



# Exploring Learning Potential Through artSMart 8: Perspectives of Mathematics Teachers in Indigenous Schools

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## ABSTRACT

In Malaysia today, challenges in learning mathematics, such as resource limitations and weakness in literacy and numeracy among Indigenous students extend to the teaching of mathematics, which has faced significant difficulties as well. The study examines the learning opportunities offered by the artSMart 8 program, which employs an innovative educational approach that integrates artistic expression with mathematical concepts among mathematics teachers in Indigenous schools. Recognising the unique cultural and contextual needs of Indigenous students, this research investigates how the program fosters engagement, conceptual understanding, and culturally responsive pedagogy. Using a qualitative design approach, data were collected through interviews, classroom observations, and reflective narratives from two primary school teachers and two secondary school teachers in the mathematics field. Findings revealed that the teachers showed a variety of perspectives on teaching Indigenous students, especially in mathematics, while promoting inclusivity and cultural relevance in mathematics education. Furthermore, teachers reported increased student motivation and deeper conceptual connections when integrating art-based techniques into their lessons. The study concludes that the importance of the emergent theme of Culturally Responsive Education for mathematics teachers in implementing arts-integrated pedagogy is to narrow the education gap between urban, rural, and interior communities. It is recommended that this potential program should be undertaken in transforming mathematics teaching in Indigenous schools and highlight the importance of the emerging theme of Culturally Responsive Education for mathematics teachers in implementing arts-integrated pedagogy in bridging the educational gap between urban, rural and remote communities.

**Keywords:** Learning Potential, ArtSmart 8, Mathematics Teachers, Indigenous Schools, Qualitative Research

## INTRODUCTION

In embracing pedagogies and perspectives that preserve the culture of Indigenous students in schools today, educators must acknowledge the emotional dimension of their students and integrate a philosophy of wellbeing into the academic curricula that emphasises the holistic nature of education (Kerr & Averill, 2024). ArtSMart 8 was a special project conceptualised to share knowledge, skills and experiences between educators and future educators with the community. It is one of the initiatives from various programs at the Faculty of Education, Universiti Teknologi MARA (UiTM). Through the implementation of the concept of contextual teaching and learning in real-life situations, the projects implemented were to help provide solutions to academic issues faced by the identified community. All projects implemented also involved good cooperation and support from government bodies, industries, institutions, private companies, associations, and related organisations.

Among the objectives of the first phase of artSMart 8 is to conduct a needs analysis related to the quality and equity of education. A discussion session between the main project drivers, academic and administrative staff of the Faculty of Education, was implemented with Indigenous students, teachers, and administrators in several Indigenous schools in Kuala Lipis, Pahang. Meetings with relevant stakeholders, reviewing and proposing the suitability of project activities based on the set objectives, and establishing networks of collaboration and

understanding with the Indigenous community and other stakeholders were also conducted. The information was collected through the distribution of questionnaires, interview sessions and observations. In addition, the information obtained was verified based on a literature review and related documents that had been previously analysed.



**Figure 1 artSMart 8 Team arrived at Kuala Lipis, Pahang**

## LITERATURE REVIEW

### The Dropout Rate of Indigenous Students

The dropout rate of Indigenous students in Malaysian education remains one of the critical issues that has drawn attention from various parties. Some factors have been identified as contributing to this problem, including low literacy and numeracy skills, language challenges, socioeconomic factors, and acceptance of education in the Indigenous community. According to.... (Journal of Gender, socioeconomic status, and numeracy test scores) Ruslan's (2018) study found that the literacy and numeracy levels of Indigenous students are still at a low level. Mastery of these basic skills is very important for the continuity of learning, and failure to master them causes many students to experience difficulties in continuing their education at a higher level. Weaknesses in literacy and numeracy are also linked to the effectiveness of pedagogy and access to learning materials that are appropriate for the needs of Indigenous students. However, for Arens et al. (2014), it is interesting to note that Indigenous and non-Indigenous students did not differ in their influence on mathematics and school but differed in their affective reactions to English.

