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Review

A Systematic Review of What Malaysia Can Learn to Improve Orang Asli Students' Mathematics Learning from Other Countries

Abdul Halim Abdullah

School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia; p-halim@utm.my

Abstract: Intending to enhance educational outcomes for indigenous students, who have long been undervalued in many present educational systems, there is an increasing variety of educational interventions in mathematics learning. This is in line with two of the Sustainable Development Goals (SDGs), which are quality education and reduced inequalities, especially among indigenous students. Nevertheless, no research on indigenous students, locally known as Orang Asli, has been performed in Malaysia. Hence, the purpose of this research is to systematically review empirical studies from various countries that documented interventions to help indigenous students in their acquisition of mathematics from 2007 to 2022. This review included a total of 25 studies. Indigenous students from elementary to high school participated in these programs, which took place in both formal and informal settings. The majority of interventions are used in formal settings and elementary schools. The two key characteristics of the interventions were their scientific inquiry practice and cultural relevance. Regarding indigenous students' cognitive, psychomotor, and affective domains, all interventions indicated successful outcomes. This information will benefit not only Malaysian indigenous mathematics teachers and researchers but also academics from all over the world in order to help improve indigenous students' mathematics learning.

Keywords: indigenous students; Orang Asli; mathematics education; elementary students; high school students; systematic review; Malaysia

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1. Introduction

The term "Orang Asli" refers to the original people of Peninsular Malaysia since time immemorial. There are at least 18 tribes from the Orang Asli ethnic group in the Malay Peninsula. There are approximately 140,000 Orang Asli in Malaysia, most of whom are concentrated in Peninsular Malaysia. Orang Asli is the earliest group to come to West Malaysia several thousand years ago. However, they still practice Malaysia's oldest way of life, belief system, and language. Most of them live in the interior, in the river's upper reaches, and on the edge of the forest near the Malay villages and coastal areas. The Orang Asli can be categorised into three main tribes, namely Negrito, Senoi and Proto-Malay. The Bateq, Mendriq, Jahai, Lanoh, Kintak, and Kensiu ethnic groups make up the Orang Asli Negrito group; they reside in the region surrounding the Titiwangsa range, mainly located on the peninsula's northern side. The Senoi group lives on the Titiwangsa slopes in Perak, Kelantan, and Pahang. The Senoi group consists of six tribes, namely Che Wong, Semai, Semoq Beri, Jahut, Mahmeri, and Temiar. Meanwhile, the Temuan, Semelai, Jakun, Orang Kanaq, Orang Kuala, and Orang Seletar tribes make up the Proto-Malay Orang Asli ethnic group; they initially resided in coastal, kuala, or valley regions. However, they now have a village area of their own [1].

The Malaysian Ministry of Education (MOE) has made it clear in The Malaysia Education Blueprint 2013–2025 that it is extremely concerned about the academic achievement of Orang Asli students (PPPM 2013–2025). For Orang Asli students and other members of minority groups, the government has invested more in teaching and will do so in the

future with physical resources and teaching aids; they will receive extra support and equal access to educational opportunities; these students will enrol in schools by 2025 that are fully equipped with the resources needed to support students and establish a conducive learning environment; they will be instructed by teachers who have undergone additional training to comprehend students' unique demands and difficulties, as well as the learning and teaching techniques necessary to instruct students with special needs. The Ministry will keep working to give Orang Asli students the chance to receive a superior education tailored to their requirements. There are several student groups whose demands and circumstances differ from those of students in the general population. There is a good chance that they will leave the public school system and will not be able to reach their full potential if it is not managed precisely and their requirements are not satisfied specifically. Students who are Orang Asli make up this group; these students will get the same advantages as others in the Malaysian educational system thanks to initiatives, schools, and programs catering to their unique requirements. Among indigenous and other minority groups, 4% of all Malaysian primary and secondary school students are members of indigenous or other minority groups, including the Penan, Sabah, Sarawak natives, Orang Asli, and Sabah natives. Other than that, 80% of these students reside in Sabah and Sarawak, and 68% live in rural areas (PPPM 2013–2025).

The Orang Asli and Indigenous Education Transformation Plan have been developed since the launch of the PPPM 2013–2025. The plan was created to ensure equity; this complies with mainstream education and provides equal access to education. This transformation is expected to address and improve education problems among the Orang Asli community so that their talents and potential are unearthed alongside what is required in 21st-century education and the country towards the Industrial Revolution (IR 4.0). Furthermore, the agenda of the indigenous people has been given attention in the Sustainable Development Goals (SDGs). Two goals related to the agenda are Goal 4: Quality education and Goal 10: Reduced inequality [2].

However, in Malaysia, mathematics achievement among indigenous students is still discussed to this day. Among Orang Asli students in Malaysia, there is still a significant achievement gap in mathematics that plagues the country's educational system [3]. The performance of Orang Asli students nationwide falls short of the required level of competency. According to Azlina and Ma'rof [4], they consistently do poorly in school and lag behind other student groups in terms of performance [5]. Statistics show that out of 100 Malaysian Orang Asli students enrolled in first grade, 5 successfully completed secondary school education [6]. The performance of Orang Asli students has improved, according to statistics, although they still perform below the national average. In contrast to the national average of 87%, 61% of Orang Asli students passed the national examination (Primary School Achievement Test) in core subjects like mathematics [5]. In addition, the literature review shows that more than 50% of Orang Asli primary school students do not reach the minimum level of proficiency in mathematics [7]. This problem is getting worse and is affecting many aspects of political harmony as well as the low socio-economic status of these groups. According to the Department of Orang Asli Development (JAKOA) [7], a limited percentage of Orang Asli students pass public examinations in secondary and primary schools [8].

According to a study by Ismail et al. [9], among Orang Asli students in Malaysia, most Orang Asli students struggle to solve mathematics word problems, which calls for literacy abilities, including context understanding and following the right procedures. Furthermore, mathematics word problems present a higher challenge to their abilities to correctly answer since they struggle with several mathematical operations, such as multiplication. Additionally, it has been observed that Orang Asli students can compute sums in symbolic form using fundamental arithmetic operations, but they struggle with multi-word problems in mathematics. Consequently, they believe mathematics to be a challenging topic, and as a result, they frequently produce unsatisfactory outcomes in mathematics [10]. To determine the mathematics proficiency of year six students in Orang Asli primary schools,

Erni Tanius et al. [8] assessed whether their perception, interest, and knowledge would affect their mathematical achievement. The study included 86 year-six Orang Asli students from 5 Orang Asli schools in Selangor. Despite having a favourable opinion of learning mathematics, the study's findings revealed that their degree of mathematical accomplishment is low. Note that low numeracy skills impair Orang Asli students' secondary school progress and achievement and increase their chance of dropping out [11]. Since students who struggle with counting and other foundational 3 M (reading, writing and counting) skills are at risk of dropping out and having trouble pursuing further education and careers, this issue demands urgent action [12].

In Malaysia, a lot of research is done on the causes of the problem. Sani and Idris [13] assert that indigenous students' arithmetic performance is significantly impacted when math assessments are given in academic languages in which students have low proficiency. Accordingly, efforts should be focused on improving language skills in mathematics classes. Integrating mathematics and language learning simultaneously can create a meaningful learning environment. Wahab and Mustapha [14] found that Orang Asli students had a hard time understanding what the teacher was saying because some of them had not yet mastered the medium of Malay at school. The Orang Asli people speak their tribal language. Alongside students, it is also challenging for teachers to explain concepts to the Orang Asli students in a way that they can grasp. A review by Veloo et al. [15] aims to see Orang Asli students' achievements in mathematics with a bilingual version of the mathematics test (Malay and Temiar). Based on mathematical calculations and word problems, both tests consist of three key topics: number operations, time and money. In the Sungai Siput district of Perak, eight Orang Asli primary schools participated in this study. The difficulty index is used to assess students' performance on word problems and math calculations in Malay and Temiar (the mother tongue of Orang Asli). This study's findings demonstrate that Orang Asli students have more trouble answering questions on money, time, and number operations in the Malay version than in the Temiar version. Subsequently, the study's findings also demonstrate that the bilingual version has enhanced Orang Asli students' arithmetic proficiency in the area of money and time in mathematical calculations and word problems.

