

Teachers' response to STEAM-based learning media implementation for improving learning quality in Riau Malay culture subject

Neni Hermita¹, Diniya Diniya², Diah Anugrah Dipuja², Dewi Nasien²,
and Tommy Tanu Wijaya²

¹Riau University, Indonesia

²Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia

*Email: diniya@uin-suska.ac.id

Abstract: This study aimed to develop students' critical thinking, creative, and problem-solving skills. The current study seeks to analyze teacher responses to implementing STEAM-based learning media to improve the quality of learning in Riau Malay Culture subjects. This research was conducted using a qualitative approach. Data was collected through questionnaires distributed to elementary school teachers who teach Riau Malay Culture subjects in Pekanbaru, Riau. The research results show that teachers positively respond to STEAM-based learning media implementation. Teachers assess that STEAM-based learning media can improve the quality of learning in Riau Malay Culture subjects. STEAM-based learning media can make learning more interesting, interactive, and meaningful for students. However, it should be noted that teachers must possess a deep understanding of the STEAM approach to pursue effective implementation. Therefore, the school needs support in providing the facilities and infrastructure required to implement STEAM-based learning media.

Keywords: *education quality, Riau Malay culture, science, technology, engineering, arts, and mathematics (STEAM)*

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INTRODUCTION

The relationship between standards and goals has long been tried to be enhanced to advance student achievement (Ambusaidi *et al.*, 2018) along with other areas of education such as skills (Çepni & Sarıoğlu, 2021; OECD, 2019). Educational experts worldwide have reconsidered the education system's construction (Beach *et al.*, 2014). They argue that curriculum integration emerges so teachers and students can cope with the skills of the 21st century (Cavas *et al.*, 2021; Çınar *et al.*, 2022; Karademir & Yıldırım, 2021). The US-based Partnership for 21st Century Skills (P21) identifies the competencies needed in the 21st century: "The 4Cs" – communication, collaboration, critical thinking, and creativity. All such important competencies are taught to students in the context of the core field of study and the theme of the 21st century. The Assessment and Teaching of 21st Century Skills (ATC21S) categorizes 21st-century skills into four categories: way of thinking, way of working, tools for working, and skills for living in the world (Griffin *et al.*, 2012). The way of thinking covers creativity, innovation, critical thinking, problem-solving, and decision-making. The way of working covers the skills of communication, collaboration, and

teamwork. Tools for working include awareness as a global and local citizen, life and career development, and a sense of personal and social responsibility. Skills for living in the world are information literacy, mastering new information and communication technologies, and learning and working through digital social networks. The challenge for 21st-century education is educating students living and working in an information-rich technology environment (Malik *et al.*, 2017). Technology is recognized to have significantly influenced the advancement of education and other sectors (Wijaya *et al.*, 2020).

Wagner (2010) and the Change Leadership Group of Harvard University identified the competencies and survival skills needed by students in the face of life, citizenship, and even in the world of work in the 21st century, emphasizing the following seven skills which are critical thinking and problem-solving skills, collaboration and leadership, agility and adaptability, initiative and entrepreneurial, able to communicate effectively both orally and in writing, able to access and analyze information and have curiosity and imagination. It is, therefore, crucial to create a learning environment that can cultivate and train the skills of the 21st century.

Learning of the 21st century is learning that prepares 21st-century generations to have the competencies of critical thinking and problem-solving, creativity, communication skills, and the ability to work collaboratively, often called 4C. In order to realize these competencies, learning in the twenty-second century has three main subjects, namely: learning and innovating skills, including the way of thinking and working; information, media, and technology, including tools used in work; and living skills in the world (Hadinugrahaningsih *et al.*, 2017). The change happening in the world requires a shift in the field of education. The learning-teaching system should be modified to meet this integration (Sedova *et al.*, 2016). The goal is more than just achieving high grades in mathematics and science. It is the idea of a generation capable of self-regulating, learning, and uniting in society professionally. Kelley and Knowles (2016) say that modern trends like STEM education have emerged to meet this integration. STEM education is an approach that focuses on integrating four subjects simultaneously, namely science, technology, engineering, and mathematics, in an applied approach (Hom, 2014). This integration is based on real-world applications. However, the desire to integrate subjects does not stop (Ormancı, 2020). There is an important need to incorporate art and design into the other four subjects. This desire has brought a wider education system, namely STEAM.

One of the 21st-century learning approaches that teachers can implement is Science, Technology, Engineering, Art, and Mathematics (STEAM). This learning approach is very attentive to the development of soft skills in pupils because it has associated the fields of science, technology, engineering, arts, and mathematics so that pupils are given a holistic understanding of the interrelationship of the field of science through the learning experience of 21st Century (Herlina *et al.*, 2022).

