

Evaluation of Academic Enhancement Program for Low-Income Students in Rural Malaysia

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Abstract

Malaysia National Science, Technology and Innovation policy 2021-2023 highlighted that Science, Technology, Engineering and Mathematics (STEM) Education plays an important role for Technical and Vocational Education and Training (TVET). Many countries are now keen on integrating STEM into TVET education to maintain competitiveness and prepare the workforce to be more effective and productive in the knowledge-based economy. Penang Regional Development Authority (PERDA) initiated the B40@PERDA Academic Enhancement Programme to enhance the academic performance of primary and secondary school students from the B40 group, focusing on critical subjects. The study aims to evaluate the program's effectiveness and gauge student and teacher satisfaction. Using a quantitative approach, data were collected via questionnaires from students and teachers at various educational institutions. Respondents were randomly selected to ensure accurate representation. Analysis results showed that more than 95% of primary school students achieved the minimum proficiency level in EMAS with a minimum of 10% reaching the highest proficiency. For secondary school students, at least 50% attained at least a C grade in EMAS and 45.77% did so in Elective Science subjects (Physics, Chemistry, Biology, and Additional Mathematics). This study concluded that the B40@PERDA programme significantly improves EMAS proficiency among rural students and helps reduce dropout rates in these subjects. Furthermore, this programme is crucial for fulfilling the minimum requirements for TVET. By enhancing proficiency in critical subjects such as English, Mathematics, and Science, the B40@PERDA Programme ensures that students are better prepared for TVET pathways, ultimately contributing to their future career opportunities and the development of skilled labor in the region.

1. Introduction

Technical and Vocational Education and Training (TVET) plays a crucial role in the transformation of Malaysia's education system and contributes significantly to economic growth (Yeap et al., 2021). TVET programmes in Malaysia aim to equip graduates with essential employability skills such as problem-solving, decision-making, organization, communication, and teamwork (Kenayathulla et al., 2019). The Malaysian government has been focusing on enhancing TVET to meet the demands of the evolving job market and industry requirements (Amin et al., 2023). Low-income students represent a significant demographic in educational settings, facing unique challenges and obstacles that can impact their academic success and overall well-being. Research has shown that low-income students often encounter financial constraints, limited access to resources, and social disparities that can affect their educational outcomes (Nguyen, 2023). This group of students often faces food insecurity, financial challenges, and social disparities that can impact their academic performance and mental health (Zein et al., 2019). Addressing low-income student's unique needs and experiences is essential for promoting equity and inclusivity in educational settings (Aquino, 2020). In addition, the impact of financial aid reforms and career readiness programmes on low-income students can significantly influence their educational trajectories and future opportunities (Berg, 2019; Choirudin et al., 2022). Therefore, low-income students represent a diverse and resilient population in education, facing a range of challenges and opportunities that require targeted support and interventions to ensure their academic success and well-being.

However, the academic performance of low-income students is a critical area of study that examines the impact of socioeconomic status on educational outcomes. Research has shown that low-income students often face unique challenges that can affect their academic achievement. Factors such as limited access to resources, financial constraints, and social disparities can contribute to lower academic preparation and achievement among low-income students compared to their higher-income peers (Alvarado et al., 2020). Furthermore, Gillen-O'Neel et al. (2021) state that studies have indicated that students from lower-income families may require additional support and resources to succeed academically. Colleges and educational institutions may need to provide targeted support to students from low-income backgrounds to ensure their academic success and retention. Interventions such as out-of-school enrichment programs and financial support have been found to positively impact the academic performance of high-potential low-income students (Chen, 2024). According to Amin et al. (2023), education enhancement refers to the process of improving and optimizing educational practices, programmes, and systems to enhance learning outcomes, student engagement, and overall educational quality. It involves implementing innovative strategies, leveraging technology, and adopting best practices to create a more effective and impactful learning environment. Education enhancement aims to address the diverse needs of students, promote critical thinking and problem-solving skills, and prepare individuals for success in the modern workforce. In Malaysia, education enhancement initiatives have been focused on various areas, including Technical and Vocational Education and Training (TVET). The Malaysian Education Blueprint 2013-2025 also stated the need for the country to move the higher education system from a primary focus university education as the sole pathway to success towards the equal valued pathways between academic and TVET where TVET is also considered as a pathway to success. According to Malaysia National Science, Technology and Innovation policy 2021-2023 (Mosti, 2021), Science, Technology, Engineering and Mathematics (STEM) Education plays an important role for Technical and Vocational Education and Training (TVET). As the economic growth proves to expect more among the skilled workers and encouraging the development of soft skills in the areas of critical thinking, problem solving and sense making, the integration of STEM element into TVET education training module is important to prepare the students within the high demand in the employability market. Many countries are now especially keen on integrating STEM into TVET to maintain competitiveness and prepare the workforce to be more effective and productive in the knowledge-based economy.