Indigenous children in Malaysia also face additional challenges in learning mathematics because they have a different social background than mainstream students. This is a crucial aspect that influences Orang Asli students' studies because their society and culture are not represented in the curriculum. The curriculum and syllabus were created with the broader student population in mind, although Orang Asli students' knowledge is considerably different from those of their Malaysian classmates. Hanafi et al. [16] findings stated that Orang Asli students encounter difficulties learning mathematics because of their social background—which is substantially different from what is illustrated in the school's mathematics curriculum. The poor mathematics performance among Orang Asli students is also a result of how mathematics is taught and learned at those schools' primary levels [10]. Despite the efforts of the Malaysian government, Wahab et al. [17] found that the mathematics education accomplishment of Orang Asli children is hampered by problems, including isolation of learning. In addition to their low academic performance, they drop out more frequently in secondary school than in elementary school, which is very concerning and impacts their academic success [18].

In conclusion, in the context of research conducted Malaysia, the majority of studies in mathematics education among Orang Asli students are more focused on determining the problem of mathematical skills among Orang Asli students [8,9], challenges in implementing mathematics learning in classes [10], and the Orang Asli language factor in determining their achievement in mathematics tests [15,19,20]. Studies on interventions given to Orang Asli students in Malaysia are very limited. Accordingly, this systematic literature review was conducted in order to identify the interventions given to Orang Asli students in other countries in aiding Orang Asli students' learning and subsequently creating a positive effect on them in a variety of ways.

2. Methodology

2.1. Systematic Review Design and Search Process

This systematic literature review adheres to widely accepted PRISMA guidelines, which provide standards for carrying out and disclosing systematic reviews. In SCOPUS and Web of Science (WoS), two academic databases, the researcher employed three sets of search terms. The initial set of identified research terms reduced the focus on research in mathematics education. Instead, it concentrated on indigenous students (i.e., Orang Asli OR aboriginal OR indigenous) (i.e., mathematics education OR mathematics teaching OR mathematics learning). The "AND" operator combines these two sets of search terms. To limit the scope of the study to kindergarten through high school, the third set of search terms (i.e., kindergarten OR elementary school OR high school) was used. For the initial search, other limiters were also applied, including (1) published between 1 January 2007 and 30 July 2022; (2) scientific articles in the form of empirical studies; and (3) written in English.

2.2. Screening and Eligibility Studies

Critical peers were invited to take part in the screening and evaluation process to determine their eligibility for peer review. Two peer reviewers and I evaluated each title and abstract of the 170 citation records to filter them for relevant research using the following inclusion criteria: (1) concentrated on indigenous students; (2) reported interventions and results of interventions; (3) focused on kindergarten to high school students; (4) in the field of mathematics; (5) the article is a program evaluation or empirical research; and (6) the article has been published in academic journals/book chapter/proceeding and is empirical research or a program evaluation. Other than that, 115 studies were excluded after a review of the titles and abstracts. This includes interventions focusing on mathematics teachers and future teachers because this literature analysis focuses on interventions for Orang Asli students. In addition, some studies involved post-secondary students that did not provide results or practises and/or had nothing to do with mathematics. After that, the researcher looked for the remaining 55 studies' full texts. Following that, the eligibility for final inclusion in the review was examined while reading the complete text of these 55 articles. Because they did not match the previously mentioned first-round inclusion criteria, a total of 30 articles were eliminated. Note that 25 articles were still available for inclusion in this systematic review after the finished full-text scan. With the help of the PRISMA Flow Diagram, Figure 1 explains the search and screening process.

2.3. Data Analysis

The 25 studies received thorough analysis. I created a codebook listing the key coding categories of interest, as indicated in Table 1, to direct the data extraction. Consequently, the researcher applied the mixed research synthesis method proposed by Ardoin and Bowers to assess the findings of the coding [21]. In order to combine the data, the researcher employed a "counting" strategy. The researcher computed and tagged categories for, among other things, countries, student grade levels, and research techniques. A general summary of the pattern in the research is given by the descriptive statistical analysis. Alternatively, the researcher employed a constant comparative method to theme analysis to examine data on intervention characteristics and outcomes [22]. Throughout the entire analysis process, peers have also been involved in peer checking.

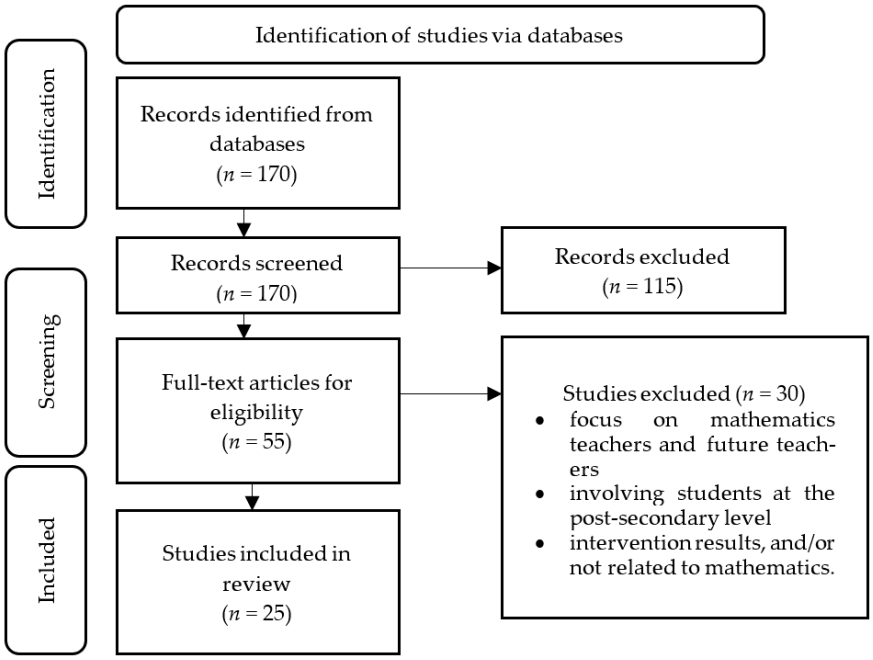

Figure 1. PRISMA Flow Diagram.

Table 1. Example of Article coding.

Coding Category	Sub-Category	Example of the Codes
Study characteristics	Publication outlet	South African Journal of Education, Journal of Mathematics Teacher Education, Australian Journal of Education, Mediterranean Journal of Social Sciences
	Publication year	2009, 2013, 2014, 2015, 2021
	Country	Australia, South Africa, Indonesia, Taiwan
Intervention characteristics	Research design	Case study, participatory action research, quasi-experiment
	Research method	Quantitative, qualitative, and mixed methods
	Intervention implementer (s)	Kindergarten teachers, mathematics teachers, indigenous teachers
	Length of the intervention	1 year, 3 years
	Number of students	Grade two, 125 students (students were aged 4 years, 11 months on average), a team of grade 10 learners
	Learning topics	Algebra, Numbers, Geometry
	Features of the intervention	Patterns and The numeracy intervention Early Algebra, Pre-school (PEAP) mathematical language embedded within learning activities, professional development (PD) program, *morabaraba* as an indigenous game, three projects; Stronger Smarter Learning Community, Make It Count, 8-ways Aboriginal approach to teaching
Outcomes of the intervention	Overall outcomes	Positive, negative, null
	Outcomes reported	Improve young children's ability to solve mathematics and reasoning mathematically, as well as their grasp of and participation in Western mathematics and the mathematical language. In addition, perform high cognitive skills of synthesis and analysing skills, understanding of mathematical concepts, self-esteem in mathematics, and ownership of their mathematics learning.

3. Results

The main coding categories, sub-categories and examples of article coding listed in Table 1 were used to organise and present the results in this section. In what follows, the researcher first discusses findings related to study and intervention characteristics, then over aspects of program practises and reported program outcomes.