Riley (2021) defines STEAM Education as a learning approach that uses Science, Technology, Engineering, Arts, and Mathematics as access points to guide students' research, dialogue, and critical thinking. STEAM gives teachers, especially primary-level teachers, the power to use project-based learning (Taylor, 2019). Teachers must be able to innovate in teaching and using the teaching material. Teachers must have the skills to

assemble a variety of learning devices so that they can produce a model/media/application of learning according to the needs of the students and the demands of learning in the 21st century (Warsita, 2017; Irdalisa *et al.*, 2022). The skills and abilities of teachers in choosing and using technology effectively in accordance with the content of learning and pedagogy are very much needed.

Malay Riau Culture (BMR) entered into learning because Malay Culture became a strong identity in the traditions of the people in Riau Province. The strength of this tradition makes Malay Culture one of the visions and missions of the Government of Riau province in building its territory, namely "The realization of the Riau Province as the centre of the Malay economy and culture in the environment of a society that is agamis, prosperous and inward in Southeast Asia by 2020" (Tambak & Sukenti, 2019). Then, the government of Riau Province incorporated BMR into the education, included it in the curriculum, and realized it in learning.

The STEAM approach needs to be developed because the conceptual approach that has been used has not been able to improve the quality of learning, especially in the subjects of BMR. Some studies investigate the role of teachers in designing and implementing STEAM curricula. However, curriculum reforms are eventually implemented by teachers, as found by Kim and Bolger (2017) on STEAM education; if teachers do not have the knowledge, confidence, and curricular support of support to implement change, that change is unlikely to happen.

Research on STEAM applications has been done by experts, such as STEAM application to enhance student creativity (Christensen & Knezek, 2015; Engelman *et al.*, 2017; Harris & de Bruin, 2018; Kennedy *et al.*, 2016), STEAM approaches to improve concept mastery (Liliawati *et al.*, 2017), implementation of STEAM at secondary school level (Harris & De Bruin, 2018; Liu *et al.*, 2015; Quigley & Herro, 2016; Reinhold *et al.*, 2018), and STEAM implementation at primary school levels (Jamil *et al.*, 2018; Lindeman *et al.*, 2013). Most of this research focuses on improving students' skills, educational curricula, and assessment. However, little attention is paid to the perception, attitude, and readiness of the teacher in teaching (Shidiq & Yaminah, 2019). The perception and readiness of teachers and students, as well as students, will affect the way they learn in the classroom (Haney *et al.*, 2002; Harlen & Holroyd, 2007).

The research carried out by Kartini and Widodo (2020) on the readiness and confidence of teachers towards STEAM education. The results of his research show that students and teachers have a positive perception of STEAM career and learning benefits. Students are actually interested in STEAM, but the competence and factors that support and stimulate STEAM in schools are still low. Teachers still have low competence in implementing STEAM learning. This is due to the teacher's lack of knowledge and understanding of STEAM.

Research on the application of STEAM learning in learning Malay culture is still very little. Based on the results of the Publish or Perish search with article searches on Google Scholar for the last 5 years (2019-2023) there are 116 articles. Based on the 116 articles, 8 articles were found that examined STEAM learning and only 1 article examined the application of STEAM learning combined with Augmented Reality (AR) about traditional Bugis community games. This research was conducted by Khaerani *et*

al. (2023), that the implementation of STEAM AREDU-based learning innovations can strengthen numeracy literacy and understanding of students' local culture. However, the local culture discussed about the local culture of the Bugis community is not the Malay culture of Riau. Furthermore, research conducted by Sari and Andromeda (2023) on the implementation of STEAM-based modules on the topic of salt hydrolysis indicated that the modules were valid and practical for use at the high school level. The module designed is STEAM-based but not related to local culture, especially the Malay culture of Riau. Nevertheless, there is still not much research to study the response of teachers in the implementation of STEAM-based learning media for improving the quality of learning in Malay Riau Cultural (BMR) subjects, especially in primary schools.

Therefore, the study aims to find out how teachers respond to implementing STEAM-based learning media to improve learning quality in specialized BMR subjects in elementary schools.

METHOD

Conducted through qualitative study, research was conducted to find out how teachers responded to the implementation of STEAM-based learning media to improve the quality of learning on BMR subjects in primary schools. The research was carried out on all the primary school teachers who are in Riau who accommodate BMR subjects with data collection techniques such as the dissemination of online written interview through Google form. Once the data has been collected successfully, then the data processing is carried out. Specifically, the data analysis technique in this study uses inductive qualitative analysis, which is an analysis based on the data obtained, then a certain relationship pattern is developed. As for the steps that must be passed in data analysis are data reduction, data display, and conclusion drawing or verification.

