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REVIEW ARTICLE

Indigenous Pedagogy Approach in Teaching Mathematics among Orang Asli Primary School Students

Abdul Hakim Abd Jalil[1*], Abdul Halim Abdullah[2]

[1]School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia.
Email: abdulhakimabdjalil@gmail.com
[2]School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor, Malaysia.
Email: p-halim@utm.my

CORRESPONDING AUTHOR (*):
Abdul Hakim Abd Jalil
(abdulhakimabdjalil@gmail.com)

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ABSTRACT

There has been a growing interest in implementing Indigenous Pedagogy methods in the education of indigenous students worldwide. This approach considers the students' unique cultural and linguistic backgrounds and aims to incorporate their traditional knowledge and practices into the curriculum. By doing so, students can understand the relevance of their studies, including the subjects of mathematics in their daily lives and gain a deeper understanding of the subject. Furthermore, involving the community and utilizing culturally relevant materials and activities has increased student engagement and motivation in learning mathematics. This concept paper discusses implementing Indigenous Pedagogy methods in teaching mathematics that can enhance academic outcomes and promote cultural preservation among Orang Asli students. In addition, this concept paper also discusses the difficulties of Orang Asli students in learning mathematics at the primary school level and how Indigenous pedagogy, which is widely practised in many countries, can help tackle the issue. The concept paper delves into the roles of various parties in enhancing the usage of Indigenous pedagogy in Mathematics teaching and learning for Orang Asli students. These parties comprise the Ministry of Education, the Department of Orang Asli Development, NGOs, teachers, parents, and the Orang Asli communities. By collaborating and pooling their resources, the cultural and environmental barriers faced by Orang Asli students in Malaysia can be effectively addressed, eventually enhancing their academic performance.

Contribution/Originality: The paper's primary contribution is to discuss the implementation of Indigenous Pedagogy methods in Mathematics teaching among Orang Asli students. Therefore, this study adds to the understanding and information related to the issues in Orang Asli education.

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1. Introduction

Malaysia is a unique country known for the diversity of races, languages, and religions among its people. The largest community in Malaysia is the Malays, followed by the Chinese, the Indians, and other minorities consisting of various languages, skin colours, and cultures. One of the minorities in Malaysia is the Orang Asli community which generally lives in Peninsular Malaysia (Aidil Fitri Sawalludin et al., 2020). The Orang Asli community in Malaysia is divided into three main groups, the Negrito, Senoi, and Melayu – Proto (Jabatan Penerangan Malaysia, 2023). The categorization of the respective communities was based on several characteristics, such as the language, physical characteristics, and lifestyle. From these three main groups, the Orang Asli community was then divided into another 18 different subgroups, known as the Kensiu, Kintak, Lanoh, Jahai, Mendriq, Bateq, Temiar, Semai, Semoq Beri, Che Wong, Jah Hut, Mah Meri, Temuan, Semelai, Jakun, Orang Kanaq, Orang Kuala and Orang Seletar (Carey, 1976; Rahman, 2018). According to the Department of Orang Asli Development (JAKOA) record, Malaysia currently has 853 villages home to the Orang Asli community in peninsular Malaysia (Jabatan Kemajuan Orang Asli [JAKOA], 2018).

The socioeconomic status of the Orang Asli community is increasing year by year, with an increase from 83.4% poor status in 2000 to only 31.16% poor status in 2010 (Jabatan Kemajuan Orang Asli [JAKOA], 2018). Nevertheless, the percentage of poverty among Orang Asli is still very high if compared with other communities and seems like a never-ending issue (Muhammad Fuad, 2020). Therefore, education is important to remove this community from poverty (Yew et al., 2021). This step is in line with the statement from Wolfe and Havemen (2002), which explained that the level of individual education would affect the psychological well-being of a person's work and further increase the marketability to be selected for employment.

In parallel with the current world's pace of modernity, the education sector should also develop according to the current needs. The education process is one factor contributing to improving a community's quality or standard of living. Education is also a measuring stick in evaluating a society's progress level. As such, the government is always concerned about efforts to improve the quality of people's education through large allocations for the field of education every year. Orang Asli students also benefit from the initiative (Ministry of Education, 2012). The Ministry of Education has carried out various initiatives to ensure that no groups, especially the Orang Asli students, drop out of education. However, most of these efforts focus more on improvement from the perspective of mainstream education without the socio-cultural integration of the Orang Asli community into the existing curriculum (Mohd Roslan & Mansor, 2019). By taking into account the socio-cultural factors of the Orang Asli community, the dropout rate of Orang Asli students can be more clearly understood. Juli Edo (2006) listed two reasons for the rising rate of dropout among Orang Asli students and their failure to score well in general school subjects, particularly in Mathematics, (1) the incapability of the Orang Asli students to adapt to the other races and (2) the school curriculum that does not suitable with culture of the Orang Asli community.

