# WOX7001 RESEARCH METHODOLOGY 1/2022/2023

**Understanding the Optimal Blend of Online and Face-to- Face Instruction in Blended Learning**

# ASSIGNMENT 4 – RESEARCH PROPOSAL

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**Abstract**

Blended learning, an education system which combines online and face-to-face instruction, has become apparent or prominent as a promising educational approach that harnesses the benefits of both traditional and digital learning environments. However, achieving the optimal blend of online and face-to-face instruction remains a critical challenge for educators and instructional designers. This research aims to bridge this knowledge gap by investigating the main factors influencing the blend, examining the effects of different instructional ratios on student engagement and learning outcomes, and providing evidence-based recommendations for designing and implementing effective blended learning models.

Using a mixed-methods research approach, qualitative data was collected and conducted through interviews and focus group discussions with educators and administrators experienced in blended learning. Thematic analysis revealed key factors influencing the blend, including learner characteristics, instructional goals, technological considerations, and pedagogical strategies. These qualitative insights formed the foundation for the subsequent quantitative phase.

A survey questionnaire was administered to a diverse sample of students enrolled in blended learning courses. Quantitative analysis which included descriptive statistics, regression analysis, and correlation analysis , examined the relationships between instructional ratios, student engagement, and learning outcomes. The results can help to indicate that the blend of online and face-to-face instruction significantly influenced student engagement levels and learning outcomes.

By integrating the qualitative and quantitative findings, this research provides a comprehensive understanding of the optimal blend of online and face-to-face instruction in blended learning environments. Based on the research outcomes, evidence-based recommendations are proposed to guide educators and policymakers in designing and implementing effective blended learning models that maximize student engagement and foster positive learning outcomes.

This study contributes to the field of blended learning by addressing the existing knowledge gap and offering valuable insights into instructional design decisions. The findings provide a foundation for enhancing instructional practices and inform the effective models development in blended learning. By optimizing the blend of online and face-to-face instruction, the educators can create engaging and impactful learning experiences which can promote student success in blended learning environments.

**CHAPTER 1: INTRODUCTION**

Blended learning, which combines online and face-to-face instruction, has become increasingly popular in higher education. The COVID-19 pandemic has accelerated the adoption of blended learning as institutions search for flexible and interactive learning environments (Bordoloi, Das, and Das (2021). In Malaysia, where higher education has a significant impact on national development, optimizing blended learning for the benefit of students is highly important. Many universities and colleges in Malaysia have incorporated blended learning approaches into their programs. This includes a combination of face-to-face classes, online lectures, virtual discussions, and interactive online activities. During 4th June 2023, Ministry of Higher Education of Malaysia, Datuk Seri Mohamed Khaled Nordin just introduced a hybrid, flexible learning system which mandatory university attendance only in first and final years, which it is a sign which Education system in Malaysia will slowly evolved into Blended Learning system.

As educational institutions in Malaysia embrace blended learning, it is essential to understand its impact on student engagement and learning outcomes. Blended learning has the higher ability to offer a variety of benefits such as increased flexibility in study, personalized learning experiences, and improved access to resources. However, the effectiveness of blended learning depends on the careful design and implementation of its components. Several studies have examined the perceptions and experiences of students and educators towards blended learning. Bordoloi, Das, and Das (2021) conducted a study in the Indian context, revealing that students generally held positive perceptions towards online and blended learning during the COVID-19 pandemic. Similarly, Heilporn, Lakhal, and Bélisle (2021) explored teachers' strategies to foster student engagement in blended learning in higher education, emphasizing the importance of active learning, interaction, and technology integration. These studies provide valuable insights into the potential benefits of blended learning but highlight the need for further exploration within the Malaysian context.

One critical aspect of blended learning is its impact on learning outcomes. Kang and Kim (2021) conducted a review of blended learning in the public healthcare education course, specifically focusing on the flipped classroom with team-based learning. They found that blended learning approaches positively influenced learning outcomes, including acquisition in knowledge and problem-solving skills. Moreover, Xu, Yuan, and Liu (2021) explored student performance prediction based on blended learning, indicating that well-designed blended learning models can significantly contribute to students' academic success. Engagement is another crucial factor in effective blended learning environments. Research suggests that increased student engagement positively influences learning outcomes. A systematic review of blended learning in higher education has been conducted by Müller and Mildenberger (2021) and found that blended learning approaches increased student engagement and active learning. Furthermore, Salas-Rueda (2020) investigated the impact of the WampServer application in blended learning and emphasized the importance of data science, machine learning, and neural networks in enhancing engagement.