Miles and Huberman suggest that activities in qualitative data analysis are carried out interactively and continue continuously until completion, so that the data is full. Activities during data analysis were namely data reduction data, data display, and conclusion drawing or verification. The activity of reducing data is that the raw data that has been collected and classified from interviews then summarized so that it is easy to understand. This aims to sharpen, select, focus, organize data with the focus of the research so that it is easy to understand. Data display is the second step after reducing data, which makes it easier for research to understand what is happening in the field about the factors that are the focus of research. If the initial conclusions are still temporary and will be changed if no strong evidence is found th,e next stage of data collection is needed. But if the conclusions put forward at an early stage are supported by valid and consistent evidence when the research goes back to the field to collect data, then the conclusions put forward are credible conclusions.

FINDINGS AND DISCUSSION

The data obtained in this study is derived from the results of the response of teachers who enrolled in BMR subjects in primary school to the process and learning outcomes of the BMR subject in elementary school.

First, how have BMR learning activities been in your class so far? (Sinthya, Safitri, S., & Suripah, 2023)

SN : The learning activities are going well and BMR learning forms good morals and shapes students' character in accordance with the values prevailing in society, history and customs.

BP: This has not been implemented well, this refers to the class subjects not being loaded for class 1, but this is taught in the P5 content in IKM.

Y : Still ongoing and in accordance with the curriculum program.

Based on the exposure of the answers given to the respondents above, it can be concluded that BMR learning in the class has gone well, smoothly and fun. Students have been able to follow the learning delivered, and the class conditions when learning is taking place are also conducive. BMR learning can also build and shape student morals in accordance with the norms that apply in the special local community environment in Riau. However, the practical activities in learning BMR have not gone with the maximum, because teachers still always stick to the handbook and follow the course on the curriculum and do not develop learning as needed in the classroom.

Second, what obstacles occur during BMR learning activities? (Ramadan, 2019)

Y : The problem is that children's interest in studying BMR lessons is decreasing.

DR : The reason is that I don't understand BMR learning, the delivery was not optimal.

NB : The obstacle that occurs in BMR learning activities in my class is that there are still non-Muslim students who experience difficulties in reading and writing Malay Arabic, while Malay Arabic writing itself is part of BMR learning.

BMR learning can also build and shape student morals in accordance with the norms that apply in the special local community environment in Riau. However, the practical activities in learning BMR have not gone with the maximum, because teachers still always stick to the handbook and follow the course on the curriculum and do not develop learning as needed in the classroom.

Insufficient learning equipment is also a significant obstacle for teachers in delivering learning material. Not every school has a BMR learning handbook. With this, it is difficult for teachers to deliver the learning material in class. Besides, there are also some teachers who are not linear with BMR subjects so that teachers do not understand the content of Riau Malay Cultural Subjects and this makes teachers not maximum in delivering BMR lessons to students.

The religious diversity that exists in the classroom is also the main point in the problem of BMR learning especially on the literary materials of the Malay Arabic, because the learning BMR not only knows the food or traditions that exist in Riau only but also is expected students can read even write a writing in Arabic literature.

Third, is there any learning media used when teaching BMR learning? If there is, explain!

DS : The media I use are learning videos. Pictures and sometimes I bring the object directly.

NN : I use is Audio Visual media, in the form of films and sound images, etc. and is linked to the learning material thus it makes the students easier to understand.

RZ : The media used in learning currently is audio video.

Based on the data, all respondents indicated that teachers have used a variety of learning media according to the materials to be taught. All teachers use audio-video media because it is considered easy to obtain and can be broadcast in the classroom. In addition, the teacher also brought concrete media into the classroom such as traditional meals (layang-layang, gasing, takraw, and so on) which are definitely played by students that are beneficial to build a common and sporting attitude on the students themselves as well as special Malay Riau food so that students know directly the shape and taste of the food.

Fourth, what are the learning outcomes of your students in the BMR subject so far in class? (Ningsih *et al.*, 2022)

SD : Alhamdulillah, my students' learning results during class were satisfactory and most of the students presented scores above the KKM (standard).

DN : The result is that students still have difficulty absorbing BMR subject.

RF : Not yet as expected, especially the Malay Arabic writing.

One of the major problems that has occurred is that students are still unable to read literary writing, because the BMR lesson is not only about the culture or tradition that is surrounded by Riau but also to know, write, and read the characters that have been characteristic of the people of Riau from ancient times until now. Besides, students' knowledge is still low compared to their skills.

Fifth, have you ever used STEAM (Science, Technology, Engineering, Art, and Mathematics) learning in BMR learning so far? (Mu'minah & Suryaningsih, 2020)

AT : Once, it is called combining student knowledge with technology and art.

WF : We have used it sometimes, but it does not run optimally.

BH : It seems yes, but maybe we don't realize it in the spontaneity of some of STEAM.

Most of the respondents stated that they have never applied STEAM to BMR subjects, but some teachers have embraced this STEAM in learning even though not all of the components of STEAM are implemented. Besides, there are still many teachers who have not understood how the proper aspects and components are based on STEAM so that teachers may have used STEAM for learning but are not aware of it. It is important to apply STEAM in classroom learning because STEAM approach can improve the quality of learning in various subjects, including the subject of BMR.