On the other hand, Malaysians can be divided into three main categories of household income: the bottom 40% have household monthly incomes that are less than the required amount (B40), the middle 40% have household monthly incomes that are higher than the required amount (M40), and the top 20% have household incomes that are greater than the necessary amount (T20). With a focus on technical and vocational education and training, the Malaysian government hopes to provide access to higher education for the students from B40 background families in order to develop skilled human capital and transform them into the M40 families. Supporting this fact, Penang Regional and Development Authority (PERDA) has implemented initiatives, B40@PERDA Academic Enhancement Programme to enhance the education performance of students from low-income families to increase the proficiency level of rural students in critical subjects, namely EMAS (English, Mathematics, and Science) and help to reduce the dropout rate of rural students in EMAS subjects. PERDA works closely with local governments, stakeholders, and communities to address regional challenges, support sustainable development, and improve the quality of life for residents in the region. Through strategic planning, collaboration, and effective governance, PERDA aims to drive positive change and advancement in the areas under its jurisdiction.

Based on the approval of the Twelfth Malaysia Plan, 2021-2025, PERDA has been granted funds to comprehensively develop rural human capital towards community excellence. Thus, PERDA has implemented the B40@PERDA Academic Enhancement Programme to enhance the academic achievement of rural B40 families of elementary and secondary students. This programme, which is funded with RM4,000,000 in years 2021 and 2022 which in line with national aims to enhance academic performance among students from B40 families in rural areas within PERDA's operational zones (Seberang Perai Utara, Tengah, Selatan, and Barat Daya). Collaborating with the Penang State Education Department and supporting the Science, Technology and Innovation 2021-2030 policy, the programme targets enhancing students' proficiency in critical subjects EMAS (English, Mathematics, and Science), reducing dropout rates, and increasing interest in these subjects through engaging activities and innovative approaches. Building on earlier initiatives (PDCA 2006-2011, MPDCA 2012-2020), it prioritizes STEM education to develop highly qualified individuals in the fields of science and technology.

The programme initiative runs online clinics and seminars, academic excellence workshops, and materials support over the year 2021–2022, promoting STEM and English subjects. Key efforts for this programme include Sinar PERDA programmes, e-tutorials for SPM 2021, English (Year 5) tutorials, and modules created by educators who have been hired. The programme used qualified teachers appointed by the Penang State Education Department to create subject-specific modules and provide interactive kits and activities to improve student outcomes. In order to address the issues such as resource scarcity, economic disparities, and lack of educational support which have been discussed above, it is important to measure the achievement of the programme to identify area of improvement. Thus, this study aims to evaluate the program's effectiveness and gauge student and teacher satisfaction. Based on the findings, several areas of recommendation will be identified. For programme effectiveness measurement purpose, PERDA have set five Key Performance Index which are 10% of primary school students achieve the highest proficiency level in English, Mathematics, and Science EMAS subjects, 95% of primary school students pass the minimum level of proficiency in EMAS subjects, 50% of secondary school students pass core science subjects (English, Mathematics and Science with minimum grade C, 40% of secondary school students pass electives science subjects (Physics, Chemistry, Biology and Additional Mathematics) with minimum grade C, and 80% of students and teacher express satisfaction towards the quality and service provided.

2. TVET Addressing the Low-Income Generation

Technical and Vocational Education and Training (TVET) in Malaysia has been the subject of extensive research and analysis. Amin et. al (2023) provide insights into the present and future of Malaysian TVET, emphasizing the importance of understanding the current and future needs of TVET in Malaysia. Abd Karim and Mustapha (2022) found that TVET is a practical education and training field encompassing both formal and non-formal learning pathways. It is designed to prepare young people for various vocational jobs, offering a hands-on approach to education that is directly aligned with industry requirements. This approach to education is pivotal in the transformation of Malaysia's education system, as it not only fosters skill development and employability among youths but also significantly contributes to the nation's economic growth (Yeap et al., 2021). TVET operates as an educational paradigm that swiftly integrates youths into the labor force by providing them with industry-relevant skills. These skills are tailored either to facilitate the entry of graduates into specific sectors of the economy or to enhance the competencies of the current workforce, ensuring they remain competitive in a rapidly evolving job market (Minghat et al., 2022). Recognizing the critical importance of TVET, the Malaysian government has made it a key priority to advance this form of education. This prioritization is particularly evident once students have completed elementary school, as the government encourages these students to enroll in junior vocational education institutions. By doing so, the government aims to create a seamless transition from basic education to vocational training, thereby equipping students with the necessary skills and knowledge to thrive in technical and vocational careers (Ridzuan & Abd Rahman, 2022).