2. Education System in Malaysia

In the year 2012, the Ministry of Education (MOE) (2012) introduced what is known as Malaysia Education Blueprint (Pelan Pembangunan Pendidikan Malaysia) 2013-2025, as a roadmap for the development of the Malaysian education system. This acts as an effort

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to achieve the desired student outcome as stated in the National Education Philosophy (NEP), which is future generations that are balanced and holistic in terms of physical, emotional, spiritual, and intellectual (MOE, 2004). Education is one of the most important aspects of achieving a quality life and should be the right of every child in Malaysia, including the Orang Asli children.

Through The Education Act 1996 (Act 550): Subsection 29A 1-4, the government has made it mandatory for every Malaysian child to attend school for six years, which is the period of primary school education (Education Act, 1996). The Aboriginal Peoples Act of 1954 states that the Orang Asli community has the right to receive an adequate education, as other communities in Malaysia. Norwaliza et al. (2016) stated that various measures have been taken to create opportunities for the Orang Asli community to move forward along with others. Multiple initiatives and infrastructures have been provided to improve the quality of education for the Orang Asli community. Despite showing a positive impact in terms of students' attendance (MOE, 2017; MOE 2018; MOE, 2019), the reality is that education problems among Orang Asli students are still a big challenge (Norwaliza et al., 2019; Lialoura et al., 2021; Abdul Halim Abdullah, 2022; S. Kanageswari et al., 2022; Wan & Rusaslina, 2022). The issue related to Orang Asli's education also has long been discussed and raised by many experts in the field (Lye, 2001; Joseph, 2008; Nah, 2008).

Since Malaysia obtained its independence in 1957, the challenge to Orang Ali's education still remained (Airil Haimi & Muhammad Aizat Saad, 2010; Wan & Rusaslina Idrus, 2022). Studies show that, instead of pursuing the next level of education, many children of the Orang Asli community would prefer to work (Fatan Hamamah, 2008; Mohammad Safwat et al., 2020; Wan & Rusaslina Idrus, 2022). According to the Preliminary Education Blueprint 2013-2025 (MOE, 2012), only 30% of Orang Asli students completed secondary school education; which is literally, less than half of the national average. Due to this reason, not many in the Orang Asli community manage to enrol themselves into higher education. Although, it is wise to mention that there are still many inspiring successful stories of the Orang Asli community, nevertheless, such worrisome inclination to drop out of school among the Orang Asli cannot be dismissed (Mohammad Safwat et al., 2020). This phenomenon is particularly alarming, especially considering that the number of dropouts among the discussed community is still much higher. In fact, the slow progress of the Orang Asli community when it comes to education had, in the end, placed them behind compared to other communities in Malaysia (Airil Haimi, 2011).

To discuss the appalling rate of dropout among the children of Orang Asli is incomplete without studying the factors that influence this phenomenon; especially, to debunk the presumptions held by many that deem the Orang Asli community as not interested in formal education and attending school (Idrus, 2010). In discussing such matters, among the major factors that must be taken into account is the geographical location of the Orang Asli's settlement which hinders access to quality education (Alias, 2015). This problem was obvious, especially during the Malaysian Movement Control Order (MCO) when the world faced the Covid-19 pandemic. Due to such restrictions, considering that many of the indigenous communities live in rural areas and the access to good internet is still extremely limited, many had major trouble joining the online learning sessions. To further intensify the problem, many of them lacked of equipment to attend online classes (MOE, 2020). Although there are continuous initiatives taken by various parties from the government and non-governmental bodies to close the achievement gap in education

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between urban and rural students, the dropout rate among Orang Asli students in Malaysia is still a challenge, including in the subject of Mathematics (Sharifah Md Nor et al., 2011; Ahmed et al., 2012; Mustapha, 2014; Vanitha Thanabalan et al., 2014; S. Kanageswari Suppiah et al., 2022; Muhammad Fuad et al., 2023).

3. Difficulties of Orang Asli Students in Learning Mathematics

In the modern world today, Mathematics is one of the main subjects that need to be mastered by the students (Rittle-Johnson, 2017). Mathematics is an essential subject for primary school students (Grootenboer & Marshman, 2015). It provides a foundation for problem-solving skills and logical reasoning that are critical for success in many areas of life. Mathematics also helps students develop the analytical and computational skills necessary for success in higher education and future careers. Emphasizing the importance of mathematics in primary education can help students build a strong foundation for their future academic and professional pursuits (Koeno Gravemeijer et al., 2017).