Previous research conducted by Wahyuningsih (2020) shows that the implementation of STEAM in BMR lessons can enhance the creativity of pupils who are characterized by pupils capable of solving problems and capable of making relationships with the surrounding environment. Moreover, media is known as one of the most important factors that support learning. It is also an intermediary in delivering messages from teachers to students (Hermita *et al.*, 2020).

The results show that teachers have understood a variety of media that can be used for learning, but teachers still use common media and do not develop them to get media that is more attractive to students. With the right learning media of course, students will become more enthusiastic in learning and directly understand the knowledge given by engaging directly to solve the problem given. This is in line with the research carried out by Suriyana and Novianti (2021)

Moreover, when STEAM approaches are implemented in primary schools, students and teachers should be careful about STEAM, teachers must be prepared to teach with STEAM and students should be ready to learn with STEAM. Both teachers and students should have a good perception of STEAM. This research on teacher perception is expected to add to the expertise of research on STEAM and be one of the references for determining policies in the implementation of steam in primary schools (Kartini & Widodo, 2020).

The other previous research conducted by Khaerani *et al.* (2023) write about the combination of AR and culture such as traditional Bugis-Makassar games is thought to be able to help students imagine the mathematical problems given and as a medium for cultural preservation in schools. This research found about Merging Culture and Technology: This innovation successfully integrates traditional Bugis-Makassar games with AR technology, creating a fun and engaging learning experience for students. Preservation of Local Culture: Through traditional games, this innovation helps in preserving and maintaining aspects of Bugis-Makassar culture. This creates awareness and pride in their cultural heritage among students. Strengthening Numeracy Literacy: The program effectively improves students' numeracy literacy by embedding mathematical concepts in the context of traditional games. This helps students to better understand and apply the concepts in everyday situations. Previous research conducted by Khoiri, Roshayanti, and Widarti (2023) about STEAM and ESD on fluid concepts found that The STEAM model integrated with ESD is very valid, has good practicality and effectively improves understanding of fluid concepts. The implications of this study are to make physics learning more interesting for students. Previous study conducted by Permana, Lestari, Harahap, Azhar, and Defianti (2023) indicated that there is a significant increase in students' creative thinking skills after learning using the PjBL model with the STEAM approach in learning Energy in Living Systems.

Combining knowledge of what has been known about education in Science, Engineering, or Mathematics with the additional potential and limitations of disciplinary integration required by the multidisciplinary STE(A)M as well as the convenience of using technology in creative ways to enhance STE(A)M integration in the classroom (Gamse *et al.*, 2017) requires significant professional effort. Specifically, it's closely related to design, a high-level professional competence for teachers (de Vries, 2020). The first global action born with this aim was to include "A" as a representative of the artistic discipline (also humanistic) in STEM projects to transform it into STEAM. His inclusion of artistic disciplines was unqualified and, in addition to expanding the interdisciplinary perspective by incorporating external fields into the scientific field, It also responds to the need to break the international stereotypes embedded in engineering for more than 40 years (Ortega-Torres *et al.*, 2019). Therefore, dealing with the STE(A)M educational challenge requires support for the progressive professional development of teachers when applying their principles in the classroom (de Meester *et al.*, 2021).

Specifically, it is essential how the STE(A)M approach is promoted and used to inform school practices and professional efforts of teachers as well as teacher development efforts. Aspects discussed in STE(A)M education, such as the level of integration of the desired inquiry approach, what role knowledge of disciplinary content in STE (A) M, or how much focus is on skills development. The implication of this research is the students' interest and

enthusiasm in learning are necessary to be continuously aroused and teachers also need to continue to figure out ways to build students' interest in the learning process because students' learning outcomes in knowledge are still quite satisfactory. One way to boost students' interest and enthusiasm in learning is by using STEAM-based learning media where some aspects of STEAM compensation are unconsciously used by teachers but requires more in-depth training for teachers on how to implement STEAM in learning. The development of STEAM-based learning media is also not only limited to Malay culture subjects of Riau but can also integrate with science. For future research, researchers can develop STEAM-based digital learning media with local cultural subjects, especially Riau Malay culture subject. Besides, it can also implement STEAM-based media and measure the level of understanding of student concepts. Future research can develop STEAM-based digital learning media on the subject of Malay culture of Riau. Researchers should also measure the level of student understanding of the subject by using STEAM-based digital learning media. Researchers can also measure student self-control in using digital media learning.

CONCLUSION

Based on results obtained in this line of research, it is concluded that BMR learning in elementary schools has run properly. Teachers provide knowledge related to BMR lessons as well as a variety of skill activities such as making special food or doing traditional games on the Riau area.

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