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The Effectiveness of Visual Alternative Module to Facilitate Science Teacher's Teaching Process in Boosting Orang Asli Student's Interest toward Science Subject

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Abstract

The effectiveness of the teaching and learning process is determined by its execution of teaching aids. Since it is vital for teachers to accept individuality and different ways of students' learning styles, more flexible and tailored teaching aids should be presented. Failing to do so will jeopardise students' interest in learning, especially in a complex subject with a minority group of students. Thus, the study aims to delve into perceptions on the effectiveness of a developed visual alternative module as a teaching aid for science teachers in stimulating Orang Asli student's interest toward science subjects. The study employed a qualitative research method where data were collected through a semi-structured interview with five Science teachers who teach Orang Asli students in Pahang, a state in Malaysia. The findings show that hands-on activity, experimentation, and technology integration are key approaches in increasing Orang Asli students' engagement, attention, and interest toward science subjects. It could also be concluded that presenting simple and clear visuals of teaching aids is an important factor in developing a visual alternative module. The study provides a guide for the Ministry of Education, teacher's training institutions, educational technologists, instructional designers and teachers in providing quality education through visual and technological integration, especially in the Science subject area.

Keywords: Visual Alternative Module, Science Teacher's Teaching Process, Orang Asli Student's Interest, Science Subject.

Introduction

Aspirations for a 21st-century school Science education as endorsed by the Education 2030 global project and the P21 Framework for 21st Century Learning, focuses on scientific knowledge, scientific skills, and scientific values and attitude (Ravana & Palpanadan, 2022). In line with this aspiration, the Ministry of Education for STEM education has highlighted a

pedagogical approach that focuses on students' creative and active participation in the solution of real-world problems (Karpudewan, 2023). Science teachers were urged to be more creative in their pedagogy, innovative in their teaching approach, and integrate technology into their instruction. This in turn will impact students' interest in the Science subject (Farihah et al 2021), students' learning process (Jawad, Majeed & Rikabi, 2021) and students' learning outcomes. Thus, capturing Science teachers' decision to integrate specific teaching approaches (Caims & Areepattamannil, 2022) and effective teaching aids (Chuang et al., 2023) is essential.

Nonetheless, this situation has become more complex in the context of Orang Asli students. Teaching them requires teachers to convey a relatedness and connectedness to every living thing, which is the foundation of Orang Asli tradition, culture, and spirituality (Razak, 2023). As suggested by Noor and Abd Razak (2022), Orang Asli students' understanding, and academic achievement can also be improved significantly when the lessons are relevant and applicable to their everyday activities. Based on that understanding, it is evoked that mainstream approaches to education, which do not reflect on Orang Asli values and tradition have failed to meet Orang Asli student's needs (Abdullah, 2022), thus impacting on their engagement in learning (Abdullah et al., 2023). Hence, the present study aims to investigate the effectiveness of a developed visual alternative module as a teaching aid for science teachers in stimulating Orang Asli student's interest toward science subjects. Then, it proposes flexible and tailored teaching aids for science teachers in stimulating the interest of Orang Asli students in science subject.

In supporting this effort, a visual alternative module was designed and developed. The function as an educational tool that involves visual concepts and providing differentiated learning experiences, the developed visual alternative module hope to assist Science teachers in increasing students' understanding and interest in learning the Science subject. Apart from a limited number of publications on similar research interests, it is anticipated that findings derived from this study will contribute to the formation of a successful teaching and learning standard for Orang Asli students and teachers, particularly in the Science subject area. This initiative is consistent with shift nine of the Malaysia Education Blueprint, which ensures inclusive and equitable quality education for everyone (Zabidi & Adams, 2022).

Science Education for Orang Asli

Science education is a subject that expects to reflect on students' everyday lives. This understanding requires teachers to conduct the Science teaching process by focusing more on hands-on activities, involvement in exploration and experiment series, and discussion and reflection sessions in understanding the Science concepts. A review of Science education in Australia has found that more than a quarter of students were unhappy with teacher-centred methods and note-taking in Science lessons (Goodrum, Druhan & Abbs, 2012). Their study also reported that conventional teaching and learning approaches had made students not feel interested in the lessons and have trouble in making connections to their everyday lives. Seriousness in shifting Science lesson toward inquiry learning, digital technologies, real-world experiences, and student-centred approaches have been addressed by many other countries, such as the United State (Hoeg & Bencze, 2017), the United Kingdom (Sahin & Yilmaz, 2020), and Indonesia (Fenanlampir et al., 2019).