As one of the core subjects, the improvement in Mathematics education among Orang Asli students is important to improve the overall education level of this community. The problem of Orang Asli student performance in this subject should be given special attention. Good performance in Mathematics among Orang Asli students will improve their general educational performance and lift the Orang Asli community to have a better life (Siti Sarawati et al., 2020). That being the case, in an effort to improve Orang Asli students' performance in education including in Mathematics, various initiatives from the government to upgrade the education level of Orang Asli students have been planned. Among them is the implementation of education policies for Orang Asli and Penan students and the Educational Transformation for Orang Asli and Peribumi to reduce the dropout rate among students while increasing their level of education (MOE, 2012).

However, most of these initiatives focus more on improving the infrastructure and attendance rate of the Orang Asli students without touching more profoundly on the abstract issues such as the sociocultural aspect of the Orang Asli community itself (Mohd Roslan, 2016; Nordina Alia & Norwaliza, 2021). According to previous studies, one of the causes of problems in Orang Asli education is the differences in language, attitude environment, and the culture of the Orang Asli community. Language is one factor that plays an important role in the achievement of Orang Asli students (Abdul Hakim et al., 2023). Research by Ruzlan et al. (2021) found that language is the main problem in learning Mathematics in the classroom, especially for Year 1 students because of their limited knowledge of Malay words (Ruzlan et al., 2021). S. Kanageswari et al. (2021) stated that the performance of Orang Asli students in Mathematics subjects would be better if the language they are proficient in is used during teaching and learning sessions. However, the level of mastery of 3M skills (reading, writing, and arithmetic) among Orang Asli students is very worrying and requires specific attention (Lialoura et al., 2021). As a result of not being able to understand the Malay language, the students will have difficulties in learning subjects, especially subjects that require an understanding of concepts such as Mathematics (Abdul Hakim et al., 2023). This situation will decrease the students' interest in the classroom, thus causing an increase in the dropout rate of Orang Asli students.

Attitude and environmental aspects are also among the main factors that contribute to the difficulty of Orang Asli students in learning Mathematics. In general, the Orang Asli

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community has different opinions on education due to the differences in their worldview, especially when compared with the community in the urban areas. Nordina Alia and Norwaliza (2021) explained that in general, their lives are based on comfort within their scope, and they prefer a simple lifestyle. This worldview causes them to be more likely to skip class and drop out of school. Yusoff (2017) also stated that a free lifestyle without rules and weak time management skills indirectly make it difficult for Orang Asli students to have the motivation to study. A more worrying problem is the parent's attitude toward the Orang Asli students, which is the lack of awareness to send their children to school. For the parents, there is no need for a high level of education due to the assumption that they will only live within their small community (Nordina Alia & Norwaliza, 2021). The life of the Orang Asli community is in general closely related to their environment, which is the forest as their main source of sustenance. According to the Orang Asli Development Department's Strategic Plan 2016-2020, the percentage of Orang Asli living outside the city is 63.2%, while the other 36.1% live in the rural areas (Wan Nor Fadzilah & Baharin, 2020). Their remote position far from the urban community prevents them from enjoying public facilities such as public transport, libraries, roads, and communication facilities. On the other hand, the efficiency and skill of hunting, catching fish, and collecting forest products are among the main skills that need to be possessed by Orang Asli children compared to formal education.

Cultural differences are another factor that causes difficulties for Orang Asli students in the mainstream education system. In the efforts of various parties to help increase the level of education of the Orang Asli community, the socio-cultural practices of the Orang Asli community should also be taken into account. Consideration should also be given to the best mechanism regarding pedagogy and curriculum in teaching and learning specifically for them. The existing education system still does not consider the differences in the culture and environment of Orang Asli students, which then causes them to feel marginalized and stressed being in the mainstream education system (Mohd Roslan & Mansor, 2019). According to Norwaliza and Ramlee (2015), there is a need to develop a specific curriculum for Orang Asli students that includes cultural elements of their society in the syllabus. The need is aligned with the education rights of the Orang Asli community according to the international framework. Malaysia is one of the countries that support the United Nations Declaration on the Rights of Indigenous People (UNDRIP), which states the rights of the Orang Asli community as citizens in a country (Gamaliel Kan, 2020). In Article 14 (UNDRIP, 2007), this declaration outlined:

a) Indigenous peoples have the right to establish and control their educational systems and institutions, providing education in their languages appropriate to their cultural teaching and learning methods.
b) Indigenous individuals, particularly children, have the right to all levels and forms of education in the State without discrimination.
c) States shall, in conjunction with indigenous peoples, take effective measures for indigenous individuals, particularly children, including those living outside their communities, to have access, when possible, to an education in their own culture and provided in their language.