Language issues are among the main factors contributing to the dropout of Indigenous students in education (Jabatan Kemajuan Orang Asli [JAKOA], 2016). In addition, the language of instruction in schools is different from their mother tongue, causing difficulties in learning. This language mismatch not only affects academic performance but also reduces students' interest and motivation to continue attending school.

According to a report by the Ministry of Education of Malaysia (KPM, 2012), economic, geographical, and cultural factors also serve as barriers to access to quality education for Indigenous students. Poverty among Indigenous families causes many families to be unable to meet the educational needs of their children. In addition, the location of schools that are far from the students' residences, as well as infrastructure challenges such as unpaved roads and a lack of transportation, also make it difficult for students to attend school



consistently. According to Kawiti et al. (2025), Indigenous people and vulnerable groups are more likely to be negatively affected and in greater magnitudes by climate change.

Cultural aspects also play an important role, where formal education is still not a priority in the Indigenous community. A study by Nor Fariha Aniza et al. (2016) shows that the level of mastery of basic reading, writing, and arithmetic (3M) skills among Indigenous students is very worrying. As a result of this weakness, Indigenous schools fail to achieve the minimum standards as intended by the Ministry of Education of Malaysia. This shows that the existing education system is still unable to have a significant impact on students from this community. This is confirmed by Hale & Lockard (2022), the absence of contextually relevant curriculum, lack of culturally responsive educators, and biased assessment test item parameters do not allow the Indigenous population to improve academically.

According to KPM (2012), the dropout rate among Indigenous students can be seen through several important statistics. Only 20% of Indigenous students complete secondary school, while only 39% of Indigenous National School students pass the core subjects in the Primary School Achievement Test (UPSR) examination. More worryingly, 35% of national schools, the majority of which consist of Indigenous students, fall into the low-performing school category. This statistic reflects the significant academic achievement gap between Indigenous students and students in the mainstream.

A study by Paiz and Mohd Anuar (2020) found that the attitude of parents in rural areas who are less concerned about their children's education also contributes to the high dropout rate. Lack of awareness of the importance of education and the priority given to family economic activities causes many parents not to encourage their children to continue schooling. A study by Vivien et al. (2019) also shows that in the Indigenous community in Sungai Tekai, most parents believe that basic education up to grade six is sufficient. This attitude causes the participation rate of Indigenous students in secondary and higher education to remain low. This factor reflects the challenge of changing society's perception of the importance of long-term education.

## METHODOLOGY

A needs analysis was conducted in a structured and focused manner with emphasis placed on current issues and challenges, particularly to improve the quality and equity of their education. The needs analysis included gathering information through interview sessions with four mathematics teachers, two from primary schools and two from secondary schools, before proposing ideas of interventions to the teachers. The mathematics teachers, who have 3 to 12 years of mathematics teaching experience, also serve as heads of their respective mathematics committees. An ethnographic research method approach was employed to systematically explore and document the daily lives, behaviours and interactions of the Indigenous community.

## RESULTS AND DISCUSSION

Although the interviews were done at two different levels, primary and secondary, the responses from the secondary school teachers showed continuity and flow of needs from primary to secondary school. Therefore, the data presented below starts with Teacher 1 (primary), Teacher 2 (secondary), Teacher 3 (primary) and Teacher 4 (secondary). Based on the study conducted, it was found that there are teachers who are confident in the capabilities of the Indigenous students to succeed in their studies. This can be seen in the statement from Teacher 1:

“...As teachers who need to teach Indigenous children, they need to use the right techniques to teach all the inputs in the mathematics syllabus, regardless of the difficult syllabus as advertised by social media. Indigenous students need teachers who are enthusiastic and are always motivated to overcome the hardships of teaching in rural schools. They need to be strong-willed. Don't count money...”