3.1. Study Characteristics

The 25 studies that have been included in this review were released in three book chapters (12%), one proceeding (4%) and 21 journals (84%). All of them were indexed in Scopus and Web of Science (WoS). Two studies (8%) were published in two publications focusing on broad indigenous and cultural perspectives (i.e., International Journal of Inclusive Education and Journal of Human Ecology). In journals with a general education focus, such as the Australian Journal of Education and the South African Journal of Education, five studies (21%) were published, Educational Studies, Education and Urban Society, and Creative Education), Moreover, seven research (or 28%) were published in journals with a concentration on mathematics education (i.e., Journal of Mathematics Teacher Education, Mathematics Education Research Journal, Canadian Journal of Science, Mathematics and Technology Education, International Journal of Science and Mathematics Education, and Journal for Research in Mathematics Education). Journals that only published one study included ZDM, Social Psychology of Education, Australian Journal of Early Childhood, Mediterranean Journal of Social Sciences, Journal of Interdisciplinary Mathematics, International Journal of Instruction, and International Journal of Learning, Teaching and Educational Research. Three chapters in the book Pedagogies to Enhance Learning for Indigenous Students: Evidence-based Practice, published by Springer, and one piece in the Proceedings of the 31st Conference of the International Group for the Psychology of Mathematics Education. Six (24%) of the studies in the sampled reviews that were published over the course of the 15-year search period did so between 2007 and 2012, 13 (52%) between 2013 and 2018, and six (24%) within the last four years. Australasia had the highest geographic representation, with 13 (52%) of the interventions taking place in Australia. With three studies in South Africa (12%), and one in Zimbabwe (4%), the continent was also significantly represented in the sample. Three studies—two in the United States (8%) and one in Canada (4%)—were carried out in North America. The third and fourth studies discussed programs in Europe (one research, 4%), Oceania (three studies, 12%), and Asia (three studies, 12%). In total, 17 (68%) of the 25 papers that made up this review were classified as focusing on qualitative data; these studies mainly used observation and interviews to gather qualitative information about the experiences of indigenous students. The other five studies (20%) adopted a quantitative methodology. The primary sources of quantitative data in these investigations were survey and test findings. A mixed methods technique was employed in three studies (12%) to generate both qualitative and quantitative data. In terms of research design, 14 studies (or 56%) were created as case studies that detailed the conception, implementation, and results of interventions, four studies (16%) used an action research methodology, four studies (16%) used a quasi-experimental methodology to compare student performance in the experimental and control groups, and two studies (8%) used comparative analysis. One study (4%) used a longitudinal research strategy. For a list of research characteristics, see Figure 2.

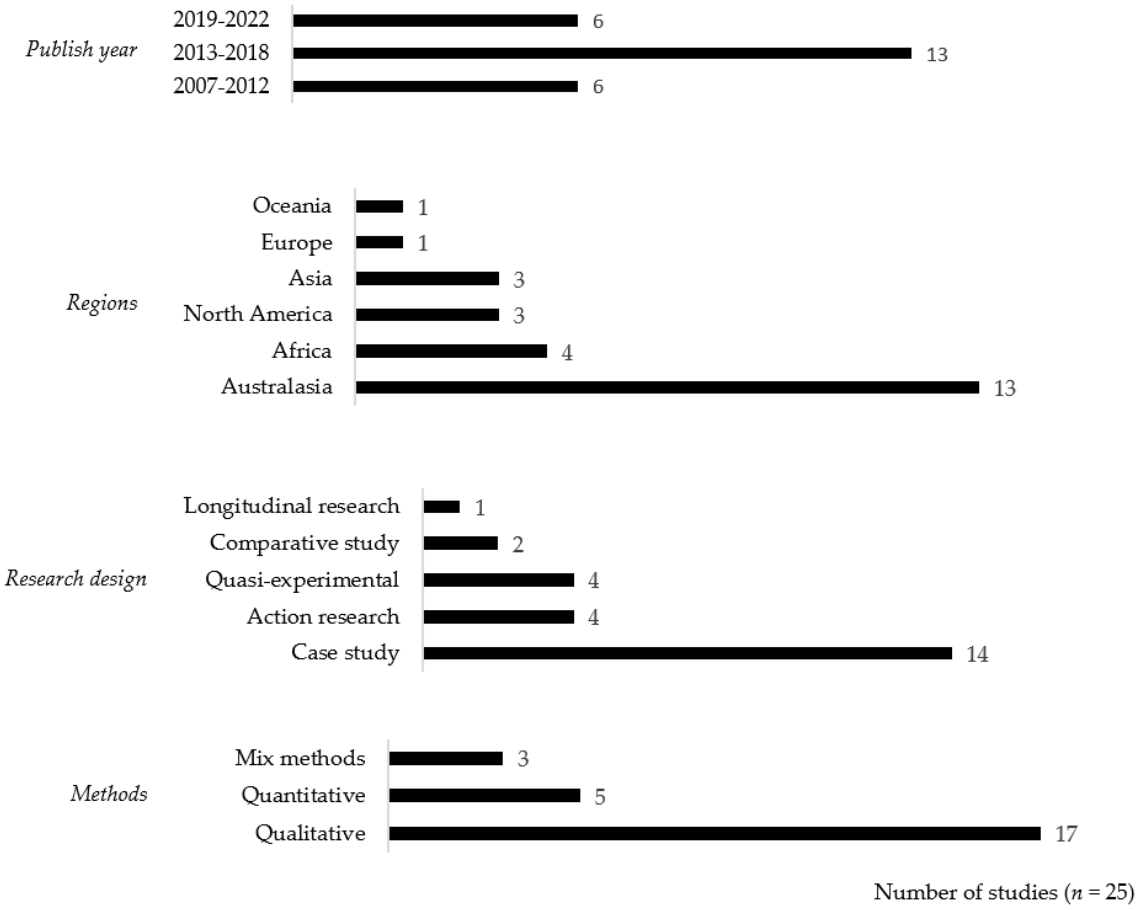

Figure 2. Study characteristics of the reviewed studies.

3.2. Intervention Characteristics

Only one study (4%) of the 25 studies included in the review reported interventions that took place outside of official educational settings and during school hours (e.g., community centres and outdoor settings). For a list of the features of the program, see Figure 3. Each intervention's patterns of characteristics varied, for example, whether indigenous knowledge holders participated in its implementation, what mathematics concept was involved in the intervention and how long the intervention took place. Even though most interventions occurred in formal settings, the majority involved members of several groups in the implementation of the intervention, including staff from relevant institutions, researchers in education, indigenous knowledge holders, and/or researchers in education. Note that the age range of the participants in these official programs was four to fourteen years old. The youngest samples were 4-year-old students who were exposed to activity-based learning that encouraged them to take part in a context for learning and teaching that was play-based and focused on that age group [23]. In the unstructured context of the study, the intervention took the shape of a 4-day summer camp with planned community and lab activities centred on college access and achievement. Other than that, 14 indigenous high school students participated in this camp, interacting with indigenous people from diverse indigenous communities and sectors [24]. Out of 25 reviewed articles, only three studies (12%) involved secondary school students, while 22 studies (88%) were conducted in elementary schools. Here, mathematics concepts can be divided into six fields (i.e., algebra, geometry, number, measurement, mathematics in general, and numeracy in general). Four studies (16%) involved the topic of numeracy in general, two studies (8%) involved the topic of geometry, and one study (4%) each involved the topic of algebra, numbers and measurement. On the other hand, 16 (64%) studies involved mathematics in general.

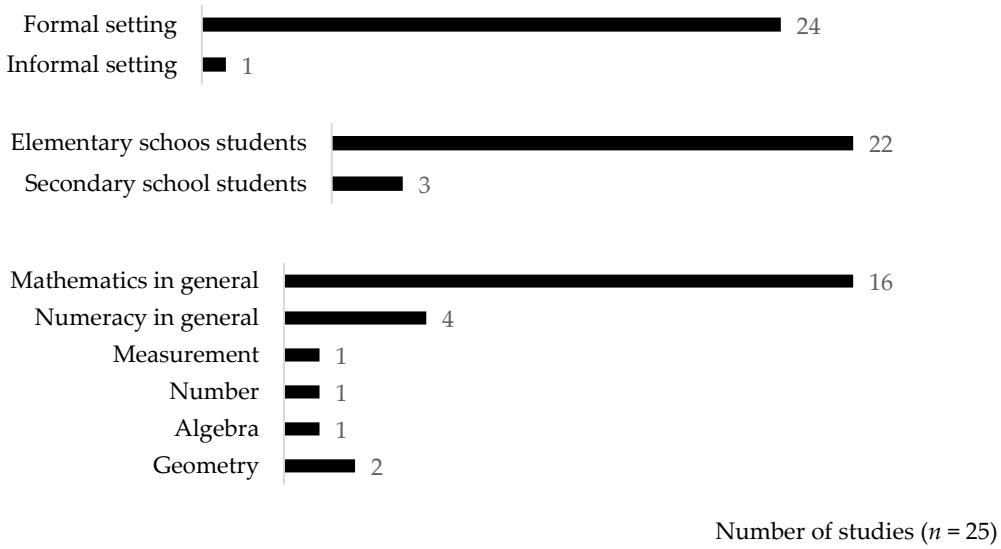

Figure 3. Intervention characteristics of the reviewed studies.