Source: UNDRIP (2017)

This declaration clearly states the right of Orang Asli students to receive education equally without any discrimination, and the state should help offer an education system based on Orang Asli culture and language to Orang Asli students. According to the declaration, the state is not only obliged to provide access to education for the Orang Asli community but also education that takes into account the culture and language of the

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Orang Asli. The integration of the culture of the Orang Asli community into the curriculum is also essential to maintain the community's identity, customs, and culture so that they are preserved over time. According to Mohd Roslan and Mansor (2019), the education system that has been provided for the Orang Asli still does not take into account the cultural differences that have caused Orang Asli children to feel pressured to be in the mainstream education system and lead to other problems that exist among the Orang Asli children such as discrimination and isolation.

In general, Orang Asli students, especially those living in rural areas, speak different languages (Veloo et al., 2021; Abdul Hakim et al., 2023) and practice a culture and way of life that is far different when compared to students in cities (Haliza, 2018). This situation causes them to have a different way of thinking and therefore requires a different approach during the teaching and learning session. There is no doubt that there is also a positive impact from the efforts of various parties to improve the level of education of Orang Asli students, such as an increase in the percentage of attaining the minimum level of mastery in the *Ujian Penilaian Sekolah Rendah* (UPSR) in 2019 compared to 2018 (MOE, 2019) and also an increase in the percentage of transition Orang Asli students from standard six to form one (MOE, 2020). However, the performance of these Orang Asli students, in general, clearly shows a huge gap compared to students from other communities, including in Mathematics. According to the report, although there was an increase in the percentage of Orang Asli students who achieved grade A for Mathematics subjects in UPSR in 2018 compared to 2017, the distribution of achievement grades showed that the majority of Orang Asli students are still unable to master Mathematics subjects and more than 50 percent of Orang Asli students still not able to reach the minimum level (at least D) for the subject (MOE, 2018). Based on past studies and reports, it is clear that there are problems in the mathematics achievement of Orang Asli students, especially at the primary school level, which should prepare these students with the basic concepts of Mathematics.

A study by Ruzlan et al. (2021) found that the level of achievement of Orang Asli students in Mathematics subjects was deficient, and most of them could not solve the Math problems given. In the study, Orang Asli students also stated that Mathematics is the most difficult subject for them compared to other subjects. S. Kanageswari et al. (2022), in their study at an Orang Asli National School (SK Asli), also found that despite an increase from 2017 to 2018, the students there got the lowest average score in Mathematics compared to other subjects, including English. On average, students' scores in Mathematics were unsatisfactory, and no student scored more than 50 percent. They face difficulties, especially when dealing with mathematical problems with verses. Some teachers in the study also stated that the lack of interest of Orang Asli students in Mathematics is likely due to the academic language in *Bahasa Melayu* used during the learning process. Hence, teachers need to take the initiative to use easier words for students to understand. The study also found that the lack of self-confidence in Orang Asli students contributes to their difficulty in Mathematics.

The Orang Asli community lifestyle is generally focused on meeting their daily needs. Most of the time, their environment only revolves around agricultural activities, hunting, and foraging. Therefore, the mainstream curriculum of Mathematics is usually related to life in the city and is rather foreign to Orang Asli students. This has somehow caused them to feel marginalized and alienated (Mohd Roslan & Mansor, 2019). The absence of a specific Mathematics pedagogy for Orang Asli students will cause them to continue to drop out of the field of education (Juli Edo, 2006; Ruzlan et al., 2021). A study by Sianturi

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et al. (2018) showed that the Orang Asli community shows more interest in curriculum learning that is based on something more accustomed to them at home; the sudden change of behaviour portrayed by the community under discussion is understandable as they can relate to the familiar examples given in the curriculum. The inclination portrayed by the Orang Asli community is very evident that should the indigenous pedagogy approach is implemented, integrating the existing curriculum with the socio-culture of the Orang Asli community, a positive result can be obtained (Ruzlan et al., 2021). Though that is the case, unfortunately, the cultures and environment of the Orang Asli are not well-represented in the curriculum (Haron et al., 2019). As a result, many Orang Asli students feel isolated and withdraw from mathematics classes, especially when they enter secondary school (Rohaida et al., 2020).

The relation of the previously mentioned problem to the difficulties in learning Mathematics by the students of the Orang Asli community can be better understood should the curriculum be made based on something meaningful; by utilising the social context and cultural practices of the Orang Asli community. Mohd Roslan and Mansor (2019) explained in their study that the problems faced by the Orang Asli children need to be overcome as soon as possible by not neglecting their socio-cultural practices. Roslan and Mansor further stated that priority needs to be given to the best mechanism regarding pedagogy and curriculum in T&L specifically for them. Considering the issues and potential solutions as discussed, implementing an indigenous pedagogy approach in primary school mathematics teaching for Orang Asli students can help improve the achievement level of Orang Asli students in mathematics.