Teacher 1 hopes that the school can find a successor who can continue his efforts in educating Indigenous children. This can be seen from the researcher's observation of the students' exercise books showing that teachers who teach in Indigenous schools do follow the syllabus given by the Ministry of Education Malaysia, which

encompasses not only spelling, counting, addition and subtraction, but also money counting activities, unit conversion, and colourful cipher memorization activities that were prepared and photocopied by the teacher. The teacher also praised the beautiful, neat and readable writing done by the Indigenous children.

However, some teachers have the opposite impression of Indigenous students. The following impression is from Teacher 2:

“...Students still lack the skills of addition and subtraction, let alone involving numbers with two digits exceeding 20. In addition, most Indigenous children are only able to memorise up to the number 4...”

This statement is supported by Teacher 3 through the following quote:

“...It is customary for an Indigenous child to need guidance from the teacher when answering test questions, where the teacher has to read the questions and explain them to the student first...”

Teacher 3 expressed her agreement with the school principal's recommendation that teachers should prioritise reading ability among Indigenous students so that they can continue learning according to the primary syllabus. Meanwhile, the teacher 4 also stated that although these Indigenous children are weak in learning, they like singing and dancing because it is part of their culture:

“...Sometimes we include folk songs in learning mathematics to attract the interest of Indigenous children to attend classes in particular and to come to school in general...” (Teacher 4).

The results of the interviews with the teachers showed a variety of perspectives on teaching Indigenous students, especially in mathematics. Teacher 1 emphasised the importance of using the right techniques and a highly motivated and enthusiastic teacher attitude in facing the challenges of teaching in rural areas. Observations also showed that teachers teaching in Indigenous schools follow the syllabus set by the Ministry of Education Malaysia, including additional activities such as counting money and memorising ciphers provided by the teachers.

However, Teacher 2 reported a major challenge in the students' level of mastery of basic mathematics, where many were only able to count up to the number 4 and were still weak in adding and subtracting two digits. Teacher 3 supported this view by stating that Indigenous students needed full guidance in answering test questions, indicating the need to focus on mastering reading skills before mathematics learning could be carried out more effectively. This coincides with the study from Ruslan (2018) and Nor Fariha Aniza et al. (2016), who found that Indigenous students still have low literacy and numeracy proficiency. Furthermore, the mastery level of basic reading, writing, and arithmetic (3M) skills among Indigenous students is highly concerning. On the contrary, Arens et al. (2014) stated it is noteworthy that Indigenous and non-Indigenous students had a similar influence on mathematics and school but exhibited different affective responses to English.

Teacher 4 emphasised that teaching methods need to be adapted to the students' culture, such as incorporating singing and dancing elements in Mathematics learning to attract their interest. This shows that a cultural approach to education can be a factor that helps increase the attendance and interest of Indigenous students in learning. However, this can be challenging as the language of instruction in schools differs from their mother tongue, making it challenging for students to comprehend lessons (JAKOA, 2016). The language barrier not only impacts academic performance but also diminishes their interest and motivation to stay in school. It is shown that music also helps students stay focused while studying. Some children who spend time with musical activities have higher IQs than other children.

Table 1 summarises the perspectives of four teachers on teaching Indigenous students, highlighting key themes such as perceptions, academic challenges, teaching strategies, observations, and student engagement. It shows both the strengths and difficulties observed by teachers, including students' low literacy and numeracy skills, the importance of culturally relevant teaching, and the role of teacher motivation in supporting learning. This structured format allows for a clear comparison across teachers, providing an overview of factors that influence Indigenous students' educational experiences.