However, persistent challenges remain, especially for low-income students within Malaysia's education system. De La Rosa and Tierney (2006) highlight connectivity issues and digital skill gaps among economically disadvantaged B40 families, which hinder their access to effective online learning tools. Engle and Tinto (2008) emphasize the ongoing obstacles faced by low-income, first-generation students in obtaining bachelor's degrees, advocating for enhanced academic support and improved pathways to higher education. Moreover, Snyder's (2008) research using Astin's I-E-O model reveals complex interactions influencing academic success among diverse student demographics, challenging traditional assumptions about educational outcomes. Reys-Nickel and Lasonen J (2018) provide insights into demographic predictors affecting completion rates in engineering programs, urging tailored educational policies to support equitable access and success in higher education. Jamri & Ishak (2023) delve into the financial pressures among Malaysian IPTA students across socio-economic groups, highlighting higher stress levels among B40 and M40 students compared to their T20 counterparts. Their study underscores the critical need for targeted financial aid initiatives, such as the "SULUNG" program, to alleviate financial burdens among B40 and potentially M40 students, thereby aiming to enhance their academic performance. Meanwhile, Kashfi et al. (2022) shed light on significant learning challenges faced by Malaysia's B40

students, including low enrollment rates and limited participation in daily learning activities, exacerbated by financial constraints and parental involvement issues. The study advocates for collaborative efforts to ensure equitable access to quality education and effectively reduce dropout rates. Furthermore, Koo & M Yasin (2020) discuss the profound impact of poverty on academic achievement among B40 students, identifying parental, peer, and teacher support as pivotal factors. Their findings underscore the importance of enhancing support systems to foster better educational outcomes for B40 students. Sani et al. (2020) address the concerning dropout rates among B40 students in Malaysian universities, employing data mining techniques to predict attrition risks. Their research recommends proactive interventions by universities to improve graduation rates and socio-economic mobility for B40 students, aligning with Malaysia's educational equity goals.

Many programmes collectively explore strategies to uplift Malaysia's B40 group, the lowest earners with household incomes below RM4,000 per month, through various educational and talent development initiatives. Japar et al. (2021) introduce a comprehensive CSR framework incorporating zakat and sadaqah, demonstrating the positive impact on B40 youth's economic contribution through the PPT framework over a decade. Similarly, Jamaluddin and Mohamad (2022) address educational disparities exacerbated by the Covid-19 pandemic, emphasizing the need for targeted education policies and financial assistance to improve B40 peoples' ESL learning outcomes, though the study's focus on a single primary school suggests broader research is needed. Furthermore, Kamaruzaman et al. (2020) propose a digital entrepreneurship education model inspired by successful international Cash Conditional Transfer programs, using Business Model Canvas (BMC) and Value Proposition Design Canvas (VPC) to reduce dropout rates and unemployment among B40 youth in rural Malaysia. In addition, Darmalinggam (2021) underscores the mismatch between government policies and industry requirements for B40 youth talent development, advocating for inclusive training, pre and post-training assessments, and proactive multi-stakeholder collaboration to achieve the goals of Malaysia's Shared Prosperity Vision (SPV) 2030. Collectively, these studies emphasize the importance of aligning educational and training programs with the actual needs of B40 youth and the market, highlighting the need for coordinated efforts among government bodies, training providers, and industry stakeholders to effectively address poverty and foster economic development in Malaysia.

In conclusion, addressing the educational challenges faced by low-income students in Malaysia demands multifaceted strategies that extend beyond mere access to include comprehensive support mechanisms. By integrating insights from research on TVET effectiveness, educational barriers, and innovative practices, policymakers and educators can better tailor interventions to promote equitable access, enhance educational outcomes, and support socioeconomic mobility among all student populations (Amin et al., 2023; Engle & Tinto, 2008; Ahmad, 2021). These efforts are crucial for realizing Malaysia's educational goals and fostering a skilled workforce capable of driving sustainable economic and skills development in the future.