To optimize blended learning for higher education students in Malaysia, it is crucial to consider the unique characteristics of the local context. Singh, Steele, and Singh (2021) proposed a hybrid and blended learning approach to address the challenges posed by the COVID-19 pandemic and emphasized the importance of adapting pedagogical strategies to suit the post-pandemic world. Additionally, Wang, Huang, and Omar (2021) analyzed the application of a blended learning model using text mining methods, highlighting the potential for technology-driven approaches in the Malaysian context.

Predictive analytics can also play a significant role in optimizing blended learning. Musabirov, Pozdniakov, and Tenisheva (2019) examined the predictors of academic achievement in blended learning, focusing on data science minors. Chango, Cerezo, and Romero (2019) and Van Goidsenhoven et al. (2020) explored the prediction of student success in blended learning environments using multi-source data and learning analytics. These studies underscore the importance of leveraging data-driven insights to enhance the design and implementation of blended learning models.

In conclusion, blended learning holds immense potential for optimizing student engagement and improving learning outcomes in higher education settings in Malaysia. Drawing on insights from research conducted in various contexts, this research project aims to explore the optimal blend of online and face-to-face components in blended learning for Malaysian students. By considering the unique characteristics of the Malaysian higher education system and leveraging technological advancements, this study seeks to contribute to the ongoing efforts in enhancing the quality of blended learning experiences for students in Malaysia.

* 1. **Research Background Problem Statement**

Blended learning has gained significant popularity in higher education institutions in Malaysia as a means of providing flexible and engaging learning environments. However, despite its increasing adoption, there is a lack of comprehensive understanding regarding the factors influencing the optimal blend of online and face-to-face instruction in blended learning environments specifically within the Malaysian context (Bordoloi et al., 2021; Banyen et al. (2016); Müller & Mildenberger, 2021). Existing research predominantly focuses on other Foreign Country and Western contexts, and limited empirical evidence exists that addresses the unique needs and challenges of Malaysian students and institutions. Given the differences in geographical, demographic, and background characteristics of Malaysian students compared to other foreign studies, it is necessary to understand the main factors influencing the optimal blend of online and face-to-face instruction in blended learning systems in Malaysian higher education to enable comparison with students from other countries in this context.

To design effective blended learning models, it is crucial to investigate the effects of different instructional ratios on student engagement and learning outcomes. Heilporn et al. (2021) conducted a research study examining the strategies employed by teachers to foster student engagement in blended learning in higher education. The study provided a comprehensive examination of teachers' strategies in this regard, detailing strategies related to asynchronous or synchronous modes where appropriate. However, further exploration is needed to explore the impact of different ratios of online and face-to-face instruction on student engagement and learning outcomes in various educational contexts (Heilporn et al., 2021). Additionally, Kang and Kim (2021) focused on the impact of blended learning, particularly the flipped classroom with team-based learning, on learning outcomes in a healthcare education course. Nevertheless, more research is needed to examine the effects of different instructional approaches and ratios on learning outcomes across different disciplines and educational settings (Kang & Kim, 2021).

Therefore, this research aims to bridge the research gap by identifying the main factors influencing the optimal blend of online and face-to-face instruction in blended learning environments in Malaysia. By considering factors such as student preferences, technological infrastructure, pedagogical strategies, and institutional support, this study seeks to understand the unique challenges and opportunities associated with blended learning implementation in the Malaysian higher education context. Additionally, this research seeks to investigate the effects of different ratios of online and face-to-face instruction on student engagement and learning outcomes, providing valuable insights into the most effective balance between online and face-to-face components for Malaysian students.

Addressing these research gaps and objectives will contribute to the advancement of blended learning practices in Malaysia. By providing evidence-based recommendations on designing and implementing effective blended learning models, this research will inform educators, instructional designers, and policymakers in creating engaging and impactful learning experiences for Malaysian higher education students Furthermore, this research will help establish a foundation for future studies on blended learning in the Malaysian context, contributing to the body of knowledge on optimizing blended learning for higher education students.

* 1. **Research Questions**

(i) What are the main factors influencing the optimal blend of online and face-to-face instruction in blended learning environments in Malaysia higher educations?

(ii) How do different ratios of online and face-to-face instruction affect student engagement and learning outcomes in blended learning for Malaysia higher educations?

(iii) What are the evidence-based recommendations can be provided on designing and implementing effective blended learning models?

* 1. **Research Objectives**

(i) Identify the main factors influencing the optimal blend of online and face-to-face instruction in blended learning environments.