4. Indigenous Pedagogy Model

The Indigenous Pedagogy Model is a model that highlights learning characteristics specific to indigenous communities such as the Orang Asli community. This model explains that the Orang Asli community sees the education process as a lifelong learning process that encourages and supports the sustainability of their lives (Battiste, Bell & Findlay, 2002). This model highlights learning characteristics such as learning through observation and practice, real experiences and individualized instruction, and fun activities. According to Yunkaporta (2009), the Indigenous Pedagogy Model contains eight main elements: story sharing, learning maps, non-verbal learning, symbols and images, land links, non-linear learning, deconstruct/reconstruct and community links related to the learning style of indigenous children. As a model developed specifically to meet the educational needs of indigenous communities such as the Orang Asli community, this model would be the best approach for Orang Asli students' T&L.

According to Smith (2003), the Indigenous Pedagogy Model is necessary for connecting formal education with the Orang Asli community by providing space for them to develop and move forward and implementing a pedagogy based on the interests of the Orang Asli community. The Indigenous Pedagogy Model was introduced by Marie Battiste (2002) through her research that a pedagogy that gives priority to learning through experience, self-learning, observation, listening, minimal intervention, and instruction, learning through seeing and making activities, reflection process, presentation of stories, learning through real-life experiences, individualized instruction, relating learning to local values and applying knowledge according to situations. Battiste et al. (2002) also explained that, for the Orang Asli community, the education process is a lifelong learning process to ensure the sustainability of their lives. Traditionally, education for the Orang Asli

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community occurs informally through experiential learning and sharing, where skills are taught as part of everyday life (Mohd Nazri, 2014).

This learning process is a natural knowledge transfer process from generation to generation (Battiste et al., 2002). The transmission of knowledge is carried out practically and verbally; generally, does not involve writing. Such knowledge includes empirical knowledge (based on experience) and normative knowledge (based on social values). Normative knowledge is transferred through the ancestors' stories that are conveyed along with social values such as honesty, courage, and mutual respect, which indirectly make it a traditional pedagogical technique in the indigenous community. The method of storytelling provides a broad understanding to the next generation and gives freedom to listeners to take lessons and find meaning from the stories they have heard. The education process for the Indigenous community aims to develop a person's inner personality. Therefore, the pedagogical difference between the national curriculum that does not consider the Indigenous community's socio-culture and this traditional pedagogy has created challenges for Indigenous students. To develop an effective pedagogy for indigenous students, Williams (2005) has proposed a T&L that includes:

i. Learning through mentors and training;
ii. Learning by doing;
iii. Learning by observation;
iv. Learning by listening;
v. Learning through stories and songs;
vi. Learning in the community;
vii. Learning through service to the community.

Harris (1984) also outlined that indigenous pedagogy must include its characteristics, namely learning through observation, imitation, trial and error, real-life experience, holistic learning, learning through repetition, and problem-solving. Another aspect to be considered in developing an indigenous pedagogy is learning the characteristics of indigenous children as learners. Robinson and Nichol (1998) explained that the following attributes of indigenous children as learners come predominantly:

a) Holistic Learners

This characteristic reflects the Aboriginal worldview that everything is interrelated and that all relationships are important. Indigenous students will learn more effectively if a lesson's overall concept and direction are outlined, discussed, and modelled before introducing specific learning activities.

b) Imaginal Learners

In indigenous society, learning occurs more frequently in informal, unstructured situations through observation and imitation rather than verbalization in informal, unstructured situations. They prefer experience-based and sequenced lessons so that a shared experience is followed by modelling, reflection, and self-performance. Robinson and Nichol (1998) also mentioned that teacher-centred instruction is not an effective form of instruction for imaginal learners like the Orang Asli students.

c) Kinaesthetic Learners

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Most indigenous students are kinaesthetic learners where information is "taken in more easily through their hands and movement" They prefer learning by observing and then doing, requiring physically active learning strategies.

d) Cooperative Learners

In indigenous society, the group is put higher than the individual. Cooperation is more important than competition or individual achievement. In contrast, in mainstream society, instruction is given by teachers, followed by a strong emphasis on competition, personal benefit, and achievement.