3. Methodology

This study employed a field research design involving a population of students and teachers from primary and secondary schools in Penang. The target population is students from the year 2021-2022, specifically targeting those in Year 6 of primary school and Form 5 of secondary school. This initiative encompasses 71 schools within the operational area of the Penang Regional Development Authority (PERDA). The quantitative method approach was used in this study to guarantee a comprehensive understanding of the research objectives. The duration of this study is 5 months, from September to December 2023. The research sample consists of 712 students from standard 6 and form 5, and 110 teachers selected according to random sampling referring to Krejcie and Morgan's (1970) Table of sample size determination. A set of survey questionnaires was designed consisting of five sections: demographic, personal information, programme effectiveness, satisfaction, and recommendation. 5-point Likert scale was used to measure the programme effectiveness and satisfaction section. Among of the questions asked are level of satisfaction after following the English, Mathematics and Science program organized by PERDA at school, the benefits of the programme, and quality of teaching and learning. The survey questionnaire was distributed to all targeted respondents from 47 primary schools and 24 secondary schools under PERDA sponsorship. Initially, a preliminary study was conducted to identify the key issues and formulate the research questions. This was followed by an extensive literature review to gather existing knowledge and identify gaps in the current research. The discussion phase helped refine the research objectives and questions, leading to the formulation of a robust research phase and a direct survey instrument. The research framework is shown in Figure 1.

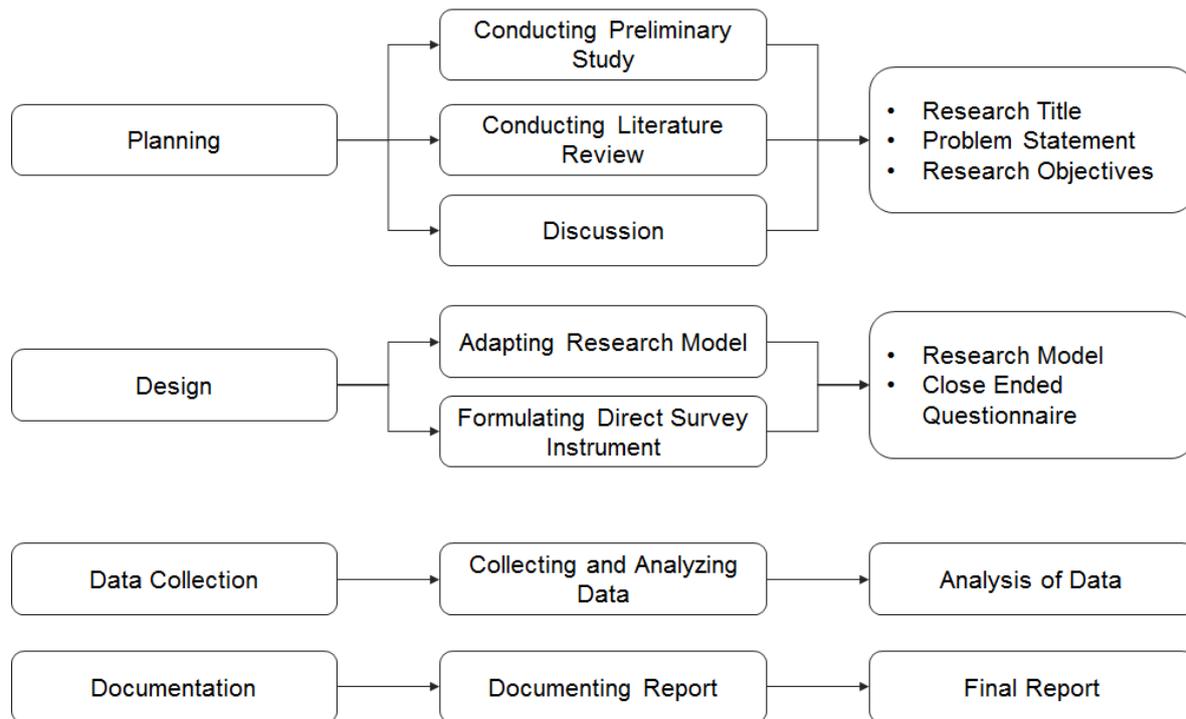


Fig. 1 Research framework

The primary data collection method involved the use of a structured survey with closed-ended questions. This survey was designed based on the insights gathered during the preliminary study and literature review. The data collection method for the study involves several steps i.e., collecting personal information about the participants, gathering specific details about their involvement in the programme, evaluating the effectiveness of the programme, measuring participant satisfaction, and collecting recommendations for improvement. This process includes using objective questions to gather quantitative data, with the entire procedure designed to be completed within 20 minutes. The survey was administered through an online platform using the Google Form. Both students and teachers are involved in providing feedback, ensuring a comprehensive collection of data covering various aspects of the program

Once the data collection was completed, the next step involved a thorough analysis of the collected data. The data analysis method employed descriptive statistical techniques to achieve the research objectives. Descriptive statistics were used to summarize the data and provide a clear picture of the sample characteristics. The analysis was conducted using IBM SPSS version 23. The results were then interpreted in the context of the research objectives and existing literature, leading to meaningful conclusions and recommendations. The discussion of the findings highlights the implications of the results for educational theory and practice and provides recommendations for improving academic support programs for B40 students in the future.