3.3. Features of the Intervention Practice

The main focus of the analysis of the practises' features was on the policies or programs that were put in place to help indigenous students' mathematical education.. Six categories were referred to coding by Jin [25] i.e., (1) Scientific inquiry refers to activities that involve students in performing scientific studies using scientific (Western) procedures, for example, formulating hypotheses and gathering data through the concept and implementation of experiments, (2) Students participate in practical tasks while designing and making, (3) Cultural relevance refers to the emphasis on Orang Asli knowledge, how to know Orang Asli, relationships with the local community, (4) Technology involvement gives students the opportunity to use software and engage with digital technologies, (5) Focus on discussion and communication, offering students the chance to interact and discuss with their peers through collaborative group work and dialogue, and (6) Literacy exercises concentrate on literacy practises including storytelling, narrative writing, creative writing, and the development of (scientific) vocabulary. Because these coding categories were not mutually exclusive, multiple codes might be used for the same study because they were all appropriate. Regarding the methodologies each intervention used, they all share a variety of features. Due to the complexity of the methodologies used in these interventions, all of the other 25 trials had two or more codes. The features of the interventions examined in this study are displayed in Figure 4 below.

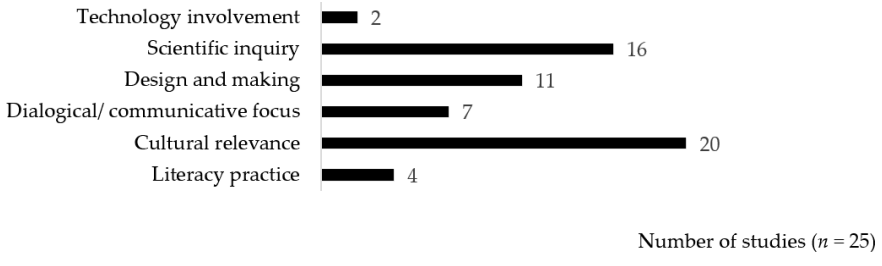

Figure 4. Features of the intervention practice.

The analysis clearly demonstrated two features: *cultural significance* and *scientific inquiry*. In 20 (80%) of the 25 studies that made up this review, indigenous knowledge and/or ways of knowing were included in students' mathematics instruction, making the interventions culturally appropriate for indigenous students. When building an understanding of arithmetic symbolism that may be easily extended to algebraic symbolism, Matthews et al. [26] adopted an approach that makes use of indigenous knowledge of

symbols within domains like sports, driving, art, and dance as a starting point. It was mentioned in Moloi [27], and Nkopodi and Mosimege [28] that Morabara was used as an example of an indigenous game to teach mathematical concepts in a condensed form; they claim that the Morabara game makes it fun to learn mathematical concepts. The efficacy of the indigenous game *kgati (skipping rope) in the teaching and learning of word problems in Grade 4 mathematics was investigated by Moloi et al. [29].

Meanwhile, Hsu et al. [30] investigated the design of a curriculum based on culture, the implementation of teaching, and the impact on the math learning performance of Paiwan children in Grades 5 and 6. Note that 16 of the 25 initiatives, or around two-thirds, placed a strong emphasis on scientific inquiry as they were being implemented. The instructors in Tai [31] were in line with cognitive load theory (CLT) and pertinent studies to instruct students to monitor their own CL while solving mathematics problems, for example, deletion of redundant information, monitoring drawing manifestation, and isolation of element; these programs, like those in Rigney et al. [32], encouraged students to think creatively, engage physically, experiment, and learn from others. For students to be motivated and competent to plan, check, monitor, assess, and correct their cognitive strategy on their own, the teachers give them the necessary tools. There were some other features discovered in addition to cultural relevance and scientific investigation, with 11 (44%) of the 25 interventions having a design and being made. All classroom activities in these interventions, like those in Warren et al. [23], were situated within the early childhood philosophy of activity-based learning, with students being encouraged to participate in a play-based and focused learning and teaching context. Correspondingly, Warren and DeVries [33] provided hands-on learning-based learning that best supports young indigenous students' engagement with mathematics. Seven studies (28%) placed emphasis on *Dialogical/communicative focus*. For example, Gardner and Mushin [34] focused on how classroom discussion is structured in these indigenous classrooms to facilitate knowledge transmission as a basis for learning and representations, oral language, and engagement in mathematics. Moreover, RoleM is a mathematics program developed by Warren and Miller [35] with the help of Miller et al. [36]. It is based on research on how to best support the learning of young indigenous students. Four studies (16%) focused on literacy practice, including Matthews et al. [26]; they recommended training and involving students in storytelling and creative writing as well as helping them create and use disciplinary vocabularies for mathematics [33]. Other than that, only two interventions (8%) emphasised *Technology involvement*. Students in these programs either utilised technological tools for the intervention [37] or took part in the course in a setting where learning is facilitated by technology [38].

3.4. Reported Outcomes

In terms of the impact of the planned interventions on indigenous students, each of the 25 studies that made up this review found favourable results. Following a review of the results, three categories were identified: the cognitive, psychomotor, and affective domains. Table 2 below provides a detailed explanation of each category. Additionally, these code domains were not exclusive.

As depicted in Figure 5 below, 14 (56%) of the 25 studies that were part of this review examined and reported outcomes linked to indigenous students' cognitive domains, for instance, mathematics proficiency and problem-solving abilities. Three studies (12%) presented outcomes related to indigenous students' psychomotor domain, such as engagement in mathematics classrooms, and another three studies (12%) reported outcomes around indigenous students' affective domains, such as their attitudes and interest toward mathematics. One study (4%) conducted a study to see the effectiveness of the intervention on cognitive- and psychomotor-related outcomes, and three studies (12%) involved cognitive- and affective-related outcomes. Last but not least, one study (4%) conducted a study on the effectiveness of the intervention on the three domains of indigenous students, namely cognitive, psychomotor and affective.

Table 2. Outcomes reported in the studies.

Domain	Explanations
I—Cognitive-related outcomes	Involves learning and intellectual skill improvement. This involves the ability to recognise or recall particular facts, procedural patterns, and ideas that support intellectual capacities growth and competencies [39].
II—Psychomotor-related outcomes	Includes using motor skills, moving around, and being coordinated [40].
III—Affective-related outcomes	Includes how we handle emotional issues, including our feelings, values, appreciation, zeal, attitudes, and motivations [41].

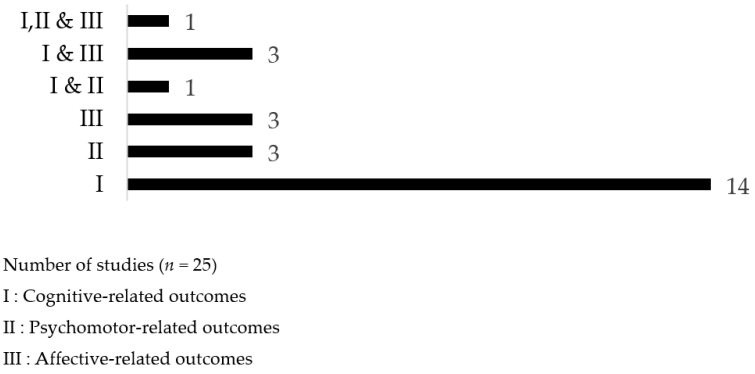

Figure 5. Outcomes reported in studies.

