

The Implementation of Classroom Assessment (PBD) in Design and Technology (RBT) Education Among Primary Schools Teachers

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DOI: <https://doi.org/10.30880/ritvet.2024.04.02.002>

Article Info

Received: 20 July 2024

Accepted: 19 December 2024

Available online: 30 December 2024

Keywords

Classroom Assessment, Design & Technology (RBT). Challenges, Mixed-Method Study, Implementation

Abstract

Malaysia is moving towards becoming a high-income and high-technology nation, in line with the goals of the 12th Malaysia Plan. In this context, Technical and Vocational Education and Training (TVET) plays a crucial role, with the subject of Life Skills now being replaced by Design and Technology (RBT). Classroom Assessment (PBD) for the RBT subject represents a new assessment approach in the national education system. This study aims to identify the level of PBA practices among RBT teachers in primary schools in the Johor Bahru district, as well as the challenges faced. It also examines the impact of these challenges on the effectiveness of teaching and learning, and the strategies used by teachers to overcome them. This study employs a mixed-method research design by using a survey for the first phase and then continuing the interviews to explain the challenges. 148 RBT teachers from primary schools in Johor Bahru were selected as respondents. Data were collected through a questionnaire covering respondents' demographics, PBD practices, and implementation challenges. The results of the study show that the level of PBA practices among RBT teachers is high. However, there are major challenges such as student absenteeism, a vast syllabus, time constraints, and a lack of resources and technology. Teachers employ various strategies to overcome these challenges, including active parental involvement, administrative support, use of technology, and early planning. In conclusion, despite the challenges, the level of PBA practices among RBT teachers is high, and they employ various approaches to ensure effective teaching. This study has important implications for the Ministry of Education Malaysia in providing better support and resources to teachers.

1. Introduction

Malaysia is moving towards becoming a high-income and high-tech country in line with the goals of the 12th Malaysia Plan (Office of the Prime Minister of Malaysia, 2021). Various challenges need to be faced, such as forming a harmonious society, a stable economy, and the use of advanced technology. To achieve this goal, comprehensive education and training is important (Mahmuad, 2022). Technical and Vocational Education and Training (TVET) plays an important role in providing a quality workforce. Technical innovation and globalization increase the need to expand TVET, which is widely accepted in countries and unions (Yazçayır & Yağcı, 2009). TVET education is also implemented in primary schools. The Malaysian Ministry of Education (KPM) constantly reviews the curriculum to produce potential individuals through quality education (Kor, 2018).

Classroom Assessment (PBD) was introduced in 2019 by the former Malaysian Minister of Education, Dr Maszlee Malek, with the aim of reducing the burden of exams, creating a fun learning culture, and helping teachers measure student development holistically. This is in line with the view that traditional exams are less suitable for today's students (Yates & Johnston, 2018). PBD provides the same learning space to all students, allowing them to improve their weaknesses (Sidhu, Kaur & Chi, 2018). The introduction of PBD aims to improve the quality of teaching and learning in schools. Although the concept of formative assessment has been around for a long time, the introduction of PBD raises concerns because of drastic changes in a short period of time (Thiagarajan & Hua, 2023).

In the context of this study, PBD for RBT subjects is a newly introduced form of assessment in the national education system. Therefore, interested parties such as KPM, BPK, LPM, administrators and even teachers themselves may still not find a suitable way to implement PBD for RBT subjects. This aspect has given space to researchers to conduct this research. Factors have shown how important it is for researchers to study how RBT teachers implement PBD at the primary level considering that the mastery of RBT at the primary school level becomes the basis for students to master this subject at the secondary school level. Therefore, the main aim of this research is to find out how RBT teachers implement PBD and further understand the challenges faced by teachers when implementing PBD for RBT subjects.

1.1 Objectives of the Study

The study is conducted to address the following objectives:

1. Identify the level of PBD practice among RBT teachers in primary schools.
2. Identify the challenges of PBD implementation among RBT teachers in primary schools.
3. Exploring the challenges of implementing PBD among RBT teachers in primary schools.
4. Study the strategies and approaches used by RBT teachers in overcoming the challenges faced when implementing PBD.

