

PROBLEM-BASED LEARNING INSTRUCTIONAL DESIGN USING
INTERACTIVE PRESENTATION TECHNOLOGY IN CROSS-CULTURAL
MANAGEMENT COURSE IN BUSINESS SCHOOL,
PRIVATE UNIVERSITY

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of Doctor of Philosophy Program in Digital Technology Management for Education

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Abstract

This study aimed to design and evaluate a Mentimeter-supported Problem-Based Learning (PBL) instructional model to enhance intercultural competence in a large undergraduate Cross-Cultural Management course at a private university. A quasi-experimental design was employed with 186 undergraduate BBA international students, equally assigned to an experimental group ($n = 93$) and a control group ($n = 93$). The experimental group received a five-stage Mentimeter-supported PBL intervention, while the control group was taught through traditional lecture-based instruction. Data were collected through pre-test and post-test intercultural competence measures, student engagement indicators, Mentimeter participation records, and expert validation, and were analyzed using descriptive statistics, independent-samples t-tests, ANCOVA, correlation, and regression analysis. The results showed that the experimental group achieved significantly higher post-test intercultural competence scores than the control group across all measured dimensions (all $p < .001$), and these differences remained significant after controlling for pre-test performance. Participation frequency was substantially higher in the experimental group than in the control group ($M = 58.903$ vs. 8.516) and was strongly

correlated with post-test intercultural competence ($r = .921$, $p < .001$). Regression analysis further showed that participation frequency significantly predicted post-test intercultural competence ($B = 0.029$, $\beta = .921$, $p < .001$, $R^2 = .848$). These findings indicate that the Mentimeter-supported PBL model effectively improved student participation and intercultural competence and provides support for the use of interactive presentation technology as a scalable instructional approach in large multicultural business classrooms.

Keywords: Problem-Based Learning, Intercultural Competence, Student Engagement, Interactive Presentation Technology, Cross-Cultural Management, Mentimeter

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Chapter 1

Introduction

Rationale

Globalisation has made it easier for people to do business, run organisations, and interact with each other across national and cultural lines. Technological progress and the opening up of international trade have made it possible for businesses to work in culturally diverse settings. This has made cross-cultural interaction an important part of modern business. Because of this, people who have graduated from business programs are now expected to not only know how to do technical and managerial tasks, but also how to communicate, work together, and make decisions well across cultures.

Within this context, cross-cultural management has become a core component of undergraduate business education. Courses in this field aim to prepare students to recognize cultural differences, interpret diverse perspectives, and respond appropriately in multicultural business settings. However, the development of intercultural competence is inherently complex, as it involves attitudinal change, perspective-taking, and reflective learning rather than the acquisition of factual knowledge alone. Consequently, traditional lecture-based approaches, which emphasize one-way knowledge transmission, are often insufficient for fostering the interactive and experiential learning processes required for intercultural competence development.

This challenge is particularly evident in large undergraduate classrooms. The present study is situated in a cross-cultural management course offered to BBA students at a private university, where class sizes typically exceed 100 students. Despite the recognized importance of the course, teaching is predominantly conducted through lectures, with limited opportunities for meaningful interaction, discussion, or real-time feedback. In such settings, many students gradually adopt passive learning behaviors. When culturally sensitive topics are introduced, students

often demonstrate low motivation to participate and a reluctance to express personal viewpoints, further constraining opportunities for intercultural learning.

The core instructional objective of cross-cultural management courses is to cultivate students' cultural adaptability, defined as the ability to communicate effectively, adjust flexibly, and cooperate productively in culturally diverse contexts. This competence is essential not only for global business operations but also for students' long-term professional development in an increasingly internationalized labor market. However, in large undergraduate classes, conventional teaching models frequently show limited effectiveness in supporting the development of this competence, largely due to restricted interaction, delayed feedback, and insufficient student engagement.

In response to these instructional challenges, recent advances in interactive presentation technologies have created new possibilities for enhancing student participation and feedback within large classes. Tools such as Mentimeter enable instructors to collect student responses anonymously, visualize collective thinking in real time, and promote inclusive participation. When integrated into student-centered pedagogical approaches such as Problem-Based Learning (PBL), interactive presentation technology has the potential to support key stages of the learning process, including problem exploration, idea generation, and reflection. There is still a dearth of empirical research on the systematic integration of interactive presentation technology into PBL to improve intercultural competency in undergraduate cross-cultural management courses, despite the growing interest in educational technology. Addressing this gap, the present study focuses on the design and evaluation of a Mentimeter-supported PBL instructional model for BBA students enrolled in a cross-cultural management course.

Research Question

What type of Problem-Based Learning (PBL) model can enhance students' learning competence in a cross-cultural management course?

Objectives

1. To study current situation teaching outcome in Cross-Cultural Management course at undergraduate level.
2. To design a Problem-Based Learning (PBL) model using MENTIMETER as an Interactive Presentation Technology in Cross-Cultural Management course
3. To implement the designed model in Cross-Cultural Management course at Private University
4. To evaluate and revised the designed model effectiveness in enhancing cross-cultural competency and learning outcomes

Research Hypothesis

H1: The integration of Mentimeter as an interactive presentation technology is associated with improved student learning outcomes in a cross-cultural management course.

H2: The implementation of a Problem-Based Learning (PBL) approach contributes to the development of students' intercultural competence in a cross-cultural management course.

H3: A Mentimeter-supported PBL model leads to higher levels of classroom participation, including student involvement in discussions, questioning, and interactive activities.

H4: The application of the proposed instructional model in a private university context is positively related to students' learning interest and overall course satisfaction.

Scope of the Research

This study focuses on undergraduate students enrolled in a cross-cultural management course at a private university in Thailand. The participants are BBA international students studying in an international classroom environment characterized by cultural diversity, which reflects the multicultural context commonly found in higher education institutions in Southeast Asia. The course serves

as the instructional setting for examining the design and implementation of a Mentimeter-supported Problem-Based Learning (PBL) model in cross-cultural management education.

The scope of the study is limited to the application of interactive presentation technology within a single cross-cultural management course. The research examines how the integration of Mentimeter into a PBL instructional framework influences students' learning outcomes, intercultural competence, classroom participation, and learning-related perceptions. The study does not aim to generalize findings beyond undergraduate business education or to evaluate the long-term development of intercultural competence after course completion. Instead, it focuses on short-term instructional effects observed during the implementation of the proposed model.

Given the multicultural composition of the international classroom, where students come from diverse national and cultural backgrounds, the study provides an appropriate context for exploring instructional strategies designed to support intercultural learning. However, the findings are bounded by the institutional setting, course design, and participant characteristics, and should therefore be interpreted within these contextual limitations.

Population and the Sample Group

The population of this study consisted of 342 undergraduate BBA international students enrolled in the Cross-Cultural Management course at a private university in Thailand. The sample size for this study was determined using Yamane's (1967) formula, which is widely applied in educational research for finite populations. Based on a total population of 342 undergraduate students enrolled in the course, the required sample size was calculated to be approximately 184.

To enhance the robustness and reliability of the dataset, a slightly larger sample was collected than the minimum required. Therefore, a total of 186 students participated in the study. This approach ensures that the sample size exceeds the minimum requirement, thereby improving the stability and validity of the statistical analysis (Creswell, 2014).

The participants were divided into two groups of equal size: an experimental group and a control group. To ensure a balanced distribution, students were assigned to each group based on their student identification numbers. The experimental group, which received instruction through a Mentimeter-supported PBL model, and a control group, which received traditional lecture-based instruction.

Specifically, a systematic allocation approach was applied, in which students were separated according to their ID sequence, resulting in comparable group sizes ($n = 93$ per group). This method was adopted to maintain group equivalence in terms of sample size while avoiding selection bias associated with purely subjective assignment.

Given the classroom setting and administrative constraints, random assignment was not feasible. Therefore, this study employed a quasi-experimental design with non-random group allocation, which is commonly used in educational research (Creswell, 2014).

Gap and Advantages

In this study, the primary independent variable is the use of interactive presentation technology, operationalized through the frequency of Mentimeter use within the instructional process. The dependent variables include students' learning outcomes, intercultural competence, classroom engagement, and technology-related perceptions. Quantitative data were collected using validated measurement scales, while qualitative data were obtained through classroom observations to support the interpretation of the implementation process and learning outcomes.

Definition of Terms

Instructional Design

In this study, instructional design refers to the systematic process of planning, developing, implementing, and evaluating instructional strategies to support student learning. It involves the structured organization of learning activities, instructional methods, and learning resources to achieve specific educational objectives within the Cross-Cultural Management course.

Interactive Presentation Technology

Interactive presentation technology refers to digital tools that enable real-time interaction between instructors and students during classroom instruction. These technologies allow learners to actively respond to questions, share opinions, and provide immediate feedback through a unified platform. In this study, Mentimeter is used as the interactive presentation technology to facilitate student participation and engagement in large undergraduate classrooms.

