

The Perceptions and Challenges of Mathematics Learning among the B40 Students and Parents during PdPR at SMK Bakong, Miri, Sarawak

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Abstract

The surge in internet usage in Malaysia, amplified by the COVID-19 pandemic, has transformed education with a shift to virtual learning. This shift, however, has been challenging for students from the Bottom 40 (B40) income group, particularly in rural areas of Sarawak, Malaysia, due to limited internet access. This paper aims to explore the perceptions and challenges of Mathematics learning among B40 students and parents during the Home-based Learning (PdPR) at SMK Bakong, Miri. Employing the Technology Acceptance Model (TAM), we propose to study the acceptability and challenges related to Mathematics learning via ICT. The

conceptual framework will be tested using statistical analysis with data collected from questionnaires. The findings from this study will help illuminate the experiences, usage patterns, and impact of online learning for B40 students and parents and identify the strengths and weaknesses of the current approach. The insights gained will be instrumental in guiding policy makers and practitioners towards improving the quality of Mathematics learning in rural areas of Sarawak during PdPR.

Keywords: Mathematics Learning, B40 Families, Online Learning, PdPR, Sarawak

Introduction

The COVID-19 pandemic has resulted in widespread school closures, profoundly disrupting traditional education systems, and impacting an estimated 147 million students worldwide (UNESCO, 2020). Consequently, digital learning has emerged as the primary mode of education delivery (World Bank, 2020). However, access to the internet and digital learning is not evenly distributed, with students from low-income groups, particularly those in the Bottom 40% (B40) income bracket and in rural areas, facing significant challenges (UNICEF, 2020). In Malaysia, despite a substantial increase in internet usage (MCMC, 2020), many students, especially those from B40 families and rural regions like Sarawak, are struggling to adapt to this digital learning environment (Ministry of Education Malaysia, 2020). These challenges are compounded in subjects like Mathematics, which often require a more hands-on, interactive approach to learning and understanding (NCTM, 2020; Gilbert, Hodds, & Lawson, 2021). This study will focus on SMK Bakong, a school situated in Miri, Sarawak, where students and parents from the B40 group are grappling with Mathematics learning during the Home-based Learning (PdPR). Specifically, this study aims to analyse students' and parents' perceptions of Mathematics learning during PdPR, investigate the students' performance in Mathematics, and identify the challenges encountered during this period. Understanding these challenges and perceptions is vital for shaping more equitable and inclusive educational policies and practices, especially in the context of crises such as the ongoing pandemic (OECD, 2020). Following are the objectives of this study

1. To analyse the students' perceptions in Mathematics learning during PdPR at SMK Bakong.
2. To analyse the parents' perceptions in Mathematics learning during PdPR at SMK Bakong.
3. To analyse the student performance in Mathematics during PdPR at SMK Bakong.
4. To analyse the issues and challenges in Mathematics learning during PdPR at SMK Bakong.

Literature Review

The Technology Acceptance Model (TAM) was used as the framework while E-learning experience was included as an additional construct. An extended TAM model was proposed and tested in this study. It consisted of five constructs, namely: intention to use, perceived usefulness, perceived ease of use, attitude toward using, and experience.

Theoretical Framework

This study employs an extended version of the Technology Acceptance Model (TAM), incorporating the E-learning experience construct, to examine the perceptions and challenges of Mathematics learning among the B40 students and parents during PdPR at SMK Bakong, Miri. The TAM postulates that user acceptance of a technology system is primarily determined by two factors: perceived usefulness (PU) and perceived ease of use (PEU). Perceived usefulness refers to the user's subjective probability that using a specific application system will increase his or her job performance (Mailizar et al., 2021). In contrast, perceived ease of use pertains to the degree to which the user expects the target system to be free of effort. These factors are believed to shape users' attitudes toward using the system, which, in turn, affect their intention to use it (Davis, 1989). In the context of our study, the TAM constructs can be interpreted as follows

1. **Perceived Usefulness (PU):** This will reflect the B40 students' and parents' views on whether online Mathematics learning during PdPR is beneficial and effective.
2. **Perceived Ease of Use (PEU):** This will assess the B40 students' and parents' perceptions of whether online Mathematics learning during PdPR is easy to use and understand.
3. **Attitude Towards Using (ATU):** This will explore B40 students' and parents' attitudes towards online Mathematics learning during PdPR, influenced by their perceptions of its usefulness and ease of use.
4. **Intention to Use (IU):** This will assess the willingness of B40 students to engage in online Mathematics learning during PdPR. This is influenced by their attitudes and the perceived usefulness of the system.

