to test the effectiveness of the SSCS model integrated with local culture in the context of science learning. Such research will give valuable empirical data and aid in the development of potentially more effective strategies to apply this model in practice. Moreover, there is a need for SSCS-based learning modules or instructional materials that incorporate local culture, which will also provide an empirical basis for the application of this model and are expected to result in a learning environment more relevant and contextualised for the learners.

RQ2: What are the challenges and opportunities in implementing the SSCS learning model integrated with local culture in science learning?

Research Gap

No research directly addresses the challenges of implementing SSCS within the context of local culture for the simple reason that the model has not been widely developed. Some challenges found in the literature related to the integration of local culture in science education are as follows:

1. Limited available teaching materials that integrate local culture with scientific education (Hadi & Palupi, 2020). This indicates that most of the available teaching materials do not reflect the grandeur of local cultures that could be used as a context in science learning.
2. No training of teachers in carrying out culture-based learning (Rusmansyah et al., 2023). In the absence of proper training, teachers will not possess the skills or knowledge to incorporate local culture into education.
3. Curriculum limitations, as local cultures' integration into science learning is not explicitly stated in the national standards (Nisa et al., 2024). This implies that there is a need to revise the curriculum to incorporate factors of local culture more overtly.

Thus, specific challenges in applying local culture-based SSCS could not be fully identified since no research has been done on the implementation of the model.

Further Research Recommendations

Exploratory studies are required to identify challenges that may be encountered in implementing SSCS models based on local culture. This study may give further insights into the difficulties experienced by teachers and students within the teaching and learning process. Policies or guidelines for educators on how to adapt this model should also be formulated so that learners will be better equipped and more confident in bringing local culture into education.

RQ3: How can local culture enhance science learning and increase relevance and learner engagement?

Research Gap

Many studies have reported that local culture enhances the comprehension of scientific concepts and students' interest in learning science subjects (Setyorini et al., 2022). However, no research has explicitly correlated the integration of local culture within the SSCS framework and its effects on relevance and student engagement in science learning. Therefore, while there is evidence that local culture strengthens science learning, this research question cannot yet be specifically answered within the context of the SSCS model.

Further Research Recommendations

More research is needed on the application of culture-based learning strategies at different stages of SSCS (Search, Solve, Create, Share). For instance, in the "Search" stage, students may be asked to look for information about scientific phenomena relevant to the local culture of the learners. In the "Create" stage, however, students may be asked to create projects that exhibit cultural knowledge surrounding them. Furthermore, it is also important to develop learning modules with scenarios that incorporate local culture into the SSCS model. The module must be designed with guiding parameters aimed at helping teachers apply this approach effectively within the classroom context.

CONCLUSION

Based on a systematic review of 23 articles published between 2021 and 2024, it was found that the integration of local culture in the SSCS model to improve science literacy is still very limited. Although the SSCS model has been proven effective in improving learners' science literacy, no studies have been found that explicitly apply this model with a local culture approach. This research gap indicates that there is not enough empirical data to answer how the local culture-based SSCS model can contribute to learning. Therefore, further research is needed that focuses on developing and piloting local culture-based SSCS models. In addition, training for teachers and the development of local culture-based learning modules are also important steps in supporting the implementation of this model in schools. The results of this study provide a foundation for further research in developing learning strategies that are more contextual and relevant to students while supporting the preservation of local culture in education.

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