e) Contextual Learners

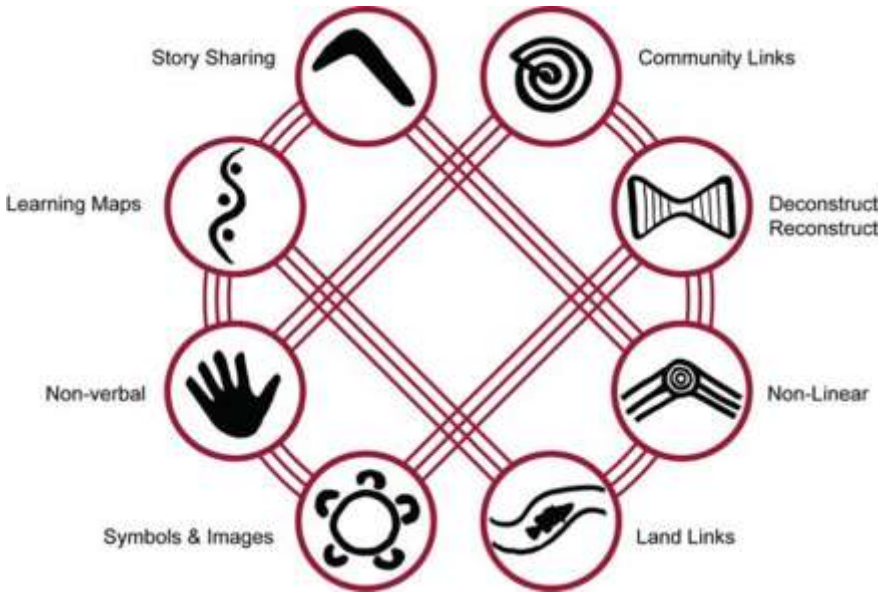
In indigenous society, the learning process occurs in the specific context to which the learning relates. For example, children learn the hunting technique during food-gathering expeditions, songs and dances. By contextualizing learning, the students discover that education is meaningful and relevant to their daily lives.

f) Person-Oriented Learner

Indigenous society is more person-oriented than information-oriented. Teachers can improve students' achievement and increase students' interest in learning through simple strategies such as acting positively, smiling regularly and welcoming them warmly to class, as indigenous children are highly skilled readers of body language (Robinson & Nichol, 1998).

Inspired by the Cultural Interface Theory developed by Nakata (1997), Yunkaporta (2009) has listed eight elements that need to be included in the pedagogy for Indigenous students, namely story sharing, map learning, non-verbal communication), symbols and images, relationships with the environment, non-linear, deconstruct/reconstruct and relationships with the community, as listed in Figure 1 below:

Figure 1: Eight Elements of Indigenous Pedagogy



Source: Yunkaporta (2009)

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Yunkaporta (2009) also suggested that to understand the position of the Orang Asli community, it is important to have a clear understanding of the ontology of the Orang Asli community with clear epistemological support. Maakrun and Maher (2016) stated that the research has proved that Yunkaporta (2009) Eight Pedagogical Elements are beneficial in understanding the indigenous community's ontology and epistemology.

The Concept of Responsive Pedagogy by Fairbanks et al. (2009) also brings the same idea as indigenous pedagogy. This concept focuses on the process of literacy teaching for indigenous students, designed based on the background and experiences of Orang Asli students in the classroom. Fairbanks et al. (2009) explained that this concept is not only able to integrate student experience with culture, social history and language during T&L, but it even involves the belief that students from various backgrounds can participate in learning that promotes high-level thinking. A study by Vanitha Thanabalan, Saedah Siraj, and Norlidah Alias (2015) has found that the integration of cultural elements and the environment of Temuan's Orang Asli students' lives in the learning session has successfully increased the interest and tendency of Orang Asli students' involvement during T&L process. In another study, Saedah Siraj and Vanitha Thanabalan (2011) outlined seven Principles of Responsive Pedagogy, namely:

i. The usage of bilingual teaching methods in the classroom by recognizing the Orang Asli dialect as well as the usage of non-standard English for Orang Asli students.
ii. The application of cultural activities and the environment of Orang Asli students in the T&L process.
iii. T&L activities that consider the learning styles and strengths of Orang Asli students.
iv. Emphasizing the involvement of Orang Asli students in the T&L process.
v. The teachers' ability to have knowledge, understanding, and a positive attitude toward Orang Asli students.
vi. The process of designing teaching materials that can optimize the life experience of Orang Asli students.
vii. The application of bilingual methods in improving literacy teaching (Saedah Siraj & Vanitha Thanabalan, 2011)

5. Special Intervention Program for Indigenous and Indigenous Students (PIKAP)

Recognizing environmental factors as one of the main factors influencing the attitude of the Orang Asli community towards education, the Ministry of Education has formed a special program for Orang Asli and Penan students, known as the Special Intervention Program for Orang Asli and Indigenous Peoples (PIKAP) to replace the previous program, namely, Orang Asli and Penan Curriculum (KAP). KAP was previously developed by the Curriculum Development Division under the Ministry of Education, which took input from representatives of the Orang Asli community, including former Orang Asli Senator Osman Bongsu. KAP began to be implemented in 2007, starting with six schools in the peninsula with 100 percent of Orang Asli students. KAP's T&L strategy emphasizes fun learning for Orang Asli students based on their environment. Among the aspects of KAP implementation is to focus on mastering 3M skills in the first three years of primary school education and exposure to other subjects in the national curriculum, such as Science, Civics, and Moral Education. When KSSR was launched in 2011, the implementation of KAP was further expanded to Sekolah Kebangsaan Asli and Penan, which are in band 6 and 7 for Level 1, while for Level 2, the KAP T&L Module for the subjects of Malay Language, English, Science, and Mathematics was prepared (Wan Nor