2 Literature Review

The change in PBD emphasis from summative assessment practices that are mostly focused on tests and exams to PBD practices that emphasize formative assessment has caused many complaints among teachers. This is due to the lack of confidence among teachers to carry out PBD in the teaching and learning process. The application of formative assessment is found to be still weak among teachers. Teachers cannot integrate PBD into the teaching and learning process because teachers often think that PBD is something isolated or separate from teaching and learning practice (Ambotang, Andin, & Minduru, 2021). As an extension, a study by Faudzi, & Ahmad (2022) previously showed that teachers lack knowledge about PBD techniques and need additional training. The lack of training before the implementation of PBD prevents teachers from carrying out assessments effectively, which in turn affects the quality of assessment and holistic student achievement (Ramli & Hashim, 2023). Therefore, this study aims to explore PBD practices among RBT teachers in primary schools as well as understand the challenges they face.

In addition, a study conducted by Arumugham (2022) reported that most teachers only use the question-and-answer technique as one of the teaching techniques and not as a PBD technique. This is supported by Said & Mohamad (2023) who stated that teachers do not understand the steps that should be taken to implement PBD or the variety of PBD techniques. Teachers' understanding of the steps to implement PBD is still at a very low level. In some cases, teachers do not realize whether they are implementing PBD or teaching and learning. This causes them to be unable to collect the information needed to make improvements in the teaching and learning process (Mustaqim, 2024). This insufficient information will also cause teachers to be unable to take appropriate action to guide their students. All this will cause the goal of PBD to be unachievable.

Many past studies have provided information about PBD techniques that teachers can use throughout their PBD implementation, but no detailed explanation has been given on how to implement the technique. What is important is the information obtained from the implementation of PBD (Mustaqim, 2024). This is because the behavior shown by students during PBD will provide a lot of information to teachers to make decisions and considerations about what needs to be done next in the teaching and learning process. Therefore, this research was conducted to explore and understand the implementation of PBD among RBT teachers in primary schools as well as understanding the challenges faced by teachers.

3. Methodology

3.1 Research Design

This study uses a mixed method approach because it is suitable to provide a comprehensive view of the topic under study. This approach combines quantitative data that provides measurable statistical information with qualitative data that provides in-depth and contextual insight. This study uses a convergent design to integrate findings from both quantitative and qualitative data analysis, with the aim of obtaining a more comprehensive understanding of the issue under study. The quantitative study answers questions about the level of practice and the challenges of implementing PBD among RBT teachers in primary schools, while the qualitative study explores the effects of those challenges as well as the strategies used by teachers to overcome them. This approach allows researchers to obtain a richer and more detailed view, organize complex data into a comprehensive narrative and provide a more comprehensive view of the PBD implementation landscape.

3.2 Sampling

This study involved the population from all primary schools in the district of Johor Bahru, including National Schools (SK), Chinese National Schools (SJKC), Tamil National Schools (SJKT), Religious Schools, and Special Education Schools, with a total of 243 RBT teachers. For the quantitative study, the sample was taken randomly according to simple sampling, resulting in 148 teachers as respondents, who were selected based on availability and the permission of the school principal. For the qualitative study, purposive sampling was used, selecting 8 RBT teachers from various school backgrounds to provide an in-depth insight into the implementation of PBD in primary schools. The participant was chosen based on teaching experience and familiarity with PBD. This sampling technique allows the collection of thorough data about the implementation and challenges of PBD among RBT teachers.

3.3 Data Collection

A research instrument is a tool used to measure variables in a study. In this study, data collection was done simultaneously using a mixed methods approach involving questionnaires and interviews. However, this study does not make a comparison between quantitative and qualitative data, instead a combined approach is used to enrich the understanding of the issues under study. Quantitative data was collected using a set of questionnaires distributed to respondents from the study population through the Google Form platform. Research questions are distributed through WhatsApp, email, and Telegram. This questionnaire consists of three parts: Part A (respondent demographics – 5 items), Part B (PBD implementation practices – 22 items), and Part C (challenges/constraints in PBD implementation practices – 10 items) that use a five-level Likert scale. For qualitative data, semi-structured interviews were conducted face-to-face or online with study participants selected through purposive sampling. The qualitative data collection process involved interviews that focused on the participants' experience, understanding, and perspective on the challenges in implementing PBD in RBT subjects at school. The questionnaire instrument was modified from the study of Abd Kadir (2022), while the items for the qualitative interview were modified from the study of Marnizam & Ali (2021). The validity and reliability of the instrument were tested through a pilot study and the Cronbach's Alpha value obtained showed excellent internal reliability. To increase the reliability of qualitative data, triangulation and expert examination methods are used. The research findings procedure was carried out by obtaining permission from authorities such as the Malaysian Ministry of Education, the Johor State Department of Education, and the Johor Bahru District Education Office.

