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論 文 審 査 の 要 旨
(Summary of Dissertation Evaluation)

博士の専攻分野の名称 (Major Field of Ph.D.)	博士（　　教育学　　） Ph.D.	氏 名 (Candidate Name)	CHOMUNORWIRA TAFARA
学位授与の要件	学位規則第４条第[1]・２項該当		

論 文 題 目 (Title of Dissertation)
Mathematics Teachers' Challenges in Practicing Project-Based Learning in Their Classrooms

論文審査担当者 (The Dissertation Committee)

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〔論文審査の要旨〕 (Summary of the Dissertation Evaluation)

This dissertation explores the challenges and solutions perceived by high school mathematics teachers in Japan in practicing project-based learning approach in their classrooms through the qualitative design descriptive-case study of data collected from both the open-ended online questionnaire and the semi-structured interview.

This dissertation consists of five chapters as followed.

Chapter 1 describes the background and purpose of this study. Project-based learning is viewed as an instructional approach that promotes student engagement and can equip learners with skills for life and work. In this regard, it is very important for teachers to have a clear understanding of project-based learning for them to be able to provide sufficient student support and guidance for its successful implementation. The purpose of this study is to explore the challenges and solutions perceived by high school mathematics teachers in Japan in practicing project-based learning approach in their classrooms.

Chapter 2 reviews literatures and shows the theoretical framework of this study. This chapter provides an inclusive discussion of the relevant literature related to the study, and it covers issues to do with project-based learning definition, discourse around project-based learning and problem-based learning. The review also looks at the discourse on the theory and historical beginnings of project-based learning, discussion on mathematics and project-based learning, and addresses the success stories of project-based learning in mathematics classroom context. Both experiential learning theory and constructivism have a common factor "experience" which is because of interactions and active learning. Thus, the acquisition of knowledge or learning emanates from learner's experiences which are very typical of project-based learning.

Chapter 3 provides a description of the research methodology used in the study, information on the participant population, ethical consideration of the study, the data collection procedures through open-ended online questionnaire and semi-structured interviews, and the data analysis procedure. The study follows a qualitative design descriptive-case study.

Participant teachers for this research were selected using purposive sampling technique.
Two data collection instruments were used to collect the data from the participant teachers on the challenges they perceived they face in practicing project-based learning in their mathematics classrooms and how they respond to these challenges. This was done to ensure credibility and validity of the study as well as to have a balanced explanation of the study results. The collected data was analyzed using qualitative content analysis.

Chapter 4 presents the findings of the study from the analyzed open-ended questionnaire and semi-structured interview responses, categorizing the challenges and their solutions. The analysis of the 25 teachers' responses to open-ended questionnaire identified challenges teachers perceived they face in preparing and designing project-based learning mathematics tasks for the learners. Three themes were identified which are c*reating authentic project-based learning mathematics task, learner interest,* and *time availability*. The analysis of challenges perceived they face in implementation process stage identified four main themes which are *the extent of learner support, time availability, learner group collaboration,* and *resources/technology*. The challenges perceived they face in evaluating project-based learning were two main themes which are *general evaluation* and *individual evaluation*. Overall, the analysis of both the open-ended online questionnaire and the semi-structured interview revealed the same challenges that teachers face including the challenge of designing authentic tasks for project-based learning that contains relevant content and fits the learner level, creating tasks that learners are willing to work on, the issue of securing time and class group discussion. However, analysis of semi-structured interview revealed clear explanations on some challenges, for example on the issue of time, teachers clarified that they do not have enough time not only to plan and implement the tasks for project-based learning but also to reflect on the whole process to improve on the practice.

Chapter 5 discusses on how the results relate or contradict the previous related studies and use literature to explain and concludes the dissertation with implications of the study. Based on the results, the study recommends the need for mandatory inclusion of project-based learning in the mathematics course of study/curriculum among others.

This dissertation can be highly evaluated on the following three points.

1. This study identified some challenges perceived by high school mathematics teachers in Japan in practicing project-based learning approach in their classrooms as the results of qualitative analysis of data collected from the open-ended online questionnaire and the semi-structured interview.
2. The results of this study are expected to contribute to the body of literature by filling in the existing gap of knowledge on the challenges and their solutions perceived by mathematics teachers in practicing project-based learning. The study also helps researchers and implementers to have a full description and understanding of project-based learning within mathematics classroom context.
3. This study is expected to act as a base or framework for other researchers who are interested in researching learner-centered mathematics teaching and learning approaches.

Based on the above examination, the author of this dissertation is considered to the fully qualified to be awarded the Doctoral degree (Doctor of Philosophy in Education).

February 13, 2024

備考　要旨は，A4版2枚（1,500字程度）以内とする。

(Note: The summary of the Dissertation should not exceed A4 size, 2pages (about 500 words).)