3.4.1. Enhancing Indigenous Students' Mathematics Cognitive-Related Outcomes

Several of the studies examined in this study intended to aid indigenous students in learning to improve their mathematics performance. Some studies, such as those [42], examined the impact of teaching geometry concepts more closely related to the experience of indigenous students. Because they had the necessary prior knowledge, the students were able to accomplish rather difficult geometrical exercises. Intervention in the form of traditional games also has a positive impact on students' cognitive domains. Among them, Moloi [27] showed that after being exposed to Morabara, an indigenous game used to teach simpler mathematical concepts, the students were able to exhibit high cognitive skills in analysis and synthesis. The moves of the *kgati (skipping rope) can be used to improve the teaching and learning of mathematics word problems, according to Moloi et al. [29]. The implementation of a special mathematics program such as in Matthews et al. [26] for Maths as Story Telling (MAST), Warren and Miller [35] for Representations, oral language and engagement in Mathematics: RoleM, Tai et al. [31] for an example-based cognitive load teaching method, Warren et al. [23] for Young Australian indigenous students Literacy and Numeracy (YAILN), Demitra and Sarjoko [43] for Handep cooperative learning, and Pegg and Graham [38] for QuickSmart, has a significant impact on indigenous mathematics learning achievements. Regarding skills of problem-solving in mathematics, the success of improving those skills can be seen in the intervention carried out in the studies by Sullivan and van Riel [42], Demitra and Sarjoko [43] and Moloi [29].

3.4.2. Enhancing Indigenous Students' Mathematics Psychomotor-Related Outcomes

Five studies (20%) have presented how interventions have improved mathematics psychomotor-related outcomes among indigenous students' crafted interventions generally positively impact indigenous students' engagement. For example, Warren and deVries [33] demonstrated that the eagerness and desire of indigenous students to participate in debates about mathematics are influenced by such hands-on, activity-based learning. According to Rigney [32], creative and body-based learning is extremely beneficial. It increases

engagement in mathematics for urban Aboriginal students. Meanwhile, Kisker et al. [44] and Miller et al. [36] also proved that special programs could increase students' engagement in the mathematics classroom. One study by Jorgensen and Lowrie [37] demonstrated how a digital game called Guitar Heroes might be used in a rural Aboriginal school to generate great social interaction and collaboration.

3.4.3. Enhancing Indigenous Students' Mathematics Affective-Related Outcomes

Some of the interventions examined in this study were created and carried out with the intention of enhancing the affective domains of indigenous students. Six studies (24%), such as Matthews et al. [26], Tai et al. [31] and Kisker et al. [44], showed the effectiveness of the implementation of the different teaching approaches has a positive impact on the affective domain of students. Meanwhile, Matthews et al. [26] showed that the approach of MAST increased self-confidence and the development of a positive self-image for indigenous students. Apart from that, Tai et al. [31] proved how using examples to teach cognitive load increased students' attitudes and interest in studying. Alternatively, Kisker et al. [44] implemented the reform-oriented and culturally based Math in a Cultural Context (MCC) to increase students' motivation. Indigenous students' love for mathematics increased with the Mathematics | Culture | Environment (IndigiLogix) program [24]. The implementation of indigenous games also has a positive impact on students. Nkopodi and Mosimege [28] demonstrate how the indigenous game Morabaraba used in math classes, can be used to enhance the learners' interest in mathematics. This can lead to the enjoyment of mathematics itself, minimise the fear of mathematics and encourage more learners to take mathematics as a subject. At the same time, Dewah and Van Wyk [45] examined how mathematical concepts incorporated into the game of pada helped to fight methophobia among indigenous students. A study by Owens [46] stated that in order to establish partnerships between the school and the community, revise teaching strategies and curricula, and value family and Aboriginal cultural heritage, it was necessary to provide an appropriate and effective professional development that had an impact on students' pride in their Aboriginal identity.

4. Discussion

There has been an increase in interest in the mathematical learning experiences of indigenous students. Thus, the number of significant studies has gradually increased over the past ten years. This study reviewed educational interventions from the past fifteen years that comprehensively supported indigenous students' mathematics learning. From elementary to high school, all of these interventions were used, and they all had great results. I summarise the findings of this review in this part and analyse the implications and trends that follow from that synthesis, with a focus on their applicability to researchers and practitioners working to advance educational equity for indigenous students in Malaysia.

4.1. Many Interventions Were Given to The Elementary School Indigenous Students

Most reviewed articles reported that the interventions were given to elementary school students. In fact, some of the studies were conducted on children before they entered elementary school. The most significant indicators of later mathematics achievement, as well as ability in other content areas and grade retention, are early mathematics knowledge and skills, as per Claessens and Engel [47]. According to studies, in Malaysia, over half of Orang Asli students leave school after their sixth year [48]. Only 30% of Orang Asli students complete secondary school, which is less than half the national average, and as many as 39.1% of Orang Asli students complete year six of primary school without enrolling in form one of secondary school [49,50]. Apart from that, most Orang Asli only obtains formal education at the primary level, according to Nordin and Danjuma [51]. Regrettably, there is a clear trend indicating that the majority of students who have finished their basic education tend to drop out of secondary school as well. Accordingly, teachers and researchers are encouraged to implement continuous interventions and programs in mathematics so that students are more motivated in mathematics class and subsequently

achieve good results in the subject. Most of the study locations in the articles reviewed in this study are in primary schools in the indigenous community. However, in Malaysia, Selvaratnam et al. [52] stated that Orang Asli schools are not necessarily close to their villages. This is due to the local geographical conditions, which are hilly and squeezed by gorges and thick forests, making it impossible to provide every village with a school for the convenience of the villagers. Even yet, the Orang Asli community continues to get educational services, albeit in a centralised way. For the convenience of various Orang Asli villages, a number of educational facilities for Orang Asli children were constructed. The Department of Orang Asli Development (JAKOA) estimates that 31.7% of Orang Asli villages are in rural areas, 61.45% are in the suburbs, and 1.38% are in urban areas [53]. The number of Orang Asli primary schools in Malaysia is depicted in Figures 6 and 7 below, respectively, along with the number of Orang Asli primary school students by gender and state in 2020. Figure 6 shows 762 Orang Asli primary school students in Malaysia. In contrast, Figure 7 shows that there are 27,224 Orang Asli primary school students in Malaysia, with 13,600 female and 13,624 male students.

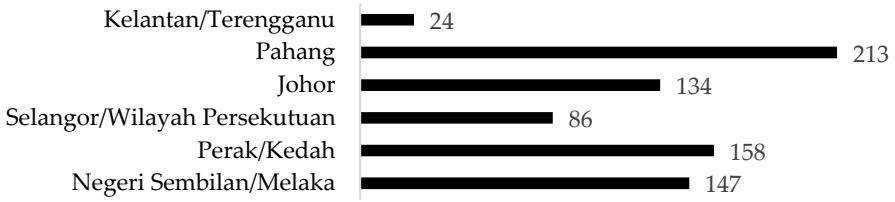

Figure 6. The number of Orang Asli primary schools in Malaysia by State in 2020. Source: JAKOA (2022) [1].

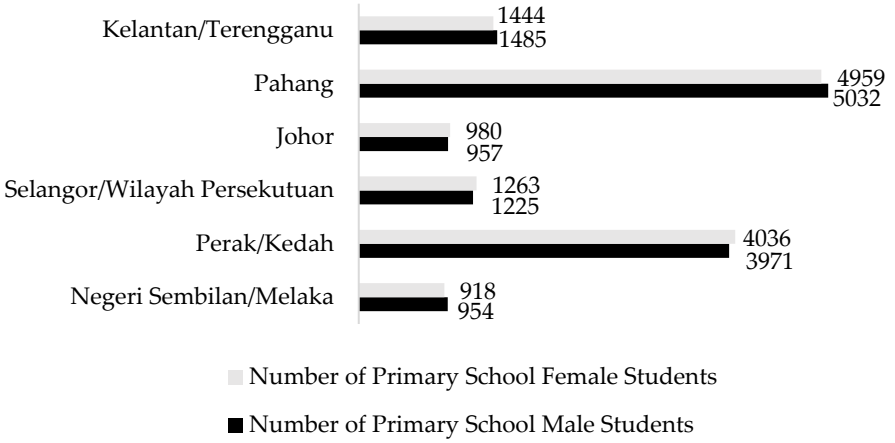

Figure 7. The number of Orang Asli primary school students in Malaysia by gender and state in 2020. Source: JAKOA (2022) [1].

Of the reports of interventions given to indigenous students, most of the interventions were given to students in their schools. For instance, Warren, Young, and DeVries [23] employed activity-based learning with elementary school students to convince them to participate in a context for learning and teaching that was play-based and targeted—their school, in their environment. In addition, Hsu et al. [30] developed a culture-based curriculum design based on their context and the effect on Paiwan students in grades 5 and 6. This early intervention should always be given to Orang Asli primary school students because the low level of educational achievement will further delay the process of advancing the Orang Asli community. Furthermore, Ma'rof [54] affirmed that progress in the Orang Asli community requires development centred on human development and not material-centred development. A society can only change from backwardness to progress when they take into account the significance of education and knowledge in their society. However,

according to Owens [46], when funds are available to support schools and communities in implementing appropriate and effective professional development, creating partnerships between schools and communities, revising teaching methodologies and curricula, and valuing family and Aboriginal cultural heritage, teachers can change.