With respect to Science Education in Malaysia, various initiatives have been carried out significantly. The dynamic of those changes undoubtedly influences the subject curriculum, teaching pedagogy, teaching aids and students' learning styles (Ismail, Salleh, Nasir, 2019).

However, this situation has brought challenges and difficulties to both teachers and students. Rather than giving a positive impact, those changes unfortunately have made the subject less popular among students (Mohd Shahali et al., 2019). Nonetheless, this situation has become more complex in the context of Orang Asli students. Teaching them requires teachers to convey a relatedness and connectedness to every living thing, which is the foundation of Orang Asli tradition, culture and spirituality (Razak, 2023). It is also suggested that when the lessons are relevant and applicable to Orang Asli's everyday activities, their understanding and academic achievement can be improved significantly. Based on that understanding, it is obvious that mainstream approaches to education, which not reflecting on Orang Asli values and tradition, have failed to meet the needs of Orang Asli students.

Visual Arts Integrated Education

In addressing these issues, Battiste (2005) has suggested that art-based teaching and learning, especially through visual forms, may have the potential to contribute to overcoming these challenges. This statement thus highlights the ability of the arts, especially through visual forms, to promote learning which is often attributed to the capacity of art-making to provide experiential, emotional and spiritual engagement and personal expression to promote personal attachment and commitment to learning (Gradle, 2019). Focused training in the arts has been shown to boost cognition by strengthening the brain's attention system and enhancing capacities for attention, memory and learning (Patterson, 2015). Further, visuals are more likely to be remembered since it processed more conceptually than words. The relation effects of the aesthetic experience in art and interpretation are realised through the student's perceptual, appreciative and interpretive process.

Given the importance of uplifting Orang Asli's quality education and the impact of visual arts to uplift Science education subject area, it is extremely important to undergo this study. Although few initiatives have been initiated by the Malaysian authorities to increase Orang Asli education, the success and effectiveness of those efforts have yet to be determined. In addition to the lack of information about current teaching approaches among teachers that teach Orang Asli students (Abdullah et al., 2023), a more in-depth study needs to be done, as it varies and might differ for each context and situation. Thus, it is hoped that findings from this present study will provide a clearer picture and facilitate Orang Asli students and teachers to ensure better education. Furthermore, the development of the alternative module is hoped to serve as a guide and reference for the Malaysian government and the Ministry of Education towards establishing a standard for successful teaching and learning among Orang Asli.

Research Methodology

This study is developed as a qualitative approach to acquiring a full understanding of the investigated phenomena. The collection of data involved a semi-structured interview with five Science teachers who teach Orang Asli students in Kuala Lipis, Pahang, a state in Malaysia. Those teachers' teaching experience ranged from ten to twenty years, thus identifying their vast knowledge, skills, and experiences. A semi-structured interview was employed to assess the respondents' ability to pick up on unexpected topics and avoid biases towards researchers involved in the study (Busetto et al., 2020). The collected data were then analyzed thematically. In strengthening the research findings, a thematic analysis through coding, sorting, and identifying the themes and relationships from the data was employed. This

process was embarked on due to different types of data in understanding the case better (Baxter & Jack, 2015).

In regard to the entire process of developing the visual alternative module, ADDIE mode was adopted in this study. Functioning as a process for planning and creating effective learning experiences, the ADDIE Model is often used to design the learning and development process. The model consists of five phases as presented in Table 1.

Table 1
Adaptation of ADDIE Model and its Phases

Phases	Phase Identification	Processes Involved
Analysis	Determining what is needed in the development of SKSS as a visual alternative module	Identifying Science teacher's teaching methods in elevating Orang Asli students learning of Science subject
Design	Conducting the design process of SKSS as a visual alternative module	Formulating the objectives of SKSS as a visual alternative module, planning the module instructions, identfying relevant resources, integrating learning theories, alignment with the Dokumen Standard Kurikulum & Pentafsiran for Science subject
Development	Undertaking the production of SKSS as a visual alternative module	Integrating technological applications and multimedia elements in developing SKSS as a visual alternative module
Implementation	Actual delivery of SKSS as a visual alternative module	Integrating SKSS as a visual alternative module in expanding Orang Asli student's understanding on related topic of Science subject
Evaluation	Determining the acceptance of SKSS as a visual alternative module	Examining Science teacher's acceptance of SKSS as a visual alternative module toward facilitate their teaching process for Orang Asli students