Table 1 Key Categories Across Mathematics Teachers' Perceptions in Indigenous Schools

Category	Description	Teacher
Perception of Indigenous Students	The abilities and potential of Indigenous students	All
Academic Challenges	The specific learning difficulties Indigenous students face	All
Teaching Strategies / Approaches	The methods teachers use to facilitate learning	1, 3 and 4
Observations / Comments	The teachers' observations about student work and learning processes	All
Motivation & Engagement	The factors influencing student participation and interest in learning	1 and 4

**Category 1: Perception of Indigenous Students.**

Teachers' perceptions of Indigenous students varied across school levels and experience. While some, like Teacher 1, expressed confidence in students' academic potential, others noted weaknesses in basic mathematics and dependence on teacher guidance (Teachers 2 and 3). Teacher 4 observed that students, despite academic struggles, demonstrated strong engagement in culturally relevant activities such as singing and dancing. Overall, these perspectives reveal a mix of optimism and concern regarding Indigenous students' learning capabilities.

**Category 2: Academic Challenges.**

Indigenous students face several academic challenges, including low literacy and numeracy skills, difficulty performing addition and subtraction beyond small numbers, and reliance on teacher support during assessments. Additional factors, such as rural school contexts and language barriers, further hinder comprehension and motivation. These findings align with previous studies highlighting the need for targeted interventions to improve reading, writing, and arithmetic proficiency.

**Category 3: Teaching Strategies / Approaches.**

Teachers employ a combination of pedagogical and culturally responsive strategies to support Indigenous students. Teacher 1 emphasised the importance of proper teaching techniques and enthusiasm, while Teacher 3 recommended prioritising reading skills before advancing in mathematics. Teacher 4 highlighted the value of integrating cultural elements, such as singing and dancing, to increase engagement. Collectively, these strategies reflect a balance between rigorous instruction and culturally sensitive practices.

**Category 4: Observations / Comments.**

Observations indicated that Indigenous students' work is generally neat and aligned with the Ministry of Education syllabus, including activities such as money counting and cipher memorisation. Teachers also noted that cultural activities positively influence student engagement and interest. These observations suggest that, despite academic challenges, teachers actively implement strategies to facilitate learning and maintain student motivation.

**Category 5: Motivation & Engagement.**

Student motivation and engagement are influenced by teacher attitude and culturally relevant teaching practices. Teacher enthusiasm was highlighted as essential for sustaining learning in rural contexts, while integrating cultural activities, such as folk songs and dances, improved attendance and classroom participation. Music and cultural activities were also reported to enhance focus and cognitive development, underscoring the importance of affective and cultural dimensions in Indigenous education.

**CONCLUSION**

The research findings have established a theme for the study, the strategy to reduce Indigenous student dropout through Culturally Responsive Education. The theme of Culturally Responsive Education involves creating



educational experiences that promote academic success, strengthen cultural identity, and foster students' social and emotional well-being (Nofazilah et al., 2023). For Anderson et al. (2022), a culturally responsive approach allows educators to use innovative methodologies and flexible processes, fostering collaboration with those affected by the program and its evaluation. By knowing that the academic performance of Indigenous students in mathematics is average, which requires additional assistance in terms of tutoring classes with improvements in basic skills in counting numbers 1 to 1000 using basic operations of addition, subtraction, multiplication and division. The interest and motivation of Indigenous students in learning mathematics are influenced by the support of parents, teachers and the community. Findings from Kerr & Averill (2024) indicate that teachers' interactions with learners are important for determining assessment practice and outcomes.

Therefore, the Ministry of Education and schools need to provide programs that are appropriate to raise awareness of the importance of education for children. The government should take intentional steps to document, acknowledge, empower, and integrate relevant Indigenous knowledge systems into policy formulation and implementation (Bol et al., 2024). A conducive environment & ecosystem are needed to help the learning process of Indigenous students, and finally, exposure from statutory and private bodies is needed to form career paths and develop students' available talents. Chang et al. (2023) suggested that the government should provide a policy that brings external resources that may help students improve their academic performance and enhance their ability to compete with urban citizens. It would be interesting for future studies to explore whether mechanisms that operate in similar patterns of relations could be found for Indigenous and non-Indigenous students from different cultural backgrounds. It is not wrong if the traditional ways of knowing and doing things can guide modern solutions for living with changes in the environment and climate (Kawiti et al, 2025).