4.2. Cultural Relevance and Scientific Inquiry: Main Features of the Interventions

Indigenous students need support in mathematics; thus, educational students must take into account their sociocultural backgrounds and practical experiences; they also need assistance transitioning from their daily culture to the recognised western modern science culture and practices. One of their cultures that can be appreciated and associated with mathematics is traditional games. Previous studies proved that interventions in the form of games could improve the quality of mathematics learning for indigenous students. Other than that, Moloi [27] claims that the Morabara game aids in the engaging teaching of mathematical concepts. Various mathematical concepts have been identified from the game, for example, Nkopodi and Mosimege [28]. Besides, Moloi [29] investigated the benefits of indigenous games in the teaching and learning of word problems in Grade 4 mathematics.

Dewah and Van Wyk [45] provided an empirical evaluation of the game Pada, which is played by many indigenous kids in Zimbabwe. In addition, a curriculum and approach that considers indigenous students' culture needs to be established. For example, Sterenberg [55] examined one Aboriginal teacher's methods for incorporating indigenous knowledge and the required mathematics curriculum in an Aboriginal school. Meanwhile, Demitra and Sarjoko [43] proved that the cultural context has an impact on students' learning, particularly in developing students' mathematical problem-solving skills. From the articles reviewed, *Scientific Inquiry* is the main feature of the intervention that can improve the quality of mathematics learning for Orang Asli students. *Scientific Inquiry* involves the active involvement of students through hands-on science activities. Hands-on activities are practical-based activities that involve students moving and using psychomotor skills to complete a task. According to Aziz and Taha [56], one strategy that the teachers emphasised to pique the attention of the Orang Asli students in the classroom was the teaching and learning strategies centred on practical, hands-on activities. In the area of mathematics, this was demonstrated in earlier studies. While Warren and Miller [35] incorporated learning strategies that include language, gestures, physical activity, texture, sound, and manipulating concrete materials and graphics to improve indigenous students' understanding of mathematics, Warren and deVries [33] provided hands-on activity-based learning that encourages young indigenous students to engage with mathematics.

4.3. The Importance of Indigenous Languages in Mathematical Learning

Language plays an important role in building relationships. Orang Asli students enter the school using their native language as well as one or more Orang Asli languages or a combination of these. Teachers who desire to connect with their students on a fundamental level must be functional Orang Asli speakers. The conditions for indigenous students' learning, according to Warren et al. [57], are not in line with their needs when they enter the school world. The mismatch between the original language and the language used in this school directly affects the achievement of indigenous students in numeracy in the long run [23]. Accordingly, in this systematic review, these articles involve the use of language in learning mathematics, such as Sullivan and van Riel [42]. Given that many indigenous languages have a high percentage of direction words, studying geometric concepts may be more familiar to indigenous students than learning numbers. The implementation of this curriculum component will increase indigenous kids' achievement, confidence, and connection to mathematics and education. Matang and Owens [58] examined the impact of children's native language (Tok Ples) and traditional counting systems on their development of early number knowledge that is formally taught in schools. Alternatively, Warren and deVries [33] highlighted the role of oral language in the language of mathematics to foster important language acquisition and assist students in acquiring meta-cognitive abilities.

In Malaysia, although the Orang Asli community is a minority group in a predominantly Malay-speaking society, they remain strong in their language and culture. Using a language that is more like the language of Che Wong proves that this community is small in number but still firmly defends its language [59]. There are believed to be more than 100 different languages spoken in Malaysia; note that the number could reach as high as 136, according to Simons and Fennig [60], which also includes the Orang Asli languages. According to a recent study by Eberhard et al. [61], of the languages spoken in Malaysia, 112 are indigenous, while 21 are not. In the context of mathematics subjects in Malaysia, the effectiveness of the use of the Orang Asli language on mathematics achievement has been implemented by Veloo et al. [15,19]. Accordingly, language is one aspect that needs to be emphasised in the mathematics learning of Orang Asli students.

4.4. Less Intervention Designed by Indigenous Teachers and Ongoing Support for Non-Indigenous Teachers

Only a small number of interventions from the 25 publications analysed in this study were created and carried out by indigenous teachers. The lack of Orang Asli teachers in the educational system is still apparent and calls for attention even though Orang Asli researchers and experts have long advocated that Orang Asli teacher programs are crucial to meeting the needs of Orang Asli children. Accordingly, educational programs offered at universities and Teacher Education Institutes (IPG) in Malaysia need to highlight the importance of appreciating the cultural and social environment in which math is learned; they should see the classroom through the eyes of the students in order to build a curriculum that is suitable, leading to an outcome of meaningful discussions between students, teachers, and communities. This is important when they are placed in Orang Asli schools in the future. Previously, in order to reduce educational problems among Orang Asli students, the Malaysian Ministry of Education (MOE) implemented an initiative through the IPG. In addition, the aspect of development and achievement of Orang Asli students is amongst the primary goals and objectives contained in the PPPM 2013–2025 [5]. The Orang Asli Education Transformation Plan has outlined seven new initiatives as an effort to mainstream the Orang Asli community along with the progress of Malaysians [62]. Among the initiatives outlined in the plan is to increase the placement of students for the Bachelor of Education Special Program (PISMP) at the Malaysian Teacher Education Institute. As of 2016, a total of 139 Orang Asli and indigenous teacher trainees have been registered at IPG to follow the program [11]. The teachers are expected to be able to use pedagogy that is suitable for Orang Asli students.

Additionally, just a few publications included in this study stated that non-indigenous teachers had obtained professional support concerning culturally responsive pedagogy. Therefore, they need to be given courses or workshops related to effective pedagogy in learning mathematics for Orang Asli students from time to time. This is important because school teachers have a substantial influence on the learning of indigenous children [63]. Therefore, in order to ensure the well-being of indigenous students, it is crucial to give non-indigenous teachers the chance to acquire the knowledge, abilities, and views necessary to comprehend the context of their students' lives [64]. In Malaysia, one of the programs that have been implemented is the *Model Pensiangan Salinatan* Project which was established in 2004 with the objective of improving content knowledge pedagogy and quality native pedagogy skills for teachers who teach in Orang Asli schools with the hope the academic performance of Orang Asli students also increase [65]. The program was expected to change teachers' teaching approaches by emphasising indigenous pedagogy. However, the program focused on aspects of education in general and did not focus on the subject of mathematics. The impact was also not encouraging when the achievement of Orang Asli students in academics is still concerning if referred to the Primary School Achievement Test (UPSR) achievement from 2012 to 2016 [11]. Accordingly, courses, programs, and workshops related to indigenous pedagogy, especially for non-Orang Asli teachers, need to be implemented continuously to improve the quality of mathematics learning for Orang

Asli students in Malaysia. Effective mathematics learning includes the beliefs of math teachers in Orang Asli schools regarding arithmetic instruction and learning. Consequently, it is appropriate to give relevant information on mathematics pedagogy for Orang Asli students to Orang Asli school teachers when offering mathematics education for Orang Asli students [10].

5. Conclusions

Studies that were indexed in the Scopus and Web of Science (WoS) databases and published in scholarly journals/book chapters/proceedings were the only ones that could be included in this review. The researcher thinks there are still a lot of studies that did not publish in scholarly journals to share their interventions or results; these interventions were not included because of unpublished reports or other grey literature, for example, theses, dissertations, and government and association reports, were excluded from this review. This is a review limitation that the researcher is aware of. The majority of the interventions examined in this study had successful results. The reviews discussed in this article are expected to provide information to academics, researchers, and teachers related to the mathematics field regarding education for indigenous students not only in Malaysia but also worldwide. This is viewed from the aspect of emphasising the early concepts of mathematics in the early stages of children, the types of effective interventions for learning mathematics for indigenous students, the importance of indigenous language in mathematics education as well as the need for continuous support to indigenous school teachers in developing the quality of education for indigenous students. Many interventions were given to the elementary school indigenous students. This is due to the fact that early mathematical knowledge and skills are the most important predictors of subsequent mathematics achievement, as well as aptitude in other curriculum areas and grade retention. In terms of the types of effective interventions for learning mathematics for indigenous students, they require mathematics assistance. Therefore, educators must consider their sociocultural backgrounds and real-world experiences. Indigenous languages are crucial for learning mathematics since, over time, a student's performance in mathematics will be negatively impacted by the discrepancy between their native tongue and the language they are being taught in school. Besides that, to enhance the calibre of mathematics instruction for Orang Asli pupils in Malaysia, ongoing support for non-indigenous teachers should also be highlighted.