(ii) To investigate the effects of different ratios of online and face-to-face instruction on student engagement and learning outcomes in blended learning.

(iii) To provide evidence-based recommendations on designing and implementing effective blended learning models.

* 1. **Research Significance**

The research study on optimizing blended learning for higher education students in Malaysia holds significant importance due to several reasons. Firstly, the outcome of this study will contribute to the growing body of knowledge on blended learning practices, specifically in the Malaysian context. While blended learning has gained attention worldwide, there is a scarcity of research that addresses the unique needs and challenges of Malaysian students and institutions. By focusing on Malaysia, this study will provide valuable insights into the design and implementation of effective blended learning models that are culturally and contextually relevant.

Secondly, this research study will address the existing research gap regarding the factors influencing the optimal blend of online and face-to-face instruction in blended learning environments in Malaysia. By identifying these factors, such as student preferences, technological infrastructure, pedagogical strategies, and institutional support, educators and instructional designers will gain a better understanding of the key elements that contribute to successful blended learning implementation. This knowledge can inform decision-making processes related to curriculum development, resource allocation, and professional development for faculty.

Thirdly, the investigation of the effects of different ratios of online and face-to-face instruction on student engagement and learning outcomes will provide evidence-based insights into designing effective blended learning models for Malaysian students. By exploring the optimal balance between online and face-to-face components, this study will contribute to enhancing student engagement and improving learning outcomes in higher education. The findings will inform educators about the most effective approaches to create engaging and impactful learning experiences that align with the preferences and needs of Malaysian students.

Furthermore, this research study has practical implications for educational institutions and policymakers. The evidence-based recommendations resulting from this study will guide institutions in designing and implementing effective blended learning models that leverage the strengths of online and face-to-face instruction. Policymakers can utilize these recommendations to develop guidelines and frameworks that support the integration of blended learning into the higher education system in Malaysia, fostering educational innovation and improving the quality of learning experiences.

In conclusion, the research study on optimizing blended learning for higher education students in Malaysia holds significance in terms of contributing to the existing knowledge base, addressing research gaps specific to the Malaysian context, informing instructional design practices, and providing practical recommendations for educational institutions and policymakers. By focusing on Malaysia, this study will contribute to the advancement of blended learning practices and ultimately enhance student engagement and learning outcomes in higher education.

**CHAPTER 2: LITERATURE REVIEW**

* 1. **Introduction**

Blended learning has garnered considerable interest in higher education due to its potential to enhance student engagement and improve learning outcomes by combining online and face-to-face instruction. This literature review seeks to offer a comprehensive synthesis of existing research pertaining to the optimization of blended learning in higher education settings, with a specific focus on Malaysia. By analysing pertinent studies, this review aims to identify key factors that influence the optimal balance between online and face-to-face instruction, explore the impact of various ratios of online and face-to-face instruction on student engagement and learning outcomes, and provide evidence-based suggestions for designing and implementing effective blended learning models.

* 1. **Factors Influencing the Optimal Blend of Online and Face-to-Face Instruction:**

The literature highlights several factors that influence the optimal blend of online and face-to-face instruction in blended learning environments. One significant factor is student preferences, which play a crucial role in determining their level of engagement and satisfaction with blended learning (Bordoloi et al., 2021; Heilporn et al., 2021). According to Heilporn et al. (2021), students tend to prefer a balanced mix of online and face-to-face activities that provide flexibility while also maintaining opportunities for social interactions. In addition to student preferences, the technological infrastructure is another critical factor for the successful implementation of blended learning (Bordoloi et al., 2021). Access to reliable internet connectivity and appropriate learning management systems are essential for students to effectively engage in the online components of blended learning. It is crucial for institutions to ensure that students have access to the necessary resources and technical support required to fully participate in blended learning activities.

Pedagogical strategies also play a critical role in optimizing blended learning. The use of interactive online resources, such as multimedia presentations and simulations, can enhance student engagement and promote active learning (Müller & Mildenberger, 2021). Furthermore, clear communication and guidance from instructors are vital for supporting students' understanding and facilitating their learning process in blended learning environments (Bordoloi et al., 2021). Institutional support, including professional development opportunities for faculty, adequate training on blended learning pedagogy, and support for course redesign, is essential for implementation successfully of blended learning (Heilporn et al., 2021; Müller & Mildenberger, 2021).

* 1. **Exploring the Impact of Instructional Ratios in Blended Learning: Student Engagement, Learning Outcomes, and Flexibility:**

Impact of different ratios of online and face-to-face instruction on student engagement and learning outcomes in blended learning remains underexplored. Several studies have investigated the student engagement and learning outcomes in blended learning. For example, Kang and Kim (2021) conducted a review focused on the flipped classroom with team-based learning approach in a public healthcare education course. They found that this blended learning approach had a positive influence on learning outcomes, such as improved critical thinking skills and knowledge retention. Another study by Xu et al. (2021) explored the use of blended learning in predicting student performance and found that an optimal balance between online and face-to-face components was associated with higher academic achievement.

Furthermore, the flexibility offered by blended learning has been shown to increase student engagement and motivation (Bordoloi et al., 2021; Müller & Mildenberger, 2021). The ability for students to access online materials at any time and engage in self-paced learning allows them to take ownership of their learning process. However, it is important to strike a balance between online and face-to-face components to maintain social interactions and promote collaborative learning (Kang & Kim, 2021; Heilporn et al., 2021).

* 1. **Evidence-Based Recommendations for Effective Blended Learning Models:**

Based on the existing research, several evidence-based recommendations can be made for designing and implementing effective blended learning models in Malaysia. Firstly, institutions should invest in technological infrastructure and provide necessary support to ensure equitable access to online resources and technical assistance for students (Bordoloi et al., 2021). Moreover, faculty members should receive professional development opportunities to enhance their pedagogical skills in designing and facilitating blended learning experiences (Müller & Mildenberger, 2021). Collaboration among faculty members and instructional designers can promote the sharing of best practices and innovative approaches to blended learning.

Additionally, careful consideration should be given to the balance between online and face-to-face components. While online components provide flexibility and self-paced learning opportunities, face-to-face interactions foster social connections and promote active engagement (Kang & Kim, 2021; Heilporn et al., 2021). Institutions should provide clear guidelines and recommendations to instructors on how to effectively integrate these components in a complementary manner.

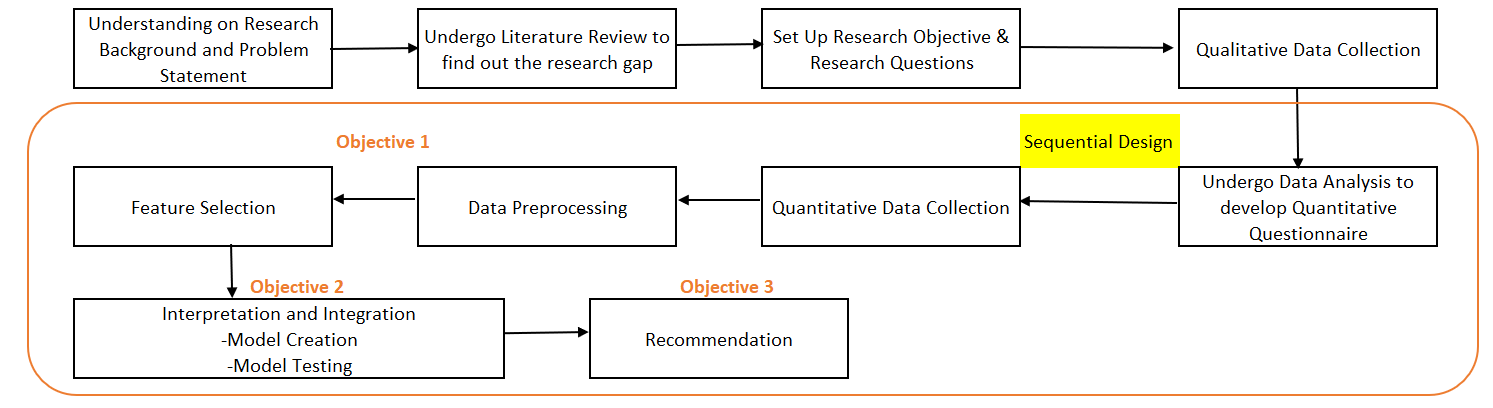
* 1. **Conclusion**

In conclusion, this literature review has explored the factors influencing the optimal blend of online and face-to-face instruction in blended learning environments. It has highlighted the importance of student preferences, technological infrastructure, pedagogical strategies, and institutional support in designing effective blended learning models. Additionally, the review has discussed the effects of different ratios of online and face-to-face instruction on student engagement and learning outcomes, emphasizing the need for a balanced approach. Finally, evidence-based recommendations have been provided for designing and implementing effective blended learning models in the Malaysian higher education context. By considering these factors and recommendations, institutions and educators can develop and refine their blended learning practices to enhance student engagement, improve learning outcomes, and provide a high-quality learning experience for higher education students in Malaysia.

**CHAPTER 3: RESEARCH METHODOLOGY**

* 1. **Research Design**

This study will employ a sequential exploratory design, beginning with qualitative data collection and analysis, followed by quantitative data collection and analysis. This design enables a thorough exploration of the factors influencing the blend of online and face-to-face instruction, laying the groundwork for subsequent quantitative analysis to investigate the effects of different ratios of online and face-to-face instruction.



**Figure 1: Research Design with sequential exploratory design**

* 1. **Qualitative Phase:**

1. Data Collection:

Semi-structured interviews and focus group discussions will be utilized to gather data from educators, instructional designers, students, and administrators who possess experience with blended learning. Through these qualitative data collection methods, valuable insights will be obtained regarding the factors that influence the optimal blend of online and face-to-face instruction. These insights may encompass learner characteristics, instructional goals, and learning strategies, among other relevant factors.Below are some field that we can gather and collect for qualitative data, which are:-

A. Experiences: Share experiences with blended learning and describe specific instances or courses where blended learning was encountered.

B. Perceptions: Explore how participants perceive the blend of online and face-to-face instruction, highlighting advantages and challenges.

C. Factors for Effectiveness: Identify factors that contribute to an effective blend and understand their impact on learning outcomes and engagement.

D. Strategies: Collect examples of specific strategies that have enhanced the learning experience in blended learning environments.

E. Preferences: Determine participants' preferred modes of instruction and their reasons for choosing one over the other or a combination of both.

F. Flexibility: Investigate how the flexibility offered by blended learning affects the learning process and accommodates other commitments.

G. Engagement and Outcomes: Examine participants' observations of differences in engagement levels and learning outcomes compared to fully online or traditional classroom-based courses.

H. Digital Resources: Assess the role of digital resources, such as online platforms and multimedia materials, in enhancing understanding and retention of course content.

I. Collaboration: Explore the impact of collaborative activities and group work on the learning experience, considering both online and face-to-face settings.

J. Recommendations: Gather participants' recommendations to improve the design and implementation of blended learning models.

1. Data Analysis:

The qualitative data analysis will involve an iterative approach that includes coding, categorizing, and identifying emerging themes. To enhance the analysis process, machine learning and data science techniques, such as natural language processing and sentiment analysis, will be employed. These techniques will enable the identification of patterns, sentiments, and relationships within the qualitative data, thereby yielding deeper insights into the factors that influence the optimal blend of online and face-to-face instruction.

* 1. **Quantitative Phase:**

1. Data Collection:

A survey questionnaire will be administered to a larger sample of students at the University of Malaya, encompassing them from different faculties and courses. The survey will gather data on student engagement levels, learning outcomes, and the perceived effectiveness of different ratios of online and face-to-face instruction. The survey will include questions related to demographics, learning preferences, engagement levels, learning outcomes, online resources, interaction and collaboration, flexibility and convenience, support and guidance, technological readiness, and overall satisfaction.

1. Data Analysis:

Descriptive statistics, correlation analysis, and regression analysis will be employed to investigate the relationships between instructional ratios, student engagement, and learning outcomes. In addition, machine learning algorithms, including classification or clustering models, will be utilized to explore patterns and relationships within the quantitative data. These algorithms will augment the analysis by providing additional insights and assisting in the identification of factors that have a significant impact on student engagement and learning outcomes.

* 1. **Integration & Interpretation:**

The qualitative and quantitative findings, combined with the outcomes derived from machine learning and data science techniques, will be integrated and interpreted to achieve a comprehensive understanding of the optimal blend of online and face-to-face instruction. The qualitative insights will serve to contextualize and enhance the quantitative findings, offering a deeper understanding of the factors that influence the blend and their effects on student engagement and learning outcomes. By incorporating machine learning and data science techniques, hidden patterns and relationships within the data will be uncovered, further enhancing the interpretation of the findings and generating evidence-based insights.

* 1. **Recommendations**

Based on the integrated findings and analysis, evidence-based recommendations will be developed for designing and implementing effective blended learning models. These recommendations will leverage the knowledge gained from qualitative analysis, quantitative analysis, and machine learning techniques to provide practical guidance to educators and policymakers on optimizing the blend of online and face-to-face instruction to enhance student engagement and promote positive learning outcomes. The recommendations will highlight specific strategies, approaches, and instructional ratios that have shown promise in improving engagement and learning outcomes in blended learning environments.

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