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Fadzilah & Baharin, 2020). Until 2018, the implementation of KAP has gone through a complete cycle, and the results of UPSR 2018 showed improved achievement of Orang Asli and Penan students.

To improve the quality of the programs implemented, the MOE reviewed the KAP program in 2018 and replaced it with PIKAP (Wan & Rusaslina Idrus, 2022). PIKAP is one of the programs in Initiative #57 of the Education Transformation Plan for Orang Asli and Peribumi students contained in the Malaysian Education Development Plan (2013-2025). The principle of PIKAP implementation is;

i. Focus on fun and engaging learning
ii. Focus on the mastery of basic knowledge and skills,
iii. Individual and flexible according to the ability level of Orang Asli students,
iv. Guide Orang Asli students to master the basic skills of 4M to be able to follow learning in line with mainstream education, and
v. Brings a collaborative nature that involves all stakeholders (Curriculum Development Division, 2021).

The implementation of PIKAP aims to encourage Orang Asli students to attend and maintain their interest in school to master the 4M basics (reading, writing, counting, and reasoning), and focus on three subjects, namely Malay Language, English, and Mathematics. It also gives flexibility to teachers to diversify T&L strategies. Apart from that, as suggestions to teachers to use strategies such as Teaching Based on Indigenous Perspectives. Teaching Strategies Based on Indigenous Perspectives refer to teaching strategies that use the background, culture, and environment of Orang Asli students integrated into T&L sessions (Curriculum Development Division, 2021). There are eight elements in this Indigenous Perspective Based Strategy, namely:

a) Rebuild/renovate

Refers to the modification of curriculum or T&L activities according to the environment and ability of Orang Asli students to achieve comprehensive and integrated learning goals. Reconstruction or renovation can be done modularly.

b) Relationship with Nature

This refers to the living relationship with the residence and environment of the Orang Asli students. The ecological environment and existing facilities influence the learning activities of Orang Asli students, enabling them to interact with T&L activities in their environment directly.

c) Community Relations

Refers to community life and values in the Orang Asli community related to the learning of Orang Asli students. The cultural values of the local community can be incorporated into teaching so that students can adapt the content to their lives.

d) Indirect Learning

Refers to activities carried out during T&L that can help Orang Asli students master skills without them realizing it. The teacher can ask questions and give instructions indirectly. Playing games, singing, acting, and simulation can be practised. Activities like this can

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indirectly shape the character of Orang Asli students, such as forming the value of seriousness in doing something and motivating and shaping the student's identity.

e) Symbols and Images

Refer to concrete symbols and images that teachers can use to strengthen the understanding of Orang Asli students. T&L activities that involve symbols and images can stimulate the senses, memory, and movement of Orang Asli students, who tend to have spatial-visual intelligence.

f) Practical

Refers to practical activities that allow Orang Asli students to experience a task for themselves, such as seeing, touching, feeling, and listening to recognize and understand it. This activity is carried out to maintain the focus of Orang Asli students to ensure the effectiveness of T&L.

g) Graphic Mind Map

Refers to activities that look at something as a whole, either in the form of text or clear visual activity. Teachers use diagrams or visualization techniques to outline the learning process for Orang Asli students. This approach requires Orang Asli students to illustrate important facts in sketches to understand the lessons. Orang Asli students are trained to draw a graphic thought map to transfer information.

h) Storytelling

Refers to the use of storytelling by teachers as a basis for attracting and maintaining the interest of Orang Asli students in learning. In this strategy, teachers are encouraged to use humour and love to convey information to Orang Asli students. The use of storytelling and moral values produces a direct experience for Orang Asli students through the process of creating, experiencing, or going through the things to be learned (Curriculum Development Department, 2021).

The application of PIKAP in T&L for Orang Asli students is still in the initial phase, and the implementation is still unclear for most teachers. According to a study by Wan and Rusaslina (2022), despite their positive view of the efforts of the Ministry of Education and Culture in improving the quality of teaching for Orang Asli students, most of the teachers are still unfamiliar and not well-informed of the application of PIKAP.