3.4 Data Analysis

Data analysis for this study was carried out separately for quantitative and qualitative components. The quantitative data was statistically analyzed using SPSS software, focusing on descriptive statistics to provide an overview of the responses, and inferential statistics to identify any significant differences or relationships among variables. The qualitative data underwent thematic analysis where responses were coded and categorized into themes using NVivo software. This involved an iterative process of reading through the transcripts, identifying patterns, and categorizing data into major and minor themes, which helped in understanding the nuanced perspectives of the participants.

4. Results and Discussion

4.1 Quantitative

This quantitative part answers research question 1 about the level of PBD practice and research question 2 about the challenges faced in the implementation of PBD. All 148 survey forms were completed and returned by the respondents. Respondent demographics include gender, academic qualifications, experience as a teacher, and experience as an RBT teacher. The level of PBD practice among RBT teachers is at a high level. Teachers implement PBD continuously during the teaching and learning process and use various assessment instruments such as worksheets, checklists, and self-assessment to assess students. However, there are challenges in ensuring that all teachers fully master PBD techniques. The main challenges identified in this study include lack of resources and technology, student absenteeism, extensive syllabus, time constraints, and lack of support from school administrators. Teachers face difficulties in meeting the needs of various students and getting sufficient support from the school administration.

4.2 Qualitative

This section includes the qualitative findings obtained from the semi-structured interviews and discusses the findings from research questions three and four. Research question three explores the impact of the existence of challenges in the implementation of PBD in primary schools and research question four explores the strategies and approaches used by RBT teachers in overcoming the challenges faced when implementing PBD. For this qualitative section, RBT teachers from all streams of primary schools have been selected to ensure diverse representation. Interview transcriptions were analyzed using thematic coding to identify themes that emerged after coding. The themes are categorized according to the research questions and issues arising from the quantitative analysis.

Theme 1: Impact of Resource and Technology Constraints

The theme highlights the critical impact of insufficient educational resources, lack of administrative support, and technological shortages on the quality of teaching and assessment under the PBD framework. Teachers face significant challenges due to the lack of teaching materials and technological tools, which hampers their ability to conduct effective teaching and assessment, ultimately affecting student learning outcomes. This theme underscores the necessity for adequate resources and administrative backing to ensure effective implementation of PBD.

Theme 2: Student Absenteeism

Student absenteeism significantly impacts the effectiveness of PBD, affecting both the quality of teaching and student learning. Teachers express frustration and demotivation due to frequent absences, which disrupt the learning process and lead to gaps in student knowledge. The theme explores how absenteeism not only affects individual students' academic performance but also disrupts classroom dynamics and teacher morale.

Theme 3: Impact of Curriculum and Time Constraints

This theme addresses the challenges posed by extensive curricula and time constraints on the effective implementation of PBD. Teachers struggle to cover extensive syllabi within limited time, which compels them to accelerate teaching, reducing the depth of instruction and student understanding. The theme reflects on the need for well-structured time management and curriculum adjustments to enhance the quality and effectiveness of PBD.

Theme 4: Support Strategies from Parents and Administration

The involvement of parents and the support from school administrations are pivotal in overcoming the challenges of PBD implementation. This theme illustrates how active parental engagement and robust administrative support can alleviate some of the burdens faced by teachers, thereby enhancing the teaching environment and enabling more effective execution of PBD.

Theme 5: Technology and Organizational Strategies

Focusing on the use of technology and early planning, this theme discusses how these strategies facilitate the implementation of PBD by making teaching more interactive and assessment more efficient. Teachers utilize digital tools to engage students and manage instructional content effectively, which helps in maintaining an

organized and smooth flow of teaching activities, ultimately improving the quality of education and assessment under the PBD framework.

4.3. Discussion

The study's results shed light on the complex obstacles and significant levels of involvement among Reka Bentuk dan Teknologi (RBT) instructors with Classroom-Based Assessment (PBD) at schools in the Johor Bahru area. The data indicates a noteworthy level of dedication among RBT teachers towards PBD, as seen by their frequent use of the PBD Guidebook and the Standard Curriculum and Assessment Document (DSKP) for RBT. The significant degree of involvement indicates that teachers are not only following the instructions but also trying to ensure that their evaluations are following national standards. The consistent utilization of these resources signifies a reliance on organized direction, emphasizing the necessity for ongoing professional growth. Teachers seem to prioritize formal frameworks that facilitate the maintenance of consistency and standardization in assessment processes across many classrooms. While the reliance on consistency is advantageous, it also brings attention to the possibility of excessive dependence that could hinder educational creativity and autonomy in assessment methods. Professional development programs must prioritize educating teachers with the ability to creatively adjust rules to suit their own classroom circumstances.