In addition to these constructs, we incorporate the construct of E-learning experience, which will examine the actual experience of B40 students in online Mathematics learning during PdPR. The relationships among these constructs form the basis of our research model and will guide the design of our questionnaire and the interpretation of our findings.

Digital Divide and Socioeconomic Factors

The digital divide, a term that encapsulates disparities in access to and utilization of technology, is a crucial factor when considering the challenges of Mathematics learning during PdPR (Warschauer, 2004). The divide extends beyond mere access to technology, with differences in digital skills and competencies (known as the "second-level digital divide") proving significant (Hargittai, 2002). In the context of SMK Bakong, Miri, students belonging to the B40 demographic may face challenges not only in accessing the necessary technology for online learning but also in effectively utilizing this technology for Mathematics learning. Socioeconomic factors can further exacerbate these challenges. According to Fairlie (2012), students with access to home computers are more likely to graduate, indicating that students without this access, likely to be more prevalent in lower socioeconomic demographics like the B40 group, could face substantial obstacles to their educational progress. The situation can become particularly dire in subject areas such as Mathematics, which often require specific digital tools and resources for effective online learning.

Moreover, DiMaggio et al (2004) highlight how socioeconomic status can lead to differentiated use of technology. Students from lower socioeconomic backgrounds may not be able to leverage digital learning opportunities as effectively as their peers from more affluent backgrounds. This could be due to various factors, including but not limited to, limited

digital literacy, lack of suitable learning environments at home, and additional responsibilities that might divert their focus from learning. Therefore, the literature suggests that issues and challenges in Mathematics learning among B40 students and parents during PdPR could be multifaceted, involving disparities in both access to and use of technology, influenced significantly by socioeconomic factors. This provides a robust foundation for investigating the specific issues and challenges faced by the B40 students and parents at SMK Bakong, Miri, in their Mathematics learning during PdPR.

Student Performance in Mathematics during Remote Learning

Student performance in Mathematics during online or remote learning has been a point of focus in educational research, with various studies pointing to the potential challenges and opportunities presented by this mode of learning. According to a meta-analysis by Means et al. (2010), the effectiveness of online learning can often depend on the specific practices employed, suggesting that the success of Mathematics learning during PdPR could be influenced by the teaching strategies used. Another meta-analysis by Cavanaugh et al. (2004) found that the impacts of distance education on student outcomes varied widely, indicating that individual student experiences during remote learning could be heterogeneous. This notion is particularly important when considering student performance in Mathematics at SMK Bakong, as the specific circumstances and challenges faced by the B40 demographic could potentially lead to varied outcomes. The shift to emergency remote teaching during the COVID-19 pandemic, as characterized by Hodges et al (2020), poses its unique challenges (Norman et al., 2022). The authors differentiate between regular online learning and the emergency remote teaching that has been necessitated by the pandemic, pointing out that the latter is not representative of the best practices in online education. This distinction could have significant implications for student performance in Mathematics during PdPR at SMK Bakong, with students potentially facing unprecedented challenges that could impact their learning outcomes. Finally, a study by Hebebcı et al (2020); Surianshah (2021) explores students' and teachers' views on remote education during the COVID-19 pandemic, including their perspectives on learning outcomes. The findings of this study could provide useful insights into how perceptions of remote learning might correlate with academic performance, including performance in Mathematics. Thus, student performance in Mathematics during remote learning can be influenced by various factors, including the specific teaching strategies used, individual circumstances of the students, the sudden shift to emergency remote teaching, and the perceptions of the students and teachers. This backdrop provides a robust foundation for investigating the specific performance outcomes in Mathematics learning among B40 students at SMK Bakong, Miri, during PdPR.