Research Findings

The finding of this study indicates that the developed module was positively accepted by the teachers. Engaging and appropriate visuals, hands-on and experiment activities, and interactivity of the developed module have contributed toward its acceptability. For instance, Teacher 2 expressed his opinion on the importance of an alternative module for teaching aids that would assist teachers in enhancing students' understanding and attracting them to science learning in more engaging ways. In addition, Teacher 3 stated that this alternative module is engaging, and non-text-book-like content could assist teachers in diversifying their instructional strategies. On the same note, Teacher 5 found this module interesting because it contains fewer sentences and more visuals and complimented the module's equivalence to international standards, which will increase Orang Asli students' interest in learning science. The following are the excerpts discovered by the three teachers:

...the visual used are very beautiful, modern and neat. (Teacher 1)

> ...very interesting and interactive. In my opinion, we really need this module as teaching aids. For me, with the right implementation, it can increase students' understanding and attract them to experience science content themselves (Teacher 2)
>
> ...very good. Teachers can also diversify their teaching techniques and materials with the help of this alternative modulebecause their activities are different from textbooks and very interesting (Teacher 3)

On the other hand, Teacher 4 and Teacher 5 both compared the developed module favourably to textbooks used in primary school. Teacher 4 revealed that teachers who wish to concentrate on experimental activities could utilise this alternative module as supplement material. Based on his observation, he also found that the alternative module was ideally suited for usage by both teachers and students and will stimulate students' attention because it contains material not found in the textbook and allows students to gain new knowledge.

This module provides different exposures to experiments, which adds a new opportunity to create a learning experience through different methods. This is an exceptionally a good input to the textbook which is sometimes described as too typical. With that, students can expect the outcome of the experiment. In this case, the textbook fails to create innovative learning since the students know the ending and result before doing the experiment as stated in the textbook. So, when teachers use this module, it will attract students' interest because this is something they do not learn in class, and it is something new (Teacher 4).

In a similar vein, Teacher 5 agreed that this visual alternative module could be used as a teaching and learning aid to boost the learning interest of Orang Asli students in the science subject because the modules' activities are easy to grasp and do not rely too heavily on text. He justified his viewpoint by noting that it is difficult for Orang Asli students to read the lengthy phrases included in standard textbooks.

> ...it can be supplementary, which means we can use the textbook, we can also use this module to do activities because activities from this module are more reasonable because Science activity books now have too many text. Since this native student is already challange of not being able to read and then want to write again, this module will be very helpful for them (Teacher 5)

In terms of their remarks on the modules' interactivity, the respondent's acceptance of the alternative module was positive. This module's intervention includes the use of multimedia elements, stickers and posters. Four respondents agreed that the interactivity of this module use of video, audio, stickers and posters could capture the interest of Orang Asli students in their learning process. The respondents valued the stickers offered in the module as a factor that can boost the learning interest of students since it relates to Orang Asli students' interest in engaging in art-related and enjoyable learning activities as described by Teacher 1, Teacher 4, and Teacher 5.

> ...I believe that other teachers will also be interested in this module. Their students will also be interested in using this module, especially with the additional stickers and posters, the students will love it (Teacher 1)
>
> ...I really like that sticker. Becasue if we want to attract the interest of native students, the techniques used are very suitable for them (Techer 4)
>
> ...can greatly increasse student's interest. My students really like thing like this. There are hands-on activities, there are videos and audios, tehre are stickers, they really like it (Teacher 5)

Research Discussion and Conclusion

Undoubtedly the modernization of the teaching and learning process has required teachers to change their pedagogical approaches. Flexibility and student-centred and technology-driven teaching approaches have become a demand in ensuring successful instruction processes happen. The finding from the present study suggested that students' hands-on and experiment-based activities have become the primary teaching method for respondents in teaching science. This result is consistent with the findings of Margot and Kettler (2019) who found that hands-on activities foster a passion for lifelong learning and inspire students to explore and discover new information. Malik and Zhu (2023) also noted that when students are actively involved in hands-on activities, they are more likely to value and understand the content of the lesson. Respondents agreed that incorporating hands-on activities not only boosted the students' enthusiasm for learning, but also stimulated their critical thinking and problem-solving skills, Through hands-on exercises, students gain knowledge, apply the given concept, and may generate a workable solution to a problem.

The study concludes that hands-on activities, experimentation and the use of technology are the primary approaches utilized by science teachers to boost the learning interest in Science subjects among Orang Asli students. Providing simple and clear visuals, interesting hands-on and experiment activities, implementing design principles and providing interactivity are all essential in developing a visual alternative module to enhance Orang Asli students' learning interest in science subjects. It is hoped that findings from this study will assist science teachers in ensuring creative, innovative and effective instruction processes happen. Furthermore, it is time for educational experts to consider conducting additional research on the development of alternative modules for Orang Asli students in order to improve educational tools for students.

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