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References

1. Department of Orang Asli Development (JAKOA). Available online: https://www.jakoa.gov.my/orang-asli (accessed on 13 May 2022).
2. United Nations. The 2030 Agenda and the Sustainable Development Goals: An opportunity for Latin America and the Caribbean (LC/G. 2681-P/Rev). 2018. Available online: https://repositorio.cepal.org/handle/11362/40156 (accessed on 1 August 2022).
3. Sani, N.; Idris, A.R. Identifying the challenges encountered by teachers in dealing with indigenous students. *MOJEM Malays. Online J. Educ. Manag.* **2017**, *1*, 48–63. Available online: https://sare.um.edu.my/index.php/MOJEM/article/view/6173/3877 (accessed on 18 October 2017).
4. Azlina, M.K.; Ma'rof, R. Atribusi kemiskinan dalam kalangan pelajar orang asli di Malaysia. In Proceedings of the International Conference on Social Science Research ICSSR 2013, Penang, Malaysia, 4–5 June 2013.
5. Ministry of Education. *Malaysia Education Blueprint: 2013–2025*; Ministry of Education, Malaysia: Putrajaya, Malaysia, 2013.

6. Nicholas, C. *The Orang Asli and the Contest for Resources: Indigenous Politic, Development and Identity in Peninsular Malaysia*; International Work Group for Indigenous Affairs: Copenhagen, Denmark, 2000.
7. Department of Orang Asli Development (JAKOA). *Pelan Strategik Kemajuan Orang Asli (2011–2015)*; Jabatan Kemajuan Orang Asli Malaysia: Kuala Lumpur, Malaysia, 2011.
8. Tanius, E.; Siregar, S.; Mohd Kasim, C.M.; Abdul Jalil, S.Z.S. Indigenous (orang asli) primary school mathematics performance in Selangor, Malaysia. *Int. J. Innov. Res. Eng. Multidiscip. Phys. Sci.* **2020**, *8*, 14–19. [CrossRef]
9. Ismail, Z.; Ching, T.Y.; Muda, N.A. Numeracy competency of year 5 aboriginal students using written and oral tests. *Math. Enthus.* **2020**, *17*, 32–62. [CrossRef]
10. Md-Ali, R.; Veloo, A.; Shanmugam, S.; Yusoff, Y.J.; Hashim, R.A. The issues and challenges of mathematics teaching and learning in Malaysia orang Asli primary schools from teachers' perspectives. *Malays. J. Learn. Instr.* **2021**, *18*, 129–160. [CrossRef]
11. Ministry of Education. *Pelaporan Pentaksiran Sekolah Rendah 2017*; Kementerian Pendidikan Malaysia: Putrajaya, Malaysia, 2017.
12. Arshad, M. *Prinsip dan Amalan Dalam Pengajaran Literasi Bahasa Melayu*; Dewan Bahasa dan Pustaka: Kuala Lumpur, Malaysia, 2016.
13. Sani, N.; Idris, A.R. Implementation of Linus programme based on the model of Van Meter and Van Horn. *MOJES Malays. Online J. Educ. Sci.* **2013**, *1*, 25–36.
14. Wahab, N.A.; Mustapha, R. Reflections on Pedagogical and Curriculum Implementation at Orang Asli Schools in Pahang. *Procedia-Soc. Behav. Sci.* **2015**, *172*, 442–448. [CrossRef]
15. Veloo, A.; Shanmugam, S.K.S.; Md-Ali, R.; Yusoff, Y.J.; Awang-Hashim, R. Grade five Indigenous (Orang Asli) pupil's achievement in bilingual versions of mathematics test. *J. Lang. Linguist. Stud.* **2021**, *17*, 1863–1872. [CrossRef]
16. Hanafi, W.A.W.; Ahmad, S.; Ali, N. Faktor budaya dan persekitaran dalam prestasi pendidikan anak Orang Asli Malaysia: Kajian kes di Kelantan. *Geogr. Malays. J. Soc. Space* **2014**, *10*, 107–122.
17. Wahab, N.A.; Mustapha, R.; Talib, J.A. Developing the Orang Asli human capital: A case study on the roles and determination of educational goals among Orang Asli parents in Kuantan, Pahang. *Geogr. Malays. J. Soc. Space* **2016**, *12*, 1–10.
18. Md Nor, S.; Roslan, S.; Mohamed, A.; Hassan, K.; Mat Ali, M.A.; Manaf, J.A. Dropout prevention initiatives for Malaysian indigenous orang asli children. *Int. J. Sch. Disaffect.* **2011**, *8*, 42–56. [CrossRef]
19. Veloo, A.; Shanmugam, S.K.S.; Md-Ali, R.; Yusoff, Y.J.; Awang-Hashim, R. Examining indigenous (Orang Asli) pupils' achievement in mathematics computation and word problem items. *J. Lang. Linguist. Stud.* **2021**, *17*, 1290–1300. [CrossRef]
20. Shanmugam, S.K.S.; Veloo, A.; Md-Ali, R. Culturally responsive assessment: Assessing mathematics performance of Indigenous pupils in Malaysia using trilingual test. *Diaspora Indig. Minor. Educ.* **2020**, *15*, 113–136. [CrossRef]
21. Ardoin, N.M.; Bowers, A.W. Early childhood environmental education: A systematic review of the research literature. *Educ. Res. Rev.* **2020**, *31*, 100353. [CrossRef] [PubMed]
22. Corbin, J.; Strauss, A. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 4th ed.; Sage Publications, Inc.: Thousand Oaks, CA, USA, 2014.
23. Warren, E.; Young, J.; DeVries, E. The impact of early numeracy engagement on four-year-old Indigenous students. *Australas. J. Early Child.* **2008**, *33*, 2–8. [CrossRef]
24. Garcia-Olp, M.; Nelson, C.; Saiz, L. Conceptualizing a mathematics curriculum: Indigenous knowledge has always been mathematics education. *Educ. Stud.* **2019**, *55*, 689–706. [CrossRef]
25. Jin, Q. Supporting indigenous students in science and STEM education: A systematic review. *Educ. Sci.* **2021**, *11*, 555. [CrossRef]
26. Matthews, C.; Cooper, T.; Baturo, A. Creating your own symbols: Beginning algebraic thinking with Indigenous students. In Proceedings of the 31st Conference of the International Group for the Psychology of Mathematics Education, Seoul, Korea, 8–13 July 2007; Woo, J., Lew, H., Seo, D., Park, K., Eds.; The Korea Society of Educational Studies in Mathematics: Seoul, Korea, 2007; pp. 249–256.
27. Moloi, T.J. The use of Morabara game to concretise the teaching of the mathematical content. *Mediterr. J. Soc. Sci.* **2014**, *5*, 585. [CrossRef]
28. Nkopodi, N.; Mosimege, M. Incorporating the indigenous game of morabaraba in the learning of mathematics. *S. Afr. J. Educ.* **2009**, *29*, 377–392. [CrossRef]
29. Moloi, T.J.; Mosia, M.S.; Matabane, M.E.; Sibaya, K.T. The use of indigenous games to enhance the learning of word problems in grade 4 mathematics: A case of Kgati. *Int. J. Learn. Teach. Educ. Res.* **2021**, *20*, 240–259. [CrossRef]
30. Hsu, W.M.; Lin, C.L.; Kao, H.L. Exploring teaching performance and students' learning effects by two elementary indigenous teachers implementing culture-based mathematics instruction. *Creat. Educ.* **2013**, *4*, 663–672. [CrossRef]
31. Tai, C.H.; Leou, S.; Hung, J.F. The effectiveness of teaching indigenous students mathematics using example-based cognitive methods. *J. Interdiscip. Math.* **2015**, *18*, 433–448. [CrossRef]
32. Rigney, L.; Garrett, R.; Curry, M.; MacGill, B. Culturally responsive pedagogy and mathematics through creative and body-based learning: Urban Aboriginal schooling. *Educ. Urban Soc.* **2020**, *52*, 1159–1180. [CrossRef]
33. Warren, E.; DeVries, E. Young Australian Indigenous students' engagement with numeracy: Actions that assist to bridge the gap. *Aust. J. Educ.* **2009**, *53*, 159–175. [CrossRef]
34. Gardner, R.; Mushin, I. Language for learning in Indigenous classrooms: Foundations for literacy and numeracy. In *Pedagogies to Enhance Learning for Indigenous Students*; Jorgensen, R., Sullivan, P., Grootenboer, P., Eds.; Springer: Singapore, 2013; pp. 89–104. [CrossRef]
35. Warren, E.; Miller, J. Young Australian Indigenous students' effective engagement in mathematics: The role of language, patterns, and structure. *Math. Educ. Res. J.* **2013**, *25*, 151–171. [CrossRef]