The obstacles encountered are considerable, with student absence cited as the primary obstacle impacting the efficacy of PBD. Regular absences undermine the consistency of instruction and evaluation, resulting in deficiencies in student comprehension and assessment records. This difficulty is exacerbated by insufficient administrative assistance and inadequate resources, such as restricted access to essential technologies. These challenges not only impede the implementation of assessments but also impact the morale and motivation of teachers. Insufficient technological resources prevent teachers from utilising digital solutions, such as instructional software and online platforms, that could promote interactive learning and evaluation. In addition, the administrative support sometimes lacks in delivering the required training and resources for successful PBD implementation. This could involve organising workshops on cutting-edge assessment techniques or allocating funding for acquiring appropriate technology. Faudzi, & Ahmad (2022) previously also showed that teachers lack knowledge about PBD techniques and need additional training.

The findings emphasise the substantial impact that these problems have on both the quality of teaching and the outcomes of student learning. Student absenteeism is a significant obstacle that directly affects the effectiveness of PBD by interrupting the continuity and consistency of educational delivery and assessment. Mustaqim (2024) also reveals teachers unable to collect the information needed to make improvements in the PBD process. Teachers have stated that absence necessitates the need to review and reteach material, resulting in a slowdown of the educational process and a reduction in the time available for curricular advancement. This recurring pattern reduces the overall quality of the educational experience, impacting both the students who are not there and those who attend consistently, as the latter often have to wait for their peers to catch up. In addition, the findings emphasise the wider consequences of inadequate administrative assistance and limitations in resources. These problems are not limited to one instance but instead have a domino effect on the drive and contentment of educators, ultimately impacting their ability to perform effectively in the classroom. An example of this is when teachers do not have sufficient access to appropriate technology and teaching materials, which limits their capacity to provide interesting and varied information. This is crucial for creating an engaged and inclusive learning environment. The lack of these resources hinders the implementation of novel teaching approaches and restricts the range of evaluations that can be conducted. This, in turn, affects the extent and variety of insights that may be obtained through Problem-Based Learning (PBD).

The survey also found that educators had a proactive approach. Despite the acknowledged resource constraints, teachers are progressively depending on technological tools to augment interactive learning and evaluation. Teachers demonstrate their flexibility and dedication to improving student involvement and assessment by utilising digital platforms such as Google Classroom and educational apps like Kahoot and Quizizz. These tools provide immediate evaluation and interactive learning experiences that can greatly enhance the educational process. Furthermore, the implementation of strategic planning and organisation by instructors is crucial in effectively managing classroom time and resources. Teachers who adeptly design their courses and assessments can more efficiently adapt the extensive curriculum and demanding teaching schedules. This technique not only facilitates the maintenance of a consistent instructional rhythm but also guarantees a thorough exploration of the curriculum, which is essential for standardised evaluations. The discussion also highlights the necessity of enhanced administrative support and increased parental involvement as broad measures to address the issues encountered. Schools would gain advantages by implementing stronger communication channels and support systems that improve teacher-parent interactions and enhance family engagement in the educational process.

Furthermore, it is imperative for administrative entities to offer ongoing professional development opportunities, sufficient resources, and moral encouragement to educators to cultivate a conducive atmosphere for effective instruction and learning.

5. Conclusion

In conclusion, this study shows that the implementation of PBD among RBT teachers in Johor Bahru district primary schools is at a high level, reflecting the commitment and seriousness of teachers in implementing PBD effectively. However, this study also identified some of the main challenges faced by teachers, including student absenteeism, large syllabuses, time constraints, and lack of resources and technology. Teachers have demonstrated ongoing efforts to overcome these challenges through a variety of strategies, including parental involvement, administrative support, technology use, and advance planning.

Despite the constraints, teachers still strive to ensure that teaching and assessment run smoothly and achieve the set learning goals. Support from school administration and parents is critical in helping teachers overcome these challenges. School administrations need to provide adequate resources, offer ongoing training, and provide moral support to teachers. Parents need to be actively involved in their children's education to ensure a consistent presence and ongoing support at home. In essence, this study provides useful guidance to teachers, school administrators, and policy makers in improving the implementation of PBD in primary schools. By practicing the recommended strategies and carrying out focused further studies, it is hoped that the quality of teaching and learning can be improved, as well as the achievement of students in the subject of RBT can be improved.

Acknowledgement

The authors would also like to thank the Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, Ert Azizah Vocational College, and Muar Vocational College.

Conflict of Interest

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

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