4. Findings and Discussion

This study analyzed responses from a total of 712 students (365 primary school students and 347 secondary school students) and 110 teachers from primary and secondary schools in Penang who have joined the programme, revealing critical insights into the academic performance of students from the B40 socioeconomic group in EMAS (English, Mathematics, and Science) subjects. A total of 7,288 primary schools' students and 3,497 secondary schools' students have joined the programme as shown in Figure 2.

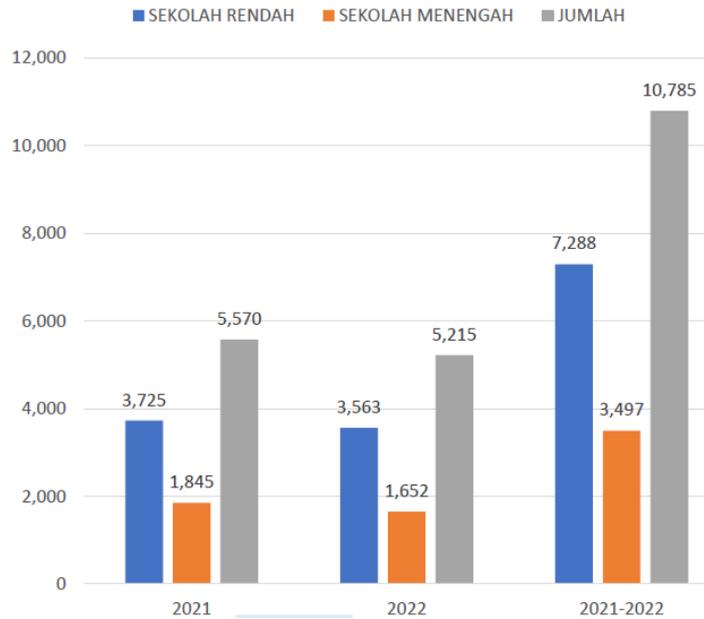


Fig. 2 Number of programme participants

From the data collection, 11.10% of primary school students (average 806 students over 7,288 students) have achieved the highest proficiency level in EMAS subjects as shown in Figure 2, while 98.05% (7,118 over 7,288 students) passed the minimum proficiency as shown in Figure 4 and Figure 5 accordingly. This suggests that despite their socioeconomic challenges, a significant majority of primary school students are managing to meet basic academic standards, with a notable percentage excelling. However, persistent challenges still exist, especially for low-income students within the Malaysian education system. De La Rosa and Tierney (2006) emphasize connectivity issues and digital skill gaps among economically disadvantaged B40 families, which hinder their access to effective online learning tools. The findings align with broader discussions in the literature on educational disparities and interventions for socioeconomically disadvantaged students. Koo & M Yasin (2020) discuss the profound impact of poverty on academic achievement among B40 students, identifying parental, peer, and teacher support as pivotal factors.