6. Continuous Efforts to the Implementation of Indigenous Pedagogy in Learning Mathematics

Indigenous pedagogy has gained recognition worldwide for its ability to enhance educational experiences and academic outcomes by integrating culturally relevant approaches and indigenous knowledge. In Malaysia, the MOE has shown a steadfast commitment to implementing indigenous pedagogy in mathematics for Orang Asli students. Through various initiatives and policies, the ministry aims to promote inclusivity and provide a meaningful education honouring the cultural identity of Orang Asli students.

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One significant initiative by the MOE is the Orang Asli Education Development Blueprint. This blueprint, introduced in 2011, addresses the unique educational needs of Orang Asli students (MOE, 2012). It emphasises the integration of indigenous pedagogy in curriculum development and instructional practices. By incorporating culturally relevant content, teaching strategies, and assessment methods in mathematics education, the ministry ensures that the learning experiences are meaningful and aligned with the students' cultural context.

Furthermore, the ministry has undertaken curriculum transformation efforts to integrate indigenous knowledge, local contexts, and culturally relevant content into the mathematics curriculum (MOE, 2017). This transformation aims to provide Orang Asli students with a holistic and inclusive education. By connecting mathematics to the students' lived experiences and cultural practices, the Ministry promotes engagement, motivation, and a deeper understanding of mathematical concepts.

To support the implementation of indigenous pedagogy, the Malaysian Ministry of Education strongly emphasises teacher professional development. Cultural competence training programs have been provided to enhance teachers' understanding of indigenous pedagogy and their ability to implement culturally sensitive instructional strategies (Curriculum Development Department, 2014). Through these programs, teachers are equipped with the knowledge and skills to create inclusive and culturally responsive learning environments that cater to the needs of Orang Asli students. The Center of Excellence for Indigenous Education under the Malaysian Institute of Teacher Education has also started practising Indigenous Pedagogy by highlighting two concepts, namely;

1. Indigenous pedagogy is a teaching strategy that exists from local context practices and is more evident among those who have knowledge, design, and apply it according to the needs of indigenous children.
2. Indigenous pedagogy is comprehensive and involves four dimensions: spiritual, physical, intellectual, and emotional (Mohd Nazri, 2014).

Collaboration and partnerships are also key components of the ministry's efforts. Collaborations with indigenous communities, universities, and non-governmental organisations facilitate knowledge exchange and sharing of best practices in indigenous pedagogy (MOE, 2020). These partnerships help to ensure that the implementation of indigenous pedagogy is grounded in the lived experiences and cultural practices of the Orang Asli community, leading to more effective and meaningful learning experiences.

From the discussion above, it can be seen that the MOE has continuously implemented indigenous mathematics pedagogy for Orang Asli students. Through initiatives such as the Orang Asli Education Development Blueprint, curriculum transformation, teacher professional development, and collaborative partnerships, the Ministry strives to provide inclusive and culturally responsive education. By honouring the cultural identity of Orang Asli students and integrating indigenous knowledge, the Ministry fosters meaningful educational experiences that promote academic achievement and empower the students to thrive in their education journey.

7. Conclusion

In conclusion, the implementation of Indigenous Pedagogy methods in teaching mathematics can enhance academic outcomes and promote cultural preservation among Orang Asli students. In addition, it is also important to address the difficulties of Orang

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Asli students in learning mathematics at the primary school level and how Indigenous pedagogy, which is widely practised in many countries, can help tackle the issue. It can be said that involving the community and utilizing culturally relevant materials and activities can increase student engagement and motivation in learning mathematics. Nevertheless, it is important to acknowledge that not every teacher can fully meet the needs of Orang Asli students regarding language, culture, and identity. However, there are ways to help teachers feel more confident and competent in building positive relationships with these students. It is not uncommon for teachers to make assumptions about their students, especially if there are cultural or language barriers to overcome. However, once teachers become more aware of their biases and how they can affect their students, these assumptions can be challenged and changed. Additionally, selecting appropriate learning activities, curriculum content, and assessment mechanisms can improve teaching outcomes. A simple yet effective way schools can support Orang Asli students is by providing and using resources developed by their communities. For example, integrating contemporary texts written by indigenous authors into the curriculum can help make learning more engaging and relevant for Orang Asli students and build their confidence and competence.

The efforts undertaken by the government, particularly the MOE, to improve the education of the Orang Asli communities are truly commendable. These initiatives are positive steps towards improving their quality of life, and it is sincerely hoped they will continue gaining momentum. However, we must acknowledge that the success of this initiative is dependent on the cooperation and support of all parties involved. Without integrity and collaboration, the programs may not have the desired impact on the target group. It is, therefore, essential that everyone remains committed and dedicated to effectively implementing these programs for the betterment of the Orang Asli communities.

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Conflict of Interest

The authors declare no conflicts of interest.

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