36. Miller, J.; Warren, E.; Armour, D. Examining changes in young Aboriginal and Torres Strait Island students and their beginning primary school teachers' engagement in the teaching and learning of mathematics. *ZDM Math. Educ.* **2020**, *52*, 557–569. [CrossRef]
37. Jorgensen, R.; Lowrie, T. Both ways strong: Using digital games to engage Aboriginal learners. *Int. J. Incl. Educ.* **2011**, *17*, 130–142. [CrossRef]
38. Pegg, J.; Graham, L. A three-level intervention pedagogy to enhance the academic achievement of Indigenous students: Evidence from QuickSmart. In *Pedagogies to Enhance Learning for Indigenous Students*; Springer: Singapore, 2013; pp. 123–138. [CrossRef]
39. Bloom, B. Bloom's taxonomy. *Teach. Educ. Spec. Educ.* **1956**, *10*, 14–18.
40. Simpson, E.J. *The Classification of Educational Objectives in the Psychomotor Domain*, 3rd ed.; Gryphon House: Washington, DC, USA, 1972.
41. Krathwohl, D.R.; Bloom, B.S.; Masia, B.B. (Eds.) *Taxonomy of Educational Objectives, the Classification of Educational Goals. Handbook II: Affective Domain*; David McKay Co., Inc.: New York, NY, USA, 1973.
42. Sullivan, P.; van Riel, N. Building confidence and fostering engagement in Aboriginal learners. In *Pedagogies to Enhance Learning for Indigenous Students*; Jorgensen, R., Sullivan, P., Grootenboer, P., Eds.; Springer: Singapore, 2013; pp. 139–153. [CrossRef]
43. Demitra, D.; Sarjoko, S. Effects of Handep cooperative learning based on indigenous knowledge on mathematical problem solving skill. *Int. J. Instr.* **2018**, *11*, 103–114. [CrossRef]
44. Kisker, E.E.; Lipka, J.; Adams, B.L.; Rickard, A.; Andrew-Ihrke, D.; Yanez, E.E.; Millard, A. The potential of a culturally based supplemental mathematics curriculum to improve the mathematics performance of Alaska Native and other students. *J. Res. Math. Educ.* **2012**, *43*, 75–113. [CrossRef]
45. Dewah, C.; Van Wyk, M.M. The place of indigenous cultural games by educators in the teaching and learning of mathematics. *J. Hum. Ecol.* **2014**, *48*, 189–197. [CrossRef]
46. Owens, K. Changing the teaching of mathematics for improved Indigenous education in a rural Australian city. *J. Math. Teach. Educ.* **2015**, *18*, 53–78. [CrossRef]
47. Claessens, A.; Engel, M. How important is where you start? Early mathematics knowledge and later school success. *Teach. Coll. Rec.* **2013**, *115*, 1–29. [CrossRef]
48. Yahaya, F.H. Pendidikan masyarakat orang Asli. In *Orang Asli: Isu, Transformasi dan Cabaran*; Redzuan, M., Gill, S.S., Eds.; Penerbit Universiti Putra Malaysia: Serdang, Malaysia, 2008.
49. Department of Orang Asli Development (JAKOA). *Bilangan dan Peratus Keciciran Pelajar Orang Asli, 1994–2008*; Jabatan Hal Ehwal Orang Asli: Kuala Lumpur, Malaysia, 2008.
50. Ministry of Education. *Laporan Awal Pelan Pembangunan Pendidikan Malaysia 2013–2025*; Kementerian Pendidikan Malaysia: Putrajaya, Malaysia, 2012.
51. Nordin, R.; Yahya, M.S.; Danjuma, I. Orang Asli student icons: An innovative teaching method for orang Asli students. *Pertanika J. Soc. Sci. Humanit.* **2018**, *26*, 219–238.
52. Selvaratnam, D.P.; Jaafar, A.H.; Salleh, N.; Othman, R.; Idris, S.H. Transformasi modal insan melalui peningkatan pendidikan: Kajian kes komuniti Orang Asli di Cameron Highlands, Pahang. *Pros. Persidang. Kebangs. Ekon. Malaysia ke 7* **2012**, *7*, 1215–1224.
53. Ali, Z.A. Peranan Jabatan Hal Ehwal Orang Asli (JHEOA) dalam pembangunan masyarakat Orang Asli. In *Orang Asli: Isu, Transformasi dan Cabaran*; Redzuan, M., Gill, S.S., Eds.; Universiti Putra Malaysia: Serdang, Malaysia, 2008.
54. Redzuan, M. Pembangunan dan kemunduran komuniti peribumi: Kes kemiskinan dalam komuniti orang Asli. In *Kemiskinan Di Malaysia: Isu Fundamental & Paparan Realiti*; Paim, L., Haron, S.A., Eds.; Penerbit Universiti Putra Malaysia: Serdang, Malaysia, 2010.
55. Sterenberg, G. Considering Indigenous knowledges and mathematics curriculum. *Can. J. Sci. Math. Technol. Educ.* **2013**, *13*, 18–32. [CrossRef]
56. Aziz, S.F.A.; Taha, N.M. Teaching and learning approaches that intriguing orang Asli students' interests in school. *Asian J. Soc. Sci. Res.* **2018**, *1*, 1–14.
57. Warren, E.; Young, J.; De Vries, E. Australian Indigenous students: The role of oral language and representations in the negotiation of mathematical understanding. In *Proceedings of the 30th Annual Conference of the Mathematics Education Research Group of Australasia*; Watson, J., Beswick, K., Eds.; MERGA Inc.: Adelaide, Australia, 2007; pp. 775–784.
58. Matang, R.A.S.; Owens, K. The role of indigenous traditional counting systems in children's development of numerical cognition: Results from a study in Papua New Guinea. *Math. Educ. Res. J.* **2014**, *26*, 531–553. [CrossRef]
59. Ma'alip, S.; Teo, K.S. Language use of orang Asli Che Wong in Kuala Gandah. *Geogr. Malays. J. Soc. Space* **2016**, *12*, 62–78.
60. Simons, G.F.; Fennig, C.D. *Ethnologue: Languages of the World*, 21st ed.; SIL International: Dallas, TX, USA, 2018.
61. Eberhard, D.M.; Simons, G.F.; Fennig, C.D. (Eds.) *Ethnologue: Languages of Asia*; SIL International: Dallas, TX, USA, 2019.
62. Bahagian Teknologi Pendidikan Negeri Pahang Majlis pelancaran pelan transformasi pendidikan Orang Asli kebangsaan. Available online: http://buletinkpm.blogspot.com/2012/07/majlis-pelancaran-pelan-transformasi.html (accessed on 22 July 2020).
63. Sabzalian, L.; Tuck, E.; Yang, K.W. *Indigenous Children's Survivance in Public Schools*; Routledge: New York, NY, USA, 2019. [CrossRef]
64. González, N.; Moll, L.C.; Amanti, C. (Eds.) *Funds of Knowledge: Theorizing Practices in Households, Communities, and Classrooms*; Lawrence Erlbaum Associates, Inc.: Mahwah, NJ, USA, 2006.
65. Shaharuddin, A.M. Quality teachers for quality education. In Proceedings of the 17th Conference of Commonwealth, Kuala Lumpur, Malaysia, 15–18 June 2009; Ministers of Education: Kuala Lumpur, Malaysia, 2009.