Method

This study will employ a cross-sectional, quantitative research design. This approach is suitable for identifying and analysing patterns and relationships between variables at a specific point in time. The participants of this study will be students and parents from the B40 group enrolled in or associated with SMK Bakong, Miri. A purposive sampling technique will be used to select participants who meet the study criteria. The primary tool for data collection will be a self-administered questionnaire, designed based on the constructs of the extended Technology Acceptance Model (TAM). The questionnaire will include sections to gauge perceived

usefulness, perceived ease of use, attitude towards using, intention to use, and elearning experience related to Mathematics learning during PdPR. Likert scale items will be used to measure these constructs. After obtaining the necessary ethical approvals and consent from the participants, the questionnaires will be distributed to the selected students and parents. They will be given a specified period to complete and return the questionnaires. Collected data will be analysed using statistical analysis to identify relationships among the constructs of the extended TAM and to test the research hypotheses. In conducting this study, researcher adhere to the ethical guidelines of the American Educational Research Association (AERA). All participants will be informed about the purpose of the study and assured of their anonymity and confidentiality. Their participation will be entirely voluntary, and they may withdraw at any time.

Conceptual Framework

An interdisciplinary literature review result in identification of previous studies suggesting relationship between perceptions and challenges of Mathematics learning among B40 students and parents during the Home-based Learning (PdPR). The conceptual framework proposes as below:

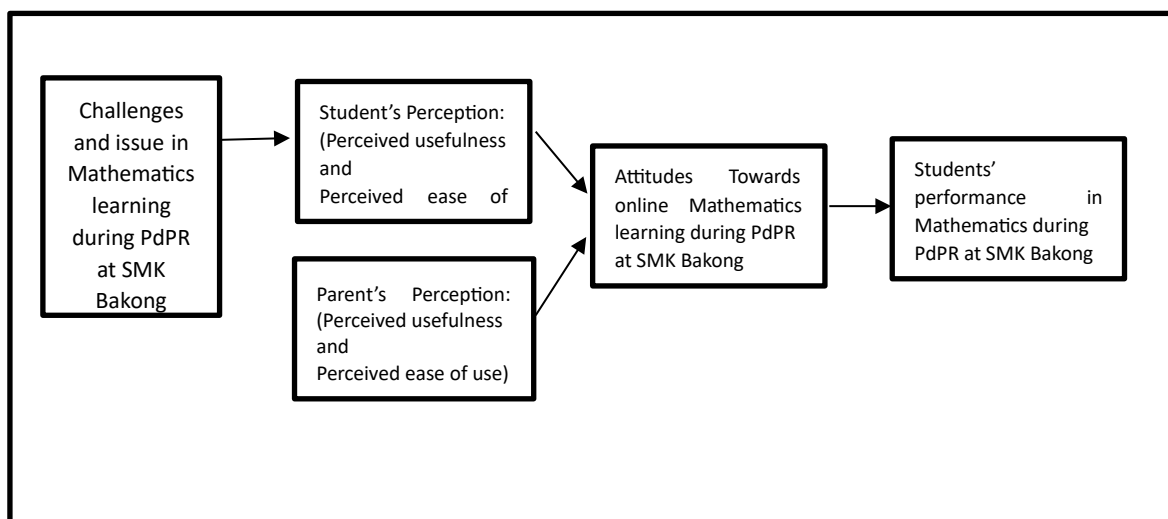


Figure 1.0 *The conceptual framework*

Conclusions, Implications, and Future Directions

This study seeks to analyze the perceptions and challenges of Mathematics learning among the B40 students and parents during PdPR at SMK Bakong, Miri. Utilizing an extended Technology Acceptance Model, the research aims to provide insights into how perceived usefulness, perceived ease of use, attitude towards using, intention to use, and e-learning experience influence Mathematics learning in an online, home-based learning context. The findings of this study can have significant implications for policy makers, educational practitioners, and parents. Understanding the specific perceptions and challenges faced by the B40 students and their parents in Mathematics learning during PdPR can inform the development of targeted strategies and interventions to enhance the effectiveness of online learning, especially in low-income and rural areas. Furthermore, the findings could guide the improvement of e-learning platforms and tools, making them more user-friendly and accessible for this demographic. Future research could expand this study by incorporating a

longitudinal design to track changes in perceptions and challenges over time. Also, it would be beneficial to carry out similar studies in different geographic areas or among different income groups to obtain a broader understanding of the issues. Furthermore, including other subjects beyond Mathematics may provide a more holistic view of the PdPR experience. Qualitative studies involving interviews or focus groups could also offer deeper insights into the personal experiences and challenges faced by B40 students and parents.

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