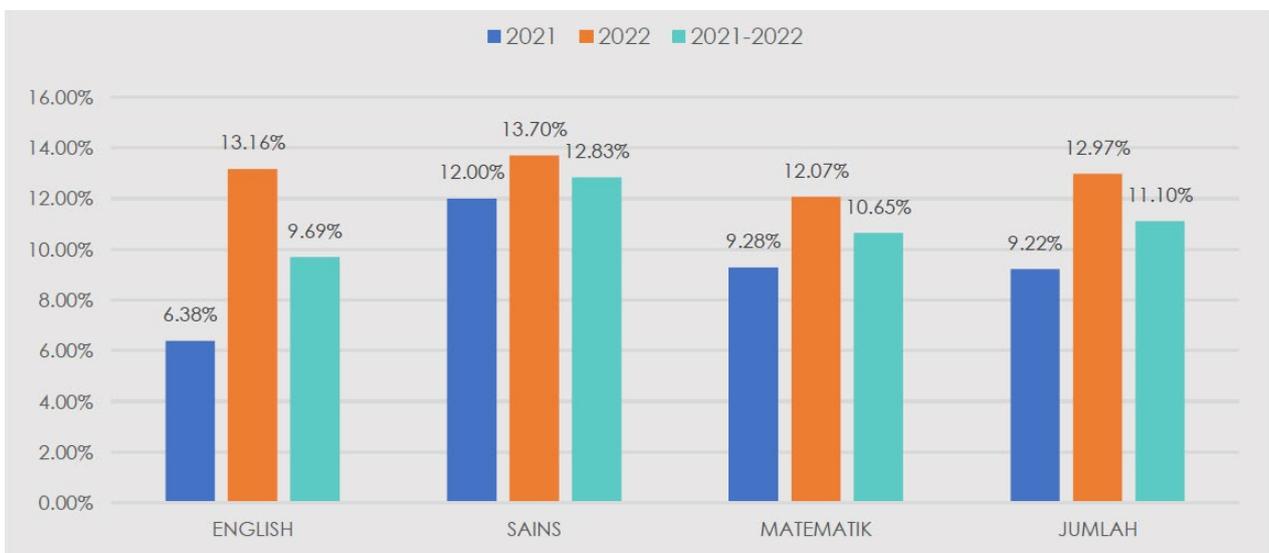


Fig. 3 Percentage of primary school students achieving the highest level of proficiency in EMAS subjects

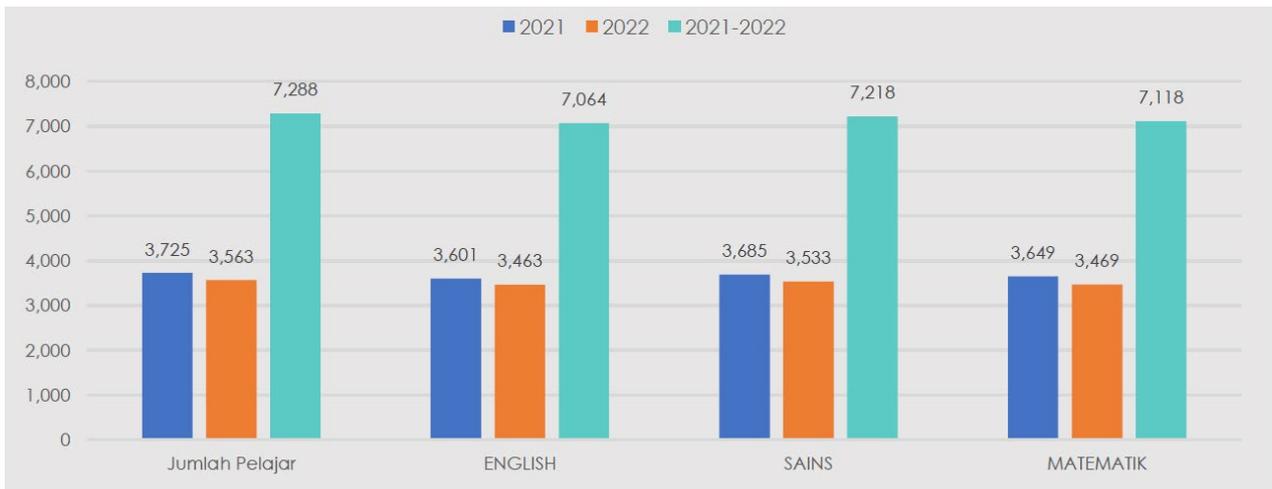


Fig. 4 Number of primary school students passed the minimum level of proficiency in EMAS subjects

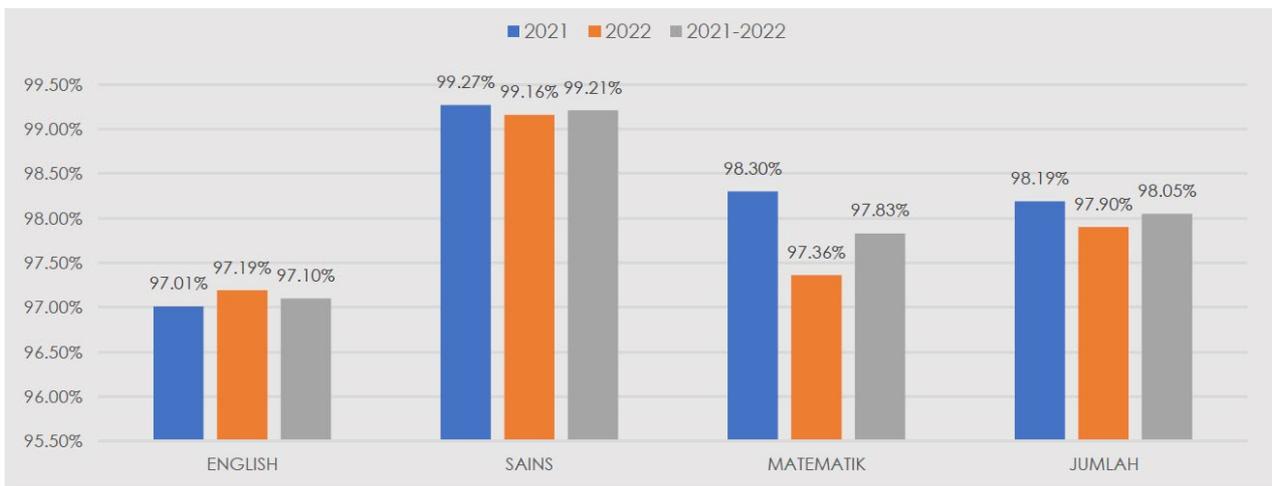


Fig. 5 Percentage of primary school students passed the minimum level of proficiency in EMAS subjects

While in the secondary schools, 59.59% of students achieved at least a grade C in core EMAS subjects as shown in Figure 6, indicating a moderate level of proficiency. However, the performance in elective science subjects, including Physics, Chemistry, Biology, and Additional Mathematics was lower with only 45.77% of students attaining at least a grade C (Figure 7). This discrepancy highlights the increasing academic challenges faced by B40 students as they progress to higher levels of education, particularly in more specialized and demanding subjects. This aligns with the opinion of Koo & M Yasin (2020), who state that the profound impact of poverty on academic achievement among B40 students identifies parental, peer, and teacher support as pivotal factors. Their findings emphasize the importance of enhancing support systems to foster better educational outcomes for B40 students.

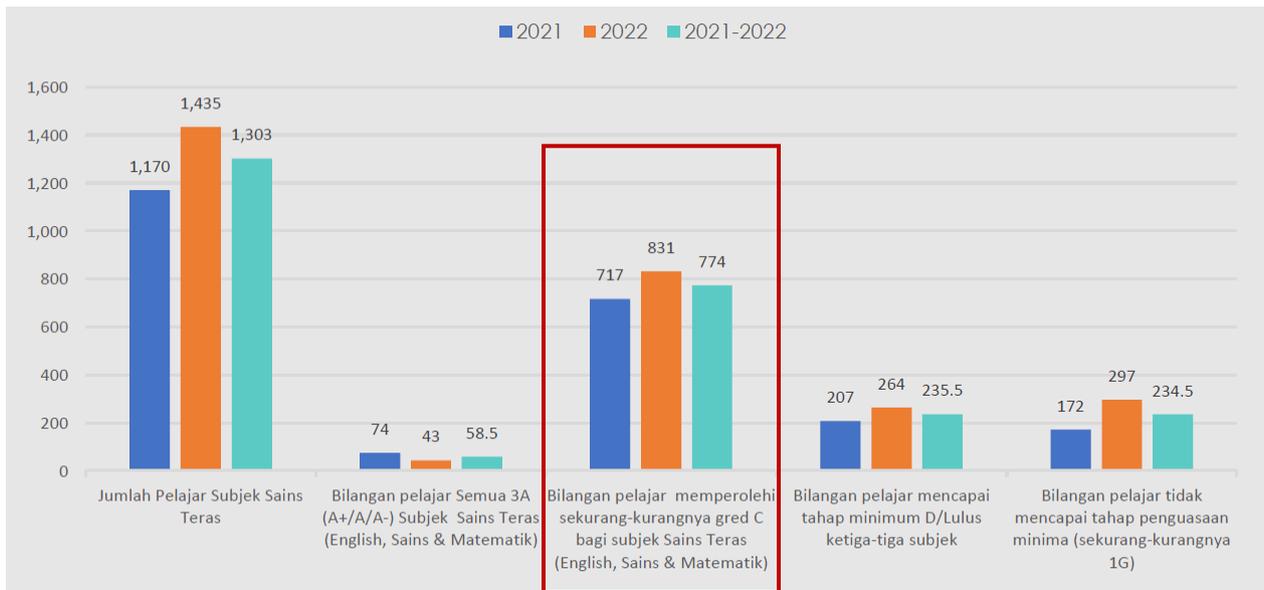


Fig. 6 Percentage of SPM students in 2021-2022 for core science subjects (english, mathematics and science)



Fig. 7 Percentage of SPM students in 2021-2022 for elective science subjects (physics, chemistry, biology, and additional mathematics)

Several factors were identified as influencing these academic outcomes. The lack of access to supplementary educational materials and resources, such as textbooks and online learning platforms, posed a major barrier. Many B40 students relied solely on classroom instruction, which was often insufficient for mastering complex subjects. Parental involvement was minimal due to factors such as parents' low educational background, long working hours, and limited understanding of the school curriculum, hindering their ability to provide adequate academic support at home. Jamri & Ishak (2023) examined financial stress among Malaysian students across socioeconomic groups, highlighting higher stress levels among B40 and M40 students compared to their T20 counterparts. Their study emphasized the critical need for targeted financial aid initiatives, such as the "SULUNG" program to alleviate financial burdens among B40 and potentially M40 students, thereby aiming to enhance their academic performance. Meanwhile, the study by Kashfi et al. (2022) shed light on significant learning challenges faced by Malaysia's B40 students, including low participation rates and limited engagement in daily learning activities, exacerbated by financial constraints and parental involvement issues. This study advocated for collaborative efforts to ensure equitable access to quality education and effectively reduce dropout rates. The quality of the school environment, including the availability of experienced teachers, classroom facilities, and extracurricular activities also played a significant role in student performance.

Finally, this study emphasizes the importance of integrating findings from research on the effectiveness of TVET, educational barriers, and innovative practices to enable PERDA to align interventions effectively. Referring to insights from studies such as Amin et al. (2023), Engle and Tinto (2008), and also Ahmad (2021), this study underscores the need to promote equitable access, improve educational outcomes, and support socioeconomic mobility among all student populations in Malaysia. These efforts are crucial in achieving Malaysia's educational objectives and developing a competent workforce capable of sustaining long-term economic development. The study also identifies significant psychosocial challenges, including low self-esteem, lack of motivation, and stress related to financial instability, further negatively impacting student's focus and engagement in learning. Despite these challenges, the study found a high level of satisfaction among students and teachers regarding the quality and services provided where 95.94% expressed satisfaction. This indicates that while there are significant barriers, there is also a strong foundation of support that can be built upon to enhance educational outcomes. Overall, these studies emphasize the importance of aligning education and training programs with the real needs of B40 youth and the market. They highlight the necessity for collaborative efforts among government bodies, training providers, and industry stakeholders to effectively address poverty and promote economic development in Malaysia. Based on the results of this study, it can be concluded that the program has shown its effectiveness where all five KPIs have been met. 11.10% of primary school students have achieved the highest proficiency level in English (target KPI:10%), Mathematics, and Science EMAS subjects, 98.05% of primary school students pass the minimum level of proficiency in EMAS subjects (target KPI: 95%), 59.5% of secondary school students pass core science subjects (English, Mathematics and Science with minimum grade C (target KPI: 50%), 45.77% of secondary school students pass electives science subjects (Physics, Chemistry, Biology and Additional Mathematics) with minimum grade C (target KPI: 40%), and 95.94% of students and teacher express satisfaction towards the quality and service provided (80%).

5. Conclusion and Recommendations

The majority of students and teachers involved have expressed their satisfaction with the quality and services provided. The program has successfully enhanced educational opportunities for rural communities and helped reduce dropout rates for core subjects such as English, Mathematics, and Science (EMAS). Additionally, the program has fostered student's interest in critical subjects through more engaging and interactive approaches. By enhancing proficiency EMAS subjects, the Program ensures that students are better prepared for TVET pathways, ultimately contributing to their future career opportunities and the development of skilled labor in the region. Therefore, increased funding is necessary to expand student participation, and teaching modules should be enhanced to align with more engaging and effective learning styles. The program's effectiveness needs to be improved by considering the findings from the conducted analyses. Collaboration and coordination between implementing agencies and schools in Penang are key factors supporting the program's success. Active participation from the Penang State Education Department also plays a crucial role in the program's implementation. Given the demonstrated effectiveness and positive impact, the program is recommended to continue with the proposed improvements to ensure its future success. Based on these findings, several recommendations were made to improve the academic performance of B40 students. Schools should provide additional educational resources such as after-school tutoring and access to online learning platforms. Initiatives to involve parents in their children's education should be strengthened through workshops and seminars aimed at educating parents on how to support their children's learning at home. Investing in the improvement of school facilities and ensuring the availability of experienced and motivated teachers can create a conducive learning environment for students. Additionally, schools should offer counseling and psychosocial support services to address issues related to low self-esteem and motivation. Developing and implementing customized intervention programs that cater specifically to the needs of B40 students can help bridge the academic gap, focusing on active learning, mentorship, and continuous assessment to track student progress.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

In crafting this academic journal article, Siti Rozaini Ahmad led the conceptualization, and introduction phases, and shaped the study's framework. Mazliyaton Samsudin and Etti Rahmawati conducted a comprehensive literature review and provided critical review and editing, ensuring the manuscript's alignment with existing research. Mohd Noor Farzli Adenan designed the methodology and conducted analysis, ensuring robust data interpretation. Muhamad Fikhri Zulkifli synthesized the findings and authored the initial draft, contributing to the discussion's depth and coherence. Ahmad Iqbal Hakim Suhaimi served as the corresponding author, overseeing manuscript development, review, and editing, ensuring clarity and integrity in the final submission. The authors' collaborative efforts enriched the scholarly impact of the research.

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