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## REFERENCES

1. Anderson, K. C., Stern, M. J., Powell, R. B., Dayer, A. A., & Archibald, T. G. (2022). A Culturally Responsive Evaluation Framework and Its Application in Environmental Education. *Evaluation and Program Planning* 92. Volume 92, June 2022. <https://doi.org/10.1016/j.evalprogplan.2022.102073>
2. Areens, A. K., Bodkin-Andrews, G., Craven, R. G., & Yeung, A. S. (2014). Self-concept of Indigenous and Non-Indigenous Australian Students: Competence and Affect Components and Relations to Achievement. *Learning and Individual Differences*, Volume 32, May 2014, Pages 93-103.
3. Bol, G. K., & Niekerk, D. V. (2024). Application of African Indigenous Knowledge Systems and Practices for Climate Change and Disaster Risk Management for Policy Formulation. *International Journal of Disaster Risk Reduction*, <https://doi.org/10.1016/j.ijdr.2024.104670>
4. Chang-Wei. C., Ming-Kuo. H, & Ta-Chih. L. (2023). The Impact of External Resources on The Development of An Indigenous School in Rural Areas: Taking A Junior High School In Taiwan As An Example. *Heliyon*, Volume 9, Issue 12, e22073
5. Hale, V. M., & Lockard, L. (2022). Building a bridge to the future: Teacher perspectives on indigenous language education. *International Journal of Educational Research Open*, 3, 100157. <https://doi.org/10.1016/j.ijedro.2022.100157>



6. Jabatan Kemajuan Orang Asli, (2016). Pelan Strategik JAKOA 2016 - 2020. <https://www.jakoa.gov.my/wp-content/uploads/2022/03/pelan-strategik-JAKOA.pdf>
7. Kerr, B. G., & Averill, R. M. (2024). Culturally sustaining assessment for indigenous learners in Aotearoa New Zealand: Drawing from policy, research, and educator voices. *Teaching and Teacher Education*, 143, 104567. <https://doi.org/10.1016/j.tate.2024.104567>
8. Kawiti, D., Refiti, A., Yates, A., Heta, E., Bloomfield, S., Chanse, V., & Zari, M. P. (2025). Indigenous knowledge, architecture, and nature in the context of Oceania. *Nature-based Solutions*, 7 (1):100213. <https://www.sciencedirect.com/science/article/pii/S2772411525000035>
9. Kementerian Pendidikan Malaysia (2012). Pelan Pembangunan Pendidikan Malaysia 2013-2025. Putrajaya: Bahagian Pendidikan Guru.
10. Nofazilah, M. S., Mazlina, M. I., Zainudin, H., Lee Vincent, T. M., & Buba, B. (2023). Strategies for Addressing Indigenous Education Dropout. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 8(11), e002600. <https://doi.org/10.47405/mjssh.v8i11.2600>
11. Nor Fariha Aniza, M. I., Nurul Nadia, A. S., & Sofan, H. (2016). Analisis trend penyertaan dan keciciran di kalangan pelajar Orang Asli. [https://www.academia.edu/13013765/analisis\\_tren\\_pendidikan\\_orang\\_asli](https://www.academia.edu/13013765/analisis_tren_pendidikan_orang_asli)
12. Paiz, H., & Mohd Anuar, R. (2020). Isolasi Sosio-Budaya Masyarakat Orang Asli di Malaysia dan Kesannya terhadap Pentafsiran Hukum Islam. *The Isolation of the Socio-cultural of Indigenous Community in Malaysia and Its Effect towards the Interpretation of Islam Law*, 21(1), 1 - 20.
13. Ruslan, A. (2018). Penilaian Pelaksanaan Program Linus Dalam Kalangan Murid Orang Asli Di Perak. In Penerbit UUM eBooks. [https://etd.uum.edu.my/6897/2/s93291\\_01.pdf](https://etd.uum.edu.my/6897/2/s93291_01.pdf)