Cross cultural management in private university

In this study, a cross-cultural management course in a private university refers to an undergraduate business course that examines the influence of cultural differences on international business practices, including management, marketing, and operations. The course is delivered within an international classroom context and serves as the instructional setting for implementing and evaluating the proposed instructional model.

Intercultural Competence Skill

Intercultural competence refers to an individual's ability to communicate and interact effectively and appropriately with people from different cultural backgrounds. In this study, intercultural competence is understood as a multidimensional construct that includes cultural awareness, openness toward cultural differences, communication skills, and the ability to adapt behavior in intercultural situations.

Problem-Based Learning (PBL) Model

Problem-Based Learning (PBL) is a student-centered instructional approach in which learning begins with an open-ended problem. Students work collaboratively to analyze the problem, identify relevant knowledge, and propose solutions, thereby developing content knowledge as well as skills related to problem-solving, critical thinking, communication, and self-directed learning.

Student Engagement Model

The student engagement model is a pedagogical framework used to describe the degree to which students are actively involved in the learning process. In this

study, student engagement is conceptualized across three dimensions: behavioral engagement, affective engagement, and cognitive engagement, which are considered closely related to learning outcomes and student satisfaction.

Research Framework

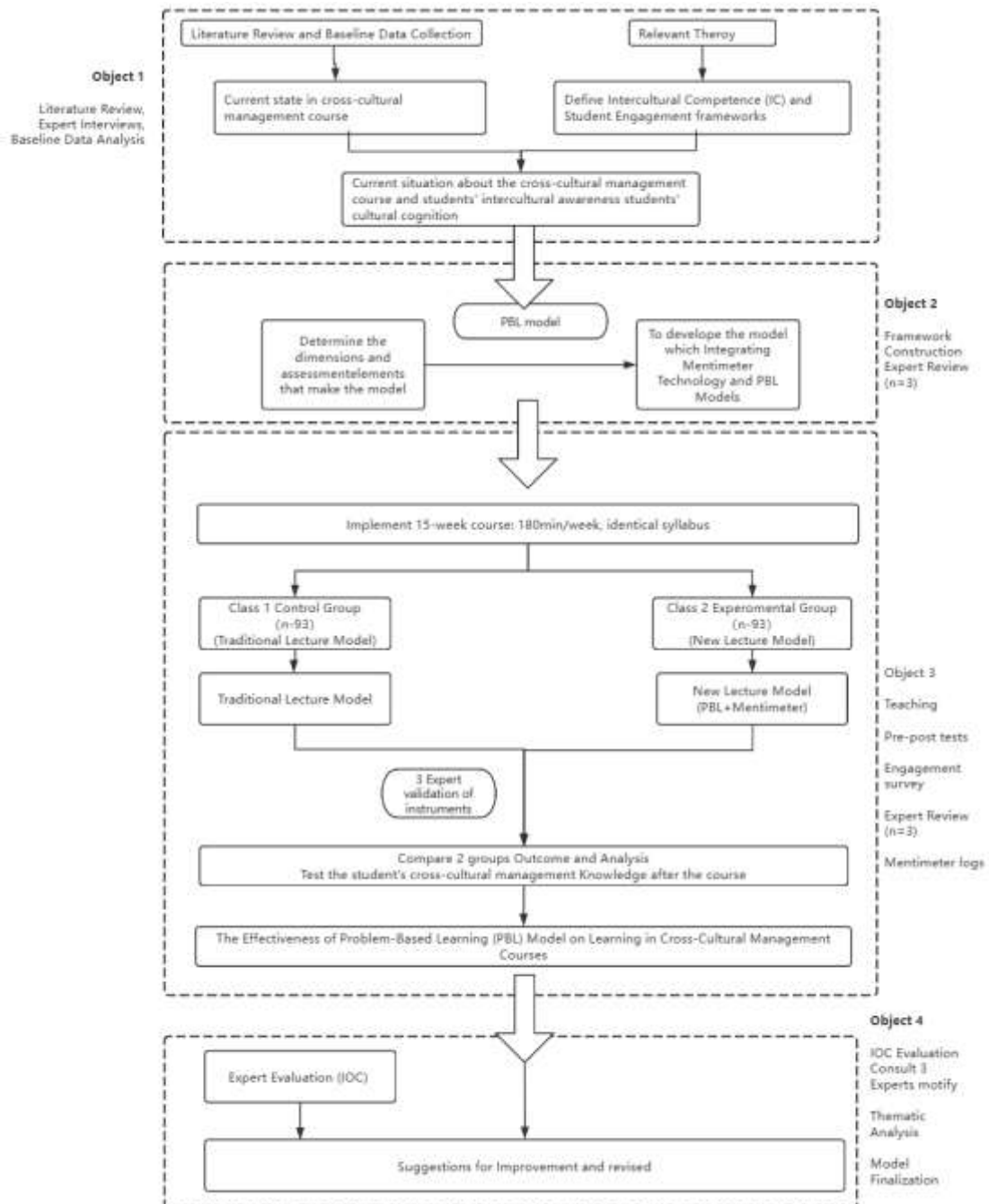


Figure 1.1 Research Framework

Figure 1 illustrates the conceptual relationship among interactive presentation technology, Problem-Based Learning, student engagement, and intercultural competence in the Cross-Cultural Management course. Independent-samples t-test was used to compare the post-test scores between the experimental group and the control group. ANCOVA was used to compare two groups (experimental and control) while controlling for pre-test scores. The calculated minimum sample size based on Yamane's formula was approximately 184; however, 186 students were ultimately included in the study.

Chapter 2

Literature Review

This chapter presents a review of the literature and related research relevant to the study. It aims to establish the theoretical foundation for the development of the proposed instructional model by examining major concepts and previous studies concerning cross-cultural management, intercultural competence, Problem-Based Learning (PBL), interactive presentation technology, and the role of Mentimeter in enhancing learning outcomes. The chapter also identifies relevant research gaps that justify the need for the present study and supports the design and evaluation of the proposed model.

1. Cross-culture management Course
2. Intercultural Competence in Cross-Cultural Management Education
3. Problem-Based Learning (PBL) in Business and Management Education
4. Interactive Presentation Technology and Its Impact on Student Engagement
5. The Role of Mentimeter in Enhancing Learning Outcomes
6. Related Research

Cross-Cultural Management Course

The concept of culture has been widely discussed in the fields of anthropology and management studies. Hofstede (1980) defined culture as “the collective programming of the mind which distinguishes the members of one group or category of people from another,” emphasizing shared values and mental patterns within social groups. Similarly, Geertz (1973) described culture as a system of inherited meanings expressed through symbols, which individuals use to interpret and communicate their understanding of the world. These perspectives highlight culture as a fundamental factor shaping human behavior and social interaction.

Within organizational contexts, cultural differences often influence communication styles, work practices, and decision-making processes. As

organizations increasingly operate across national and cultural boundaries, interactions among individuals from diverse cultural backgrounds have become more frequent. Research in cross-cultural management therefore focuses on understanding how cultural differences affect organizational behavior and how such differences can be managed effectively (Barmeyer et al., 2019).

Definition of Cross-Cultural Management

Cross-cultural management refers to the study and practice of managing interactions among individuals from different cultural backgrounds within organizational settings. It examines how cultural values, beliefs, and behavioral norms influence communication, collaboration, leadership, and decision-making in international and multicultural environments (Barmeyer et al., 2019). The primary aim of cross-cultural management is to enhance mutual understanding and improve organizational effectiveness in culturally diverse contexts.

Importance of Cross-Cultural Management

The importance of cross-cultural management has been widely recognized in the context of globalization. Previous studies suggest that inadequate understanding of cultural differences may lead to misunderstandings, conflict, and reduced team performance in multicultural organizations. Conversely, effective cross-cultural management has been associated with improved communication, higher levels of collaboration, and more informed decision-making in international business operations. From an educational perspective, developing cross-cultural management competence is considered essential for preparing business students to work in culturally diverse professional environments.

Content of Cross-Cultural Management Courses

Cross-cultural management courses in business education typically cover topics such as cultural values, communication styles, negotiation processes, leadership across cultures, and conflict management. Frameworks such as Hofstede's cultural dimensions are commonly used to help students analyze and compare cultural differences across societies. While traditional lecture-based instruction can provide foundational knowledge, previous research has suggested that experiential

and interactive learning approaches may be more effective in supporting students' understanding of complex cultural issues. As a result, higher education institutions have increasingly explored instructional approaches that encourage active learning and student engagement in cross-cultural management education.

Intercultural Competence in Cross-Cultural Management Education

Conceptual Foundations of Intercultural Competence

The concept of intercultural competence has evolved alongside the increasing intensity of global interaction in business, education, and organizational contexts. Although terms such as cross-cultural, intercultural, multicultural, and sociocultural are often used interchangeably in everyday discourse, academic research emphasizes that these concepts are not identical and reflect different analytical perspectives.

Early discussions of culture laid the theoretical foundation for later interpretations of intercultural competence. Hofstede (1980) defined culture as “the collective programming of the mind which distinguishes the members of one group or category of people from another,” highlighting the patterned nature of values, beliefs, and behaviors shared by members of a cultural group. Similarly, Geertz (1973) conceptualized culture as a system of inherited meanings expressed through symbols, through which individuals interpret their experiences and guide their actions. These definitions underscore that culture is neither static nor superficial; rather, it shapes cognition, communication, and social interaction at a deep level.

Within this theoretical background, cross-cultural studies traditionally focus on comparing cultural differences across nations or groups, often emphasizing contrasts in values, communication styles, or organizational practices. In contrast, the term intercultural places greater emphasis on interaction and process, referring to what happens when individuals from different cultural backgrounds engage with one another in real contexts. As a result, intercultural competence is not limited to knowledge of cultural differences, but involves the ability to navigate, interpret, and respond effectively within culturally diverse interactions.

In educational and management research, intercultural competence has increasingly been understood as a multidimensional construct that integrates cognitive, affective, and behavioral elements. Rather than being viewed as a fixed personal trait, it is commonly regarded as a dynamic capability that develops over time through learning, reflection, and experience. This shift reflects a broader movement in educational theory away from purely knowledge-based outcomes toward competence-oriented learning, where students are expected not only to understand concepts but also to apply them in complex, real-world situations.

In the context of cross-cultural management education, intercultural competence serves as a core learning outcome. Management students are expected to operate in environments characterized by cultural diversity, uncertainty, and ambiguity. Consequently, the ability to communicate appropriately, interpret culturally embedded behavior, and adapt one's responses becomes essential for effective leadership and collaboration. Scholars have therefore argued that intercultural competence should be cultivated intentionally through curriculum design, pedagogical strategies, and learning activities rather than assumed to emerge automatically through exposure to cultural diversity.

Importantly, contemporary interpretations of intercultural competence emphasize its developmental nature. Early cultural exposure alone does not guarantee competence; instead, structured learning experiences, guided interaction, and reflective practice are required to support meaningful development. This perspective has significant implications for instructional design in higher education, particularly in business and management programs with culturally diverse student populations. It suggests that teaching approaches must move beyond traditional lecture-based methods and incorporate pedagogies that actively engage students in intercultural problem-solving and interaction.

In summary, the conceptual foundations of intercultural competence rest on three key assumptions: first, that culture fundamentally shapes human interaction; second, that effective intercultural engagement requires more than factual cultural knowledge; and third, that intercultural competence can be intentionally developed

through appropriate educational interventions. These assumptions provide the theoretical basis for examining how specific teaching models, such as Problem-Based Learning supported by interactive presentation technologies, may contribute to the development of intercultural competence in cross-cultural management education.

Major Definitions and Theoretical Models of Intercultural Competence

As intercultural competence became a central concept in education and management studies, scholars from different disciplinary backgrounds proposed a variety of definitions and theoretical models. Although these models differ in structure and emphasis, they share a common assumption: effective interaction across cultures requires more than language proficiency or cultural knowledge alone.

One of the earliest systematic attempts to conceptualize intercultural competence can be traced to Ruben (1976), who emphasized behavioral and communicative effectiveness in intercultural encounters. From this perspective, intercultural competence is reflected in observable interactional behaviors, such as empathy, respect, flexibility, and the ability to manage ambiguity. This behavioral orientation laid the groundwork for later models that treat intercultural competence as a set of learnable skills rather than an innate personal attribute.

Building on this foundation, Guilherme (2000) broadened the scope of intercultural competence by highlighting its ethical and critical dimensions. She argued that intercultural competence involves not only the ability to function effectively in intercultural situations, but also the capacity to critically reflect on one's own cultural assumptions and power relations embedded in intercultural interactions. This view introduced an important reflective element into the discourse, emphasizing that intercultural competence is closely linked to personal awareness and moral responsibility.

A widely cited and influential framework was proposed by Byram (1997) through the concept of Intercultural Communicative Competence (ICC). Byram's model extends beyond linguistic competence and identifies five interrelated components: attitudes (curiosity and openness), knowledge (of social groups and cultural practices), skills of interpreting and relating, skills of discovery and

interaction, and critical cultural awareness. This model has been particularly influential in educational contexts because it provides a structured yet flexible framework for curriculum design and assessment. It also explicitly recognizes that intercultural competence involves both internal dispositions and external communicative practices.

Fantini (2000) further refined this perspective by synthesizing intercultural competence into four core dimensions: knowledge, attitudes, skills, and awareness. Fantini emphasized that intercultural competence develops through ongoing interaction and reflection in intercultural contexts, rather than through formal instruction alone. His model highlights the dynamic and cyclical nature of competence development, where experience, reflection, and behavioral adjustment continuously inform one another.

Among contemporary frameworks, the model proposed by Deardorff (2006) has gained particularly broad recognition across disciplines. Based on a Delphi study involving intercultural experts, Deardorff defined intercultural competence as the ability to communicate effectively and appropriately in intercultural situations. Her Process Model of Intercultural Competence conceptualizes competence as an iterative process rather than a linear outcome. According to this model, intercultural competence develops through the interaction of attitudes (respect, openness), knowledge and comprehension, and skills, which lead to internal outcomes such as adaptability and empathy, and eventually to external outcomes reflected in effective and appropriate behavior. This process-oriented approach has been widely adopted in higher education research due to its emphasis on development, reflection, and measurable learning outcomes.

In management education, the relevance of intercultural competence theories has been further strengthened by the integration of cultural intelligence (CQ). Earley and Ang (2003) conceptualized cultural intelligence as a multidimensional capability consisting of cognitive, metacognitive, motivational, and behavioral components. While intercultural competence and cultural intelligence are not identical constructs, research has shown a strong conceptual and empirical

overlap between the two. Cultural intelligence provides a useful analytical lens for examining how individuals interpret cultural cues, regulate their responses, and sustain motivation in intercultural interactions. Studies such as Eisenberg et al. (2013) have demonstrated that cross-cultural management education can positively influence students' cultural intelligence, thereby supporting their intercultural competence development.

Taken together, these theoretical models suggest that intercultural competence is a complex, multidimensional, and developmental construct. It involves knowledge, attitudes, skills, motivation, and reflective capacity, all of which interact over time through experience and learning. For cross-cultural management education, these models provide a robust theoretical foundation for designing instructional interventions aimed at enhancing students' ability to function effectively in culturally diverse business environments.

Developmental Perspectives of Intercultural Competence

Beyond structural definitions and component-based models, many scholars emphasize that intercultural competence should be understood as a developmental process rather than a static outcome. This perspective highlights that individuals do not become interculturally competent simply by acquiring cultural knowledge; instead, competence emerges gradually through experience, reflection, and adaptation in intercultural contexts.

One of the earliest developmental interpretations of intercultural adaptation was proposed by Oberg (1960) through the concept of culture shock. Oberg described intercultural adjustment as a four-stage process consisting of the honeymoon, crisis, recovery, and adjustment phases. Individuals initially experience excitement and curiosity when encountering a new culture, followed by frustration and disorientation as cultural differences become more salient. Over time, through learning and coping strategies, individuals gradually recover and adapt to the new cultural environment. Although originally developed in the context of expatriate adjustment, this model provided an important foundation for understanding intercultural learning as a process involving emotional and psychological change.

Adler (1975) expanded this perspective by framing intercultural adaptation as a transformative learning experience. Rather than viewing adaptation merely as stress reduction, Adler emphasized that individuals undergoing intercultural experiences reconstruct their identity and worldview. According to this view, intercultural competence involves increased self-awareness, greater tolerance of ambiguity, and the ability to integrate multiple cultural perspectives. This interpretation underscores the idea that intercultural learning is not linear but involves periods of tension, reflection, and personal growth.

A more structured developmental framework was introduced by Bennett through the Developmental Model of Intercultural Sensitivity (DMIS). Bennett's model conceptualizes intercultural development as a progression from ethnocentric stages to ethnorelative stages. At the ethnocentric level, individuals interpret cultural differences primarily through their own cultural framework, often minimizing or evaluating differences negatively. As development progresses, individuals begin to recognize, accept, and adapt to cultural differences, eventually reaching a stage where they can shift perspectives and behaviors according to cultural context. The DMIS has been widely applied in educational settings due to its clear developmental logic and its emphasis on perceptual and cognitive change.

In management education, developmental models of intercultural competence are particularly relevant because students often enter cross-cultural courses with limited intercultural experience. These models suggest that exposure to cultural content alone is insufficient to promote development. Instead, learning activities must be intentionally designed to challenge students' existing assumptions, encourage reflection, and provide opportunities for meaningful intercultural interaction. Without such pedagogical support, students may remain at lower developmental stages despite being in culturally diverse classrooms.

Complementing these models, Earley and Ang's (2003) cultural intelligence framework also reflects a developmental orientation. The four dimensions of cultural intelligence—cognitive, metacognitive, motivational, and behavioral—are not acquired simultaneously but develop through repeated intercultural experiences and

self-regulation. From this perspective, intercultural competence is strengthened when learners are motivated to engage with cultural differences, able to reflect on their intercultural experiences, and capable of adjusting their behavior accordingly.

Collectively, developmental perspectives highlight three important implications for cross-cultural management education. First, intercultural competence develops over time and requires sustained engagement rather than isolated instructional activities. Second, emotional and reflective dimensions are as important as cognitive learning in the development process. Third, instructional design plays a critical role in structuring learning experiences that support progression from lower to higher levels of intercultural competence.

These insights provide a strong theoretical justification for adopting student-centered and experience-based pedagogies in cross-cultural management courses. Teaching approaches such as Problem-Based Learning, when supported by interactive presentation technologies, can create learning environments that promote reflection, interaction, and gradual competence development. As a result, developmental theories of intercultural competence form an essential foundation for the instructional framework examined in this study.

Intercultural Competence in Cross-Cultural Management Education

While intercultural competence has been extensively examined in fields such as intercultural communication and language education, its role within cross-cultural management education possesses distinct characteristics and pedagogical demands. In management contexts, intercultural competence is not only concerned with effective communication but also with decision-making, leadership, negotiation, and collaboration in culturally diverse organizational environments.

Cross-cultural management education aims to prepare students to function effectively in global business settings where cultural diversity is an inherent feature rather than an exception. Students are expected to interpret culturally embedded managerial behaviors, respond appropriately to unfamiliar norms, and coordinate actions across cultural boundaries. As a result, intercultural competence in this

context must integrate cognitive understanding of cultural frameworks with practical managerial skills and adaptive behavior.

Compared with language-focused intercultural education, cross-cultural management courses place greater emphasis on applied competence. Management students are required to analyze complex business scenarios, evaluate culturally influenced strategies, and propose solutions that are both culturally sensitive and operationally feasible. This requires higher-order cognitive skills such as critical thinking, problem-solving, and contextual judgment. Therefore, intercultural competence in management education extends beyond interpersonal communication and includes strategic awareness and organizational sensitivity.

Previous studies have suggested that traditional lecture-based approaches are limited in fostering these competencies. Although lectures are effective for transmitting theoretical knowledge, they often fail to provide opportunities for students to experience cultural complexity or to practice adaptive responses in real time. In large classroom settings, this limitation becomes more pronounced, as student participation tends to be uneven and interaction is constrained by time and class size. Consequently, students may acquire conceptual knowledge of cultural differences without developing the ability to apply this knowledge in practice.

To address these challenges, scholars have increasingly advocated experiential and student-centered pedagogical approaches in cross-cultural management education. Approaches such as case-based learning, simulations, role-playing, and Problem-Based Learning (PBL) have been shown to encourage active engagement and reflective learning. These methods allow students to confront culturally ambiguous situations, articulate their assumptions, and learn from peer interaction. Through repeated exposure to such learning experiences, students gradually develop greater cultural awareness, flexibility, and confidence in intercultural contexts.

Furthermore, the multicultural composition of many business school classrooms presents both opportunities and challenges. On the one hand, culturally diverse classrooms offer a rich learning environment where students can learn

directly from peers with different cultural backgrounds. On the other hand, without appropriate instructional support, cultural diversity alone does not automatically lead to intercultural learning. Students may remain within culturally homogeneous interaction patterns or avoid sensitive discussions. This underscores the importance of instructional design in structuring meaningful intercultural interaction and ensuring inclusive participation.

In this regard, the integration of interactive learning technologies has gained increasing attention. Interactive presentation technologies can facilitate real-time feedback, anonymous participation, and collective reflection, which are particularly valuable in large and culturally diverse classes. When combined with pedagogical models such as PBL, these technologies can support collaborative problem-solving, encourage diverse viewpoints, and lower participation barriers related to language proficiency or cultural norms.

In summary, intercultural competence in cross-cultural management education is a multifaceted learning outcome that requires intentional pedagogical design. It involves the integration of knowledge, skills, attitudes, and adaptive behavior within authentic managerial contexts. The limitations of traditional teaching methods and the complexity of large, multicultural classrooms highlight the need for innovative instructional approaches. This provides a strong rationale for exploring the effectiveness of a Mentimeter-supported PBL model in enhancing intercultural competence among business students.

Measurement and Assessment of Intercultural Competence

As intercultural competence has been conceptualized as a multidimensional and developmental construct, its measurement and assessment present considerable methodological challenges. Unlike purely cognitive learning outcomes, intercultural competence involves internal attitudes, perceptions, and reflective processes that are not always directly observable. Consequently, researchers have adopted a range of quantitative and qualitative approaches to capture different aspects of intercultural competence development.

Early attempts to assess intercultural competence focused primarily on behavioral outcomes and communication effectiveness. Instruments developed during this period often relied on self-report measures or observer evaluations to assess individuals' ability to interact appropriately in intercultural situations. While such approaches provided valuable insights into communicative behavior, they were limited in capturing internal dimensions such as cultural awareness, motivation, and cognitive flexibility.

In response to these limitations, more comprehensive assessment frameworks emerged that align with multidimensional theoretical models. For example, Byram's (1997) model of intercultural communicative competence has been operationalized through assessment tools that examine attitudes, knowledge, skills, and critical cultural awareness. Similarly, Deardorff's (2006) process-oriented model has informed the development of instruments that distinguish between internal outcomes (e.g., adaptability, empathy) and external outcomes (e.g., effective and appropriate behavior). These frameworks emphasize that assessment should reflect both learning processes and observable performance.

Within cross-cultural management education, cultural intelligence (CQ) has become a widely used construct for assessing intercultural capability. The Cultural Intelligence Scale developed by Earley and Ang (2003) measures four dimensions: cognitive, metacognitive, motivational, and behavioral cultural intelligence. Empirical studies have demonstrated that CQ is strongly associated with intercultural effectiveness in organizational and educational settings, making it a useful proxy for evaluating intercultural competence in management-focused research.

Despite the availability of standardized instruments, reliance on a single measurement method is increasingly viewed as insufficient. Scholars have argued that intercultural competence is best assessed through a combination of quantitative and qualitative methods. Quantitative surveys allow researchers to capture changes in perceived competence across large samples, while qualitative methods such as interviews, reflective journals, and classroom observations provide deeper insights into students' learning experiences and behavioral adaptation. This mixed-methods

approach enhances the validity and reliability of assessment by triangulating data from multiple sources.

In educational intervention studies, pre-test and post-test designs are commonly employed to examine changes in intercultural competence over time. Such designs are particularly relevant for evaluating instructional models, as they allow researchers to assess the impact of specific pedagogical interventions on student learning outcomes. In addition, process-oriented data, such as participation frequency and engagement indicators collected through interactive technologies, can offer supplementary evidence of intercultural learning dynamics.

However, several challenges remain in the assessment of intercultural competence. Self-report instruments may be influenced by social desirability bias, and students' self-perceptions may not always align with their actual behavior in intercultural contexts. Furthermore, short-term assessments may fail to capture the long-term development of intercultural competence, which often unfolds gradually. These limitations highlight the importance of carefully selecting assessment tools that align with research objectives and contextual constraints.

In the present study, the assessment of intercultural competence is informed by established theoretical models and adopts a multidimensional approach. By integrating survey-based measures with classroom observation and learning analytics derived from interactive presentation technology, this study seeks to capture both the outcomes and the processes of intercultural competence development. This approach provides a more comprehensive evaluation of how a Mentimeter-supported Problem-Based Learning model influences intercultural competence in cross-cultural management education.

Table 2.1 The Dimension of Intercultural Competence

Dimension	Key Indicators	Researcher
Knowledge	Understanding of cultural norms, values, and business practices across cultures	Byram (1997), Deardorff (2006)
Attitude	Openness Respect for Cultural Diversity Curiosity and Willingness to Learn	Fantini (2000) Deardorff (2006)
Skills	Intercultural Communication Skills Adaptability & Flexibility Conflict Resolution Skills	Byram (1997) Earley & Ang (2003)
Motivation	Willingness and confidence to participate in intercultural interactions	Fantini (2000), Deardorff (2006)
Cultural Self-Awareness	Awareness of one's own cultural assumptions and biases	Byram (1997); Deardorff (2006)
Metacognition	Ability to reflect on intercultural experiences and adjust strategies	Earley & Ang (2003)
Critical Reflection	Evaluation of cultural issues within social and managerial contexts	Guilherme (2000)
Cognitive CQ	Knowledge about cultural systems and practices	Earley & Ang (2003)
Motivational CQ	Interest and confidence in functioning in intercultural contexts	Earley & Ang (2003)
Behavioral CQ	Capability to adapt verbal and non-verbal behavior	Earley & Ang (2003)

Based on the reviewed theoretical models, this study conceptualizes intercultural competence as a multidimensional construct consisting of knowledge, attitudes, skills, and motivation. Cognitive and reflective processes are treated as developmental mechanisms, while cultural intelligence is considered a

complementary construct supporting the interpretation of intercultural competence development.

Problem-Based Learning (PBL) in Business Management Education

Problem-Based Learning (PBL) was initially formalized in medical education as an instructional approach designed to bridge the gap between theoretical knowledge and professional practice. Since its early application in medical training, PBL has been progressively adopted across a range of disciplines, including economics, business, and management education (Gijssels, 1995). This expansion reflects a broader shift in higher education toward learning models that emphasize active engagement, problem-solving, and the application of knowledge in complex, real-world contexts.

The pedagogical foundations of PBL can be traced to earlier educational philosophies that emphasize experiential learning and reflective inquiry. Dewey (1938) argued that meaningful learning occurs through experience and continuous reflection, rather than through passive reception of information. Similarly, Kilpatrick's project method highlighted the educational value of purposeful activity and learner autonomy. Although these early theories did not explicitly propose PBL as a structured instructional model, they provide a philosophical basis for later problem-centered learning approaches.

In contemporary PBL models, learning is organized around authentic and ill-structured problems that resemble professional situations. As illustrated in the PBL learning cycle (Hmelo-Silver, 2004), students are first confronted with a problem scenario that requires interpretation and analysis. Through collaborative discussion, learners identify relevant information, recognize gaps in their existing knowledge, and formulate learning objectives. This process encourages students to take responsibility for their own learning while engaging in collective meaning-making. The role of the instructor shifts from content transmitter to learning facilitator, guiding inquiry through questioning and feedback rather than direct instruction.

Research has consistently shown that PBL supports the development of higher-order skills that are essential in business and management contexts. Erdogan

(2015) found that PBL has a positive impact on students' problem-solving abilities, learning attitudes, and professional skill application. Similarly, Surif et al. (2013) reported that PBL enhances students' motivation, communication skills, collaboration, and self-directed learning when compared with traditional lecture-based approaches. These competencies are closely aligned with the demands placed on graduates in contemporary business environments, where uncertainty, complexity, and collaboration are common.

In business and management education, PBL is particularly relevant due to its alignment with competency-based learning objectives. Savery (2015) suggests that PBL is effective in developing "T-shaped professionals," who combine deep disciplinary knowledge with broad interpersonal and problem-solving capabilities. Such skill profiles are increasingly valued in globalized organizations, where managers must integrate technical expertise with social, cultural, and strategic awareness.

Importantly, the emphasis of PBL on collaboration, reflection, and problem-solving provides a strong foundation for intercultural competence development. By engaging students in group-based problem-solving activities, PBL creates opportunities for interaction among learners with diverse cultural backgrounds. These interactions, when appropriately structured, can encourage perspective-taking, negotiation of meaning, and adaptive communication—key elements of intercultural competence. However, the effectiveness of PBL in multicultural classrooms depends on how learning activities are designed and facilitated, particularly in large class settings.

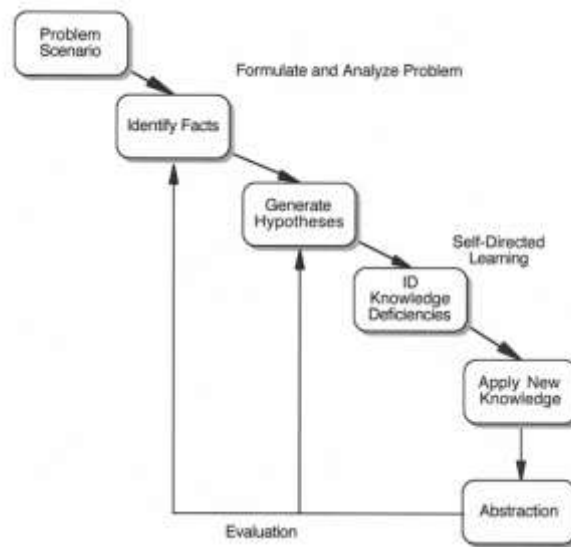


Figure 2.2 The Problem-Based Learning Cycle (Hmelo-Silver, 2004)

PBL in Business and Management Curricula

The integration of Problem-Based Learning (PBL) into business and management curricula varies in structure, intensity, and pedagogical focus. In general, PBL implementation in business education can be categorized into three broad approaches: full PBL curricula, hybrid PBL models, and case-enhanced PBL. These approaches differ primarily in the extent to which problem-solving activities replace or complement traditional lecture-based instruction.

In full PBL models, entire courses or program modules are organized around iterative problem-solving cycles. Students engage continuously with complex, authentic business problems, while instructors function primarily as facilitators of learning. Hybrid PBL models, by contrast, combine conventional lectures with problem-based activities, allowing theoretical input to coexist with student-centered inquiry (Dochy et al., 2003). A third approach, often adopted in business schools, integrates PBL principles into case-based teaching by incorporating iterative inquiry, self-directed learning, and reflection into case analysis (Hallinger & Lu, 2011).

Empirical studies indicate that PBL is particularly effective in developing competencies that are highly valued in business and management contexts. Research

has shown that students engaged in PBL demonstrate significant improvements in critical thinking, as they are required to analyze ambiguous information, synthesize interdisciplinary knowledge, and justify decision-making processes (Walker et al., 2015). Team-based PBL activities also enhance collaboration skills, including communication, leadership, and conflict resolution, as students work collectively toward shared solutions (Lohman & Finkelstein, 2000). Furthermore, graduates from PBL-oriented programs often report greater confidence in addressing workplace challenges compared to peers educated through lecture-dominated curricula (Bédard et al., 2012).

Meta-analytic evidence further supports the pedagogical value of PBL in business education. Strobel and Van Barneveld (2009) found that PBL is more effective than traditional instruction in promoting long-term knowledge retention and skill transfer, although short-term content acquisition may be less pronounced. This finding suggests that PBL is particularly suitable for educational contexts where the development of transferable competencies is prioritized over rote memorization, a consideration that is highly relevant in management education.

PBL and Intercultural Competence Development

The increasing globalization of business activities has heightened the importance of intercultural competence, defined as the ability to communicate and collaborate effectively across cultural boundaries (Byram, 1997). The core characteristics of PBL—collaborative learning, exposure to multiple perspectives, and engagement with complex problems—align closely with the learning conditions required for intercultural competence development.

Within multicultural student groups, PBL creates structured opportunities for learners to encounter diverse communication styles, value systems, and decision-making approaches. Through sustained interaction and joint problem-solving, students are encouraged to develop cultural sensitivity and empathy, key components of intercultural competence (Deardorff, 2006). In addition, PBL tasks often involve negotiation and consensus-building, particularly in simulations of cross-cultural business scenarios such as mergers, market entry strategies, or international

partnerships. These activities require students to recognize and reconcile differing cultural assumptions, thereby strengthening their intercultural negotiation skills (Thomas & Peterson, 2017).

Empirical research in international business programs suggests that PBL contributes positively to the development of cultural intelligence, especially metacognitive and behavioral dimensions. Students become more aware of their own cultural biases and more capable of adjusting their behavior in response to culturally diverse contexts (Livermore, 2011). However, the effectiveness of PBL in fostering intercultural competence is not automatic. Studies emphasize the importance of intentional instructional design, including culturally diverse group composition and structured reflection activities, to ensure that intercultural learning is meaningfully supported (Jackson, 2019).

Traditionally, intercultural skill development in business education has relied heavily on case-based teaching and experiential learning approaches. Case studies enable students to analyze real-world intercultural dilemmas within a controlled classroom environment. Nevertheless, some scholars argue that cases may be culturally bounded, reflecting assumptions embedded in their original contexts, which can limit their applicability in multicultural classrooms (Ashamalla, 1999). Existing case teaching guidelines often provide limited guidance on facilitating intercultural discussion or addressing cultural dynamics among diverse student groups (Mauffette-Leenders et al., 1997; Bramorski, 2002).

Experiential learning approaches, such as international exchanges, overseas internships, and study tours, are widely recognized as effective means of developing global managerial competence (Gregersen et al., 1998). While such experiences can be transformative (Sherman, 1999), they are typically accessible to only a small proportion of students and are constrained by financial, institutional, and logistical factors. As a result, there is a growing need to design classroom-based learning activities that simulate intercultural complexity and provide experiential learning opportunities at scale.

In this context, PBL offers a pedagogical bridge between case teaching and experiential learning. By combining theoretical analysis with collaborative problem-solving and reflection, PBL enables students to engage with intercultural challenges within the classroom. This makes PBL a particularly promising approach for cross-cultural management education, especially in large and culturally diverse undergraduate or postgraduate programs.

Advantages of PBL in Cross-Cultural Management

(1) PBL enhances cultural understanding and intercultural sensitivity through contextualized problem engagement

One of the most significant advantages of Problem-Based Learning (PBL) in cross-cultural management education lies in its capacity to enhance students' cultural understanding and intercultural sensitivity by situating learning within authentic and context-rich problem scenarios. Unlike traditional lecture-based approaches that often present cultural theories in an abstract and decontextualized manner, PBL requires students to engage directly with complex managerial problems embedded in specific cultural, institutional, and social contexts. These problems may include managing culturally diverse teams, negotiating with foreign partners, or entering culturally unfamiliar markets, all of which demand an awareness of cultural values, communication norms, and behavioral expectations.

From a theoretical perspective, intercultural sensitivity is a core component of intercultural competence, as emphasized in the models proposed by Byram (1997) and Deardorff (2006). These frameworks stress that effective intercultural interaction depends not only on cognitive knowledge of cultural differences but also on the ability to recognize, interpret, and respond appropriately to culturally shaped behaviors. PBL supports this developmental process by exposing students to situations where cultural assumptions are challenged and must be explicitly examined. As students analyze problem scenarios, they are encouraged to identify how cultural dimensions—such as power distance, individualism–collectivism, or uncertainty avoidance (Hofstede, 1980)—shape managerial decisions and stakeholder expectations.

Empirical research supports the effectiveness of PBL in fostering cultural understanding. For example, Smith et al. (2019) found that students enrolled in a global strategy course using PBL demonstrated a deeper ability to interpret cultural variables in multinational business cases compared to students taught through traditional lectures. Rather than merely recalling cultural frameworks, students were able to apply these concepts flexibly when evaluating culturally sensitive business strategies. This suggests that PBL facilitates not only cultural awareness but also intercultural sensitivity, defined as the ability to perceive and respond to cultural differences in nuanced and respectful ways.

(2) PBL promotes collaborative learning and intercultural interaction among diverse learners

Another major advantage of PBL in cross-cultural management education is its emphasis on collaborative learning, which creates structured opportunities for intercultural interaction among students from diverse cultural backgrounds. PBL typically relies on small-group work, where students jointly define problems, share perspectives, negotiate meanings, and develop solutions. In cross-cultural management courses—particularly those enrolling international or culturally heterogeneous student cohorts—this collaborative format mirrors the realities of multicultural workplaces.

Collaborative learning within PBL aligns closely with sociocultural learning theories, which posit that knowledge is constructed through social interaction and shared meaning-making (Vygotsky, 1978). In multicultural PBL groups, students bring culturally shaped communication styles, values, and problem-solving approaches into the learning process. Through sustained interaction, they become more aware of cultural differences in participation patterns, leadership expectations, and decision-making norms. Such awareness is a foundational step in developing intercultural competence and cultural intelligence (CQ).

Studies in business and management education indicate that PBL-based collaboration enhances key interpersonal competencies. Lohman and Finkelstein (2000) reported that students participating in team-based PBL activities demonstrated

improved communication skills, conflict management abilities, and leadership awareness. These skills are particularly relevant in cross-cultural contexts, where misunderstandings and value conflicts are more likely to arise. By working through disagreements and coordinating tasks within culturally diverse groups, students gain practical experience in managing intercultural dynamics rather than merely learning about them theoretically.

Moreover, PBL encourages peer learning, allowing students to learn from cultural difference rather than simply about it. Exposure to alternative viewpoints can challenge ethnocentric assumptions and foster greater openness and respect for diversity, both of which are key attitudinal components of intercultural competence (Fantini, 2000; Deardorff, 2006).

(3) PBL bridges theory and practice by developing transferable managerial skills in cross-cultural contexts

A further advantage of PBL in cross-cultural management education is its ability to bridge the gap between theoretical knowledge and practical application. Cross-cultural management theories—such as cultural dimensions, communication frameworks, or cultural intelligence models—are often criticized for being overly abstract or difficult to apply in real managerial situations. PBL addresses this limitation by requiring students to use theoretical concepts as analytical tools for solving realistic business problems.

In PBL settings, students are not passive recipients of knowledge but active problem solvers who must determine which theories are relevant, how they should be interpreted, and how they can inform decision-making. This process supports the development of higher-order cognitive skills, including critical thinking, integrative reasoning, and reflective judgment. Walker et al. (2015) demonstrated that students engaged in PBL showed significant improvement in their ability to analyze complex information and synthesize interdisciplinary solutions—competencies that are essential for cross-cultural management.

From a professional development perspective, PBL contributes to the formation of practical managerial competencies that extend beyond the classroom.

Bédard et al. (2012) found that graduates from PBL-oriented business programs reported higher confidence in handling ambiguous workplace challenges and adapting to unfamiliar organizational environments. In cross-cultural contexts, where managers must operate under uncertainty and negotiate cultural differences, such confidence and adaptability are particularly valuable.

Importantly, PBL supports the development of “learning-to-learn” capabilities, a concept rooted in Dewey’s (1938) view of education as an iterative process of inquiry and reflection. By repeatedly engaging with unfamiliar problems, students cultivate the ability to acquire new cultural knowledge autonomously and adjust their strategies accordingly—an essential skill for lifelong learning in global business environments.

(4) PBL increases student engagement and intrinsic motivation in cross-cultural management learning

Student engagement and motivation represent another key advantage of PBL in cross-cultural management education. Traditional lecture-based approaches often struggle to maintain student interest, particularly when dealing with abstract cultural theories or generalized models. In contrast, PBL situates learning within meaningful and relevant problem contexts, which can enhance students’ intrinsic motivation and sense of ownership over the learning process.

Strobel and Van Barneveld’s (2009) meta-analysis found that while PBL may not always produce superior short-term content recall compared to traditional instruction, it consistently outperforms lecture-based methods in terms of long-term retention and skill transfer. This finding is particularly relevant for cross-cultural management education, where the goal is not memorization but the ability to apply knowledge flexibly in dynamic and culturally diverse situations.

Engagement is further strengthened when students perceive PBL tasks as relevant to their future professional roles. Business students, especially at the MBA or upper undergraduate level, are often motivated by opportunities to work on problems that resemble real managerial challenges. By addressing authentic cross-

cultural issues, PBL can enhance students' perceived value of the course and their commitment to active participation.

Overall, PBL offers multiple advantages for cross-cultural management education, including enhanced cultural sensitivity, improved collaborative skills, stronger theory–practice integration, and increased student engagement. However, these advantages are not automatic; they depend heavily on instructional design, facilitation quality, and cultural context. The following section therefore examines the challenges and limitations of implementing PBL in cross-cultural management courses, particularly in non-Western and high power distance educational settings.

Challenges Associated with PBL in Cross-Cultural Management

Despite universal consensus on the advantages of Problem-Based Learning (PBL), its implementation in cross-cultural management education presents several pedagogical, cultural, and institutional challenges. These issues are particularly evident in multicultural classrooms and non-Western educational contexts, when learning norms, power dynamics, and student expectations may significantly differ from the core principles of PBL methodology. An exhaustive examination of these limitations is essential to avert overly idealised interpretations of PBL and to inform the creation of more contextually pertinent instructional frameworks.

Cultural constraints on student participation and interaction

A prevalent issue in project-based learning within cross-cultural management education is the unequal participation of individuals due to cultural conventions. Project-Based Learning necessitates student engagement, open dialogue, and a readiness to interrogate both peers and instructors. In cultures marked by elevated power distance and collectivism, students may refrain from expressing dissident opinions, challenging group consensus, or assuming leadership roles in collaborative learning environments (Hofstede, 1980; Hallinger & Lu, 2011).

This issue is frequently exacerbated in cross-cultural management courses due to the diverse cultural backgrounds of the students. Students from cultures characterised by low power distance may assume leadership in

conversations, whereas those from cultures with high power distance or strong uncertainty avoidance may exhibit passivity. Such inequalities can undermine the collaborative essence of PBL and hinder interactions among individuals from many cultures, hence negating the objective of fostering intercultural competence.

Moreover, cultural norms related to "face-saving" and the maintenance of harmony may inhibit students from engaging in critical debate, particularly when problem scenarios involve sensitive cultural or ethical issues. Consequently, PBL conversations may remain superficial and concentrate on technically secure solutions rather than engaging in profound cultural analysis. This difficulty underscores the need for painstakingly structured facilitation and culturally sensitive scaffolding frameworks.

Alterations in the function of faculty and their capacity to instruct

Transforming the teacher's position from an information transmitter to a learning facilitator is a significant barrier in the implementation of Project-Based Learning (PBL). For Project-Based Learning to be effective, educators must facilitate the inquiry process, pose stimulating questions, oversee group dynamics, and foster reflective learning without dominating the discourse. Nevertheless, many educators—particularly those trained in traditional lecture-based methods—may lack expertise or confidence in facilitative teaching tactics (Savery, 2015; Savery, 2019).

The requirements for facilitation are significantly greater in cross-cultural management education. Educators must recognise the cultural disparities among their students and intervene in instances of miscommunication. They must ensure that all pupils are participating equitably. Instructors lacking adequate pedagogical training may struggle to address these issues, perhaps resulting in excessive control that undermines students' autonomy or insufficient guidance that induces confusion and frustration.

Faculty resistance to the use of PBL may stem from concerns about content comprehensiveness and academic rigour. Educators may perceive that Project-Based Learning (PBL) is excessively time-consuming and express concerns regarding the inadequate coverage of essential theoretical ideas. These concerns are

particularly significant in programs with fixed curricula, standardised assessments, or institutional demands to demonstrate quantifiable learning results.

Issues related to resource intensity and scalability

Numerous individuals concur that Project-Based Learning (PBL) is an instructional approach that demands substantial resources. It typically requires smaller class sizes, adaptable seating arrangements, and sufficient time for students to engage with problems, discuss them, and contemplate their solutions. These requirements may be challenging to fulfil in business and management courses, particularly at private institutions or in programs with large enrolments (Woods et al., 2016).

The challenge of scalability in cross-cultural management courses is intensified by the need to develop culturally nuanced and contextually authentic problem scenarios. Creating these resources requires much time and expertise, particularly when addressing issues that illustrate the dynamics of various cultures rather than a singular national environment. If educators receive insufficient support from their institutions, they may resort to simplistic or generic scenarios that fail to illustrate the complexities of real-world cross-cultural issues.

Extensive class numbers hinder teachers' ability to monitor group activities, provide individualised feedback, and assess each student's performance equitably. This constraint can diminish the quality of the PBL experience and reduce its impact on learning outcomes and the development of intercultural competence.

The challenges of evaluation and the issues associated with quantifying it

Assessing student learning in PBL environments presents a further challenge, particularly in cross-cultural management education, where learning goals are complex and process-oriented. Traditional evaluation methods, such as written exams and multiple-choice assessments, insufficiently evaluate characteristics like teamwork, intercultural sensitivity, reflective thinking, and problem-solving abilities (Dochy et al., 2003).

The intricacy of evaluation in cross-cultural contexts is intensified by differences in communication styles and methods of self-expression among civilisations. For example, students from certain cultural backgrounds may struggle with oral presentations or peer evaluations, despite their proficiency in analysis. Conversely, pupils who are more vocal may receive disproportionately favourable ratings, regardless of their comprehension of different cultures.

The lack of standardised and culturally relevant assessment tools for measuring intercultural competency complicates evaluation efforts. Numerous frameworks exist (e.g., Deardorff, 2006; Earley & Ang, 2003), although transforming these models into dependable instruments for evaluating students in the classroom remains challenging. As a result, educators may struggle to demonstrate the effectiveness of PBL interventions in accordance with institutional accountability requirements.

Cognitive overload and student anxiety in ambiguously specified problems

Project-Based Learning (PBL) is predicated on ambiguously stated challenges that lack definitive solutions. This pushes pupils to enquire, investigate, and critically reflect on their concepts again. This uncertainty is educationally advantageous; but, it may also induce cognitive overload and anxiety, particularly for pupils accustomed to highly organised learning environments (Hmelo-Silver, 2004).

In cross-cultural management education, students may face increased cognitive demands while navigating unfamiliar cultural notions, foreign business processes, and obstacles in intercultural communication. Without appropriate scaffolding, students may experience frustration, disengagement, or withdrawal from participation, so diminishing the efficacy of project-based learning (PBL).

This difficulty is especially relevant in multinational classrooms when students display varying levels of prior knowledge, language skills, and educational backgrounds. Consequently, it is a nuanced endeavour to design PBL tasks that are sufficiently challenging while simultaneously providing adequate support.

The previously described obstacles do not undermine the importance of PBL in cross-cultural management education. They underscore the necessity of customising PBL to specific cultural, institutional, and technological contexts. Comprehending these constraints is a crucial initial step in developing enhanced pedagogical models that integrate innovative instructional techniques with practical applicability.

These specific issues demonstrate that we require:

- organised assistance with facilitation,
- methods to engage individuals in large classrooms that have the potential for expansion,
- observing engagement and providing immediate feedback,
- and evaluative techniques that consider cultural factors.

The requirements necessitate the integration of interactive presentation technologies, such as Mentimeter, into project-based learning (PBL) for cross-cultural management education, which will be examined in the subsequent sections.

Challenges and opportunities of PBL in cross-cultural management

Although Problem-Based Learning is acknowledged as an effective educational method in business and management, its implementation in cross-cultural management contexts involves a complicated interaction of difficulties and opportunities. Rather than viewing these challenges solely as limitations, contemporary research suggests they may reveal substantial opportunities for educational innovation, particularly when Project-Based Learning (PBL) is adapted to specific cultural, institutional, and technical contexts.

One common problem with using PBL is that teachers are hesitant to do so. Educators familiar with conventional lecture-based instruction frequently struggle to adapt to facilitative roles that include guiding inquiry instead of imparting material (Savery, 2019). This challenge is especially obvious in cross-cultural management education, as educators must concurrently handle group dynamics, cultural diversity, and open-ended problem-solving techniques. This challenge also presents an opportunity: the restructuring of instructional roles through organised facilitation

tools and pedagogical support systems that assist educators in managing complex classroom interactions.

Limited resources are a major problem that makes it hard to do PBL well. The research consistently demonstrates that PBL requires substantial dedication in terms of time, instructional design, and management of class size (Woods et al., 2016). These standards pose particular issues for private universities and large undergraduate or postgraduate programs, as class sizes sometimes exceed optimal levels for intensive instruction. This limitation creates an opportunity to explore scalable forms of Project-Based Learning (PBL) that maintain student interest and interaction without relying exclusively on small-group, instructor-driven methods.

Assessment remains a considerable challenge in project-based learning contexts. Traditional assessments fail to appropriately measure the diverse learning objectives associated with project-based learning, including collaboration, creativity, reflective thinking, and problem-solving abilities (Dochy et al., 2003). The problem of evaluation in cross-cultural management education is made worse by the fact that different cultures have different ways of communicating and participating. These challenges underscore the need to develop alternative assessment methodologies that incorporate formative feedback, peer interaction, and process-oriented evaluation, aligning more effectively with the learning objectives of intercultural competence development.

The cultural context profoundly affects the challenges and prospects related to PBL. In nations with a large power distance, like Thailand, students may not want to question authority, voice their disagreement, or take charge in group discussions (Hallinger & Lu, 2011). These cultural tendencies can hinder the open dialogue and active participation that PBL seeks to promote. Recognising these cultural features enables educators to create learning settings that reduce participation barriers and promote inclusive engagement, thus converting cultural restrictions into pedagogical opportunities.

Even with these limitations, the advantages of PBL in cross-cultural management education are significant. Numerous empirical research consistently

indicate that PBL improves students' analytical skills, interdisciplinary thinking, and their ability to apply theoretical knowledge to practical issues (Walker et al., 2015). Moreover, PBL fosters teamwork, communication, and leadership skills, which are particularly essential in multicultural and multinational corporate environments (Lohman & Finkelstein, 2000). Longitudinal evidence demonstrates that PBL improves long-term retention of information and skill transfer, preparing students for complex professional settings outside the classroom (Strobel & van Barneveld, 2009).

To sum up, these results show that PBL works better in cross-cultural management education when it is used in a specific way, not when it is used as a general teaching method. The limitations identified in the research do not undermine the importance of PBL; rather, they underscore the necessity for the integration of supportive mechanisms that address cultural diversity, substantial class sizes, and the complexities of evaluation. These factors make a compelling case for looking at project-based learning approaches that use technology to encourage interaction, feedback, and participation in cross-cultural management classrooms.

Technology-Enhanced PBL for Business Education

As discussed in previous sections, Problem-Based Learning (PBL) is grounded in active inquiry, collaborative problem-solving, and iterative reflection. However, empirical research has consistently shown that the effectiveness of PBL is highly contingent on instructional scaffolding, particularly in large and culturally diverse classrooms (Hmelo-Silver et al., 2007). In business education contexts, where class sizes are often large and learning objectives extend beyond content mastery to include transferable skills and intercultural competence, the structural limitations of traditional PBL become more pronounced.

In response to these challenges, educational technologies have increasingly been integrated into PBL frameworks—not as replacements for pedagogical design, but as mediating tools that support engagement, feedback, and collaborative learning processes (Belland, 2014). From a learning sciences perspective, technology-enhanced PBL can be understood as a form of scaffolded learning, where digital

tools assist learners in managing cognitive load, coordinating group activities, and reflecting on their problem-solving processes.

Enhancing Student Engagement through Interactive Technologies

Student engagement is widely recognized as a multidimensional construct encompassing behavioral, emotional, and cognitive components (Fredricks et al., 2004). In higher education, especially in large business classes, maintaining sustained engagement during PBL activities presents a significant challenge (Kahu, 2013). Unequal participation, passive observation, and participation anxiety can undermine the collaborative foundations of PBL and limit learning outcomes.

Interactive presentation technologies such as Mentimeter have been shown to address these challenges by enabling anonymous and low-threshold participation. Classroom response systems allow students to contribute ideas, opinions, and solutions without the social pressure associated with public speaking (Siau et al., 2006). This feature is particularly valuable in high power distance cultural contexts, where students may hesitate to express dissenting views or challenge peers and instructors (Zhao & McDougall, 2008).

Empirical evidence supports the effectiveness of such tools. For example, in a blended PBL course at Nanyang Business School, Mentimeter was used to crowdsource student responses during case discussions, resulting in a significant increase in participation compared to traditional hand-raising methods (Tan & Neo, 2021). From a pedagogical standpoint, this increased participation reflects not only higher behavioral engagement, but also deeper cognitive involvement, as students are prompted to articulate and evaluate ideas throughout the problem-solving process.

Real-Time Feedback and Iterative Learning in PBL

Timely feedback is a core element of effective PBL, as it supports hypothesis testing, reflection, and iterative refinement of solutions (Hmelo-Silver, 2004). However, in large classrooms, instructors often struggle to assess student understanding and adjust instruction in real time. Interactive technologies provide a

practical solution to this challenge by enabling immediate visualization of student thinking.

Mentimeter's live polling and analytics functions allow instructors to monitor student responses during PBL sessions and identify misconceptions or divergent interpretations as they emerge (Kay & LeSage, 2009). For instance, in a PBL activity focused on cross-cultural negotiation strategies, instructors may pose scenario-based questions related to high-context and low-context communication. Aggregated responses can then be displayed and discussed collectively, creating opportunities for comparison, debate, and conceptual clarification.

Such feedback loops align with formative assessment principles, which emphasize continuous monitoring of learning processes rather than summative evaluation alone (Gikandi et al., 2011). In cross-cultural management education, real-time feedback is particularly valuable, as it allows instructors to surface implicit cultural assumptions and guide students toward more reflective and culturally informed interpretations..

Supporting Cross-Cultural Collaboration through Digital Platforms

In multicultural classrooms, differences in language proficiency, communication styles, and cultural norms can hinder effective collaboration. Research in international business education suggests that cultural diversity alone does not automatically lead to improved intercultural competence; rather, learning outcomes depend on how interaction is structured and facilitated (Taras et al., 2013).

Interactive tools such as Mentimeter and Miro offer affordances that support inclusive participation in cross-cultural PBL settings. Mentimeter's anonymity reduces the dominance of more assertive students and encourages contributions from those who may otherwise remain silent due to cultural or linguistic constraints (Wang & Tahir, 2020). Meanwhile, visual collaboration platforms like Miro enable students to express ideas through diagrams, symbols, and spatial organization, reducing reliance on verbal fluency alone.

Fernández et al. (2022) found that international student teams using visual collaboration tools produced more integrative and culturally nuanced

solutions than teams relying solely on face-to-face discussion. These findings align with Byram's (1997) model of intercultural competence, which emphasizes the role of multiple communicative resources in achieving mutual understanding across cultural boundaries.

Instructional Design Considerations and Risks

Despite their pedagogical benefits, interactive technologies also introduce new challenges that require careful instructional design. Technical issues such as unstable internet connections or software limitations can disrupt learning activities and increase frustration among students (Fernández et al., 2022). In addition, the simultaneous use of multiple platforms may contribute to cognitive overload, particularly for students who are unfamiliar with digital learning environments (Kay & LeSage, 2009).

Resistance to technology adoption among faculty and students also remains a concern. According to the Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use significantly influence users' willingness to adopt new technologies (Davis, 1989). Gradual integration, combined with pedagogical training and evidence-based evaluation, is therefore essential to ensure sustainable implementation.

Implications for Instructional Model Development

Taken together, the literature suggests that technology-enhanced PBL holds significant potential for addressing the structural and cultural challenges of cross-cultural management education. However, the effectiveness of such approaches depends on intentional alignment between pedagogical objectives, technological affordances, and contextual constraints.

Rather than viewing interactive presentation technologies as standalone solutions, this study conceptualizes tools such as Mentimeter as instructional mediators that support engagement, feedback, and inclusive participation within the PBL framework. These insights provide a theoretical foundation for the development of a Mentimeter-supported PBL instructional model tailored to large, multicultural business classrooms in a private university context.

How to Measure PBL Outcomes Effectively

Despite the widely documented benefits of Problem-Based Learning (PBL), the assessment of its learning outcomes remains one of the most persistent challenges in higher education research. Unlike traditional lecture-based instruction, PBL emphasizes complex, process-oriented outcomes—such as teamwork, creativity, problem-solving ability, and reflective thinking—that are not easily captured through conventional examinations (Dochy et al., 2003). As a result, the effectiveness of PBL cannot be adequately evaluated using single-point, knowledge-based assessments alone.

From an educational measurement perspective, assessing PBL outcomes requires a shift from summative, product-focused evaluation toward multidimensional and process-oriented assessment frameworks (Gijbels et al., 2005). Such frameworks acknowledge that learning in PBL environments unfolds over time and is shaped by interaction, reflection, and iterative problem-solving. Therefore, a combination of formative and summative assessment methods is necessary to capture both learning processes and learning outcomes.

Formative Assessment in PBL Contexts

Formative assessment plays a central role in PBL, as it provides continuous feedback that supports students' learning during the problem-solving process rather than solely evaluating final outputs (Black & Wiliam, 2009). Common formative assessment strategies in PBL include peer assessment, self-assessment, and instructor feedback. These approaches encourage students to reflect on their contributions, monitor their progress, and adjust their learning strategies accordingly (Boud & Falchikov, 2007).

Peer and self-assessment are particularly valuable in PBL environments because they align with the collaborative and self-directed nature of the approach. Through evaluating their own performance and that of their peers, students develop metacognitive awareness and a deeper understanding of quality criteria related to teamwork and problem-solving (Panadero et al., 2016). In cross-cultural management courses, formative assessment also helps surface culturally embedded assumptions

about participation, leadership, and communication, thereby supporting the development of intercultural competence.

Assessing Problem-Solving Processes through Projects and Presentations

Project-based outputs, such as written reports and oral presentations, are widely used to assess learning outcomes in PBL because they provide tangible evidence of students' reasoning processes and solution development (Frederiksen & White, 2000). Unlike traditional exams, project reports allow instructors to evaluate how students identify problems, integrate theoretical frameworks, analyze contextual data, and justify their decisions.

Presentations further enable the assessment of communication skills and collective sense-making, which are essential competencies in business and management education. In PBL settings, the emphasis is not solely on the correctness of the final solution, but on the coherence, feasibility, and cultural sensitivity of the proposed strategies. This distinction is particularly important in cross-cultural management courses, where multiple solutions may be equally valid depending on cultural and contextual considerations.

Rubric-Based Assessment for Complex Learning Outcomes

Rubrics are widely regarded as an effective tool for assessing complex and abstract learning outcomes in PBL environments (Reddy & Andrade, 2010). By explicitly defining performance criteria and achievement levels, rubrics enhance transparency, consistency, and reliability in assessment. Well-designed rubrics can capture dimensions such as teamwork quality, creativity, analytical depth, and application of theory to practice.

In addition to supporting instructor assessment, rubrics also function as learning scaffolds by clarifying expectations and guiding students' efforts throughout the PBL process (Jonsson & Svingby, 2007). In multicultural classrooms, rubrics help reduce ambiguity that may arise from differing cultural interpretations of "good performance," thereby contributing to more equitable evaluation practices.

Portfolios as Longitudinal Evidence of Learning

Portfolios provide a longitudinal approach to assessing PBL outcomes by collecting multiple artifacts of student learning over time, including project drafts, reflective journals, peer feedback, and final reports (Barrett, 2007). This method is particularly well suited to PBL because it captures learning as an evolving process rather than a single outcome.

Research suggests that portfolios support deeper reflection and integration of knowledge, as students are required to revisit and justify their learning trajectories (Tillema, 2001). In the context of cross-cultural management education, reflective components within portfolios allow students to articulate changes in their cultural awareness, attitudes, and behaviors, offering valuable qualitative evidence of intercultural competence development.

Technology-Enhanced Assessment in PBL Environments

The integration of digital technologies has expanded the possibilities for assessing PBL outcomes by enabling the systematic collection and analysis of learning data. Learning management systems (LMS) and interactive tools can track student participation, collaboration patterns, and engagement levels throughout the PBL process (Wang et al., 2018). These data sources provide complementary evidence that supports both formative and summative assessment.

Technology-enhanced assessment is particularly valuable in large PBL classes, where manual observation of individual contributions is impractical. When combined with self-reports and performance-based assessments, digital analytics contribute to a more comprehensive and triangulated evaluation of learning outcomes. However, scholars caution that learning analytics should be interpreted cautiously and used to inform pedagogical decisions rather than replace qualitative judgment (Siemens & Baker, 2012).

Implications for Measuring PBL Outcomes in Cross-Cultural Management Education

Taken together, the literature indicates that no single assessment method can fully capture the complex outcomes associated with PBL. Effective measurement

requires a mixed-methods approach that integrates formative feedback, performance-based assessment, rubric-guided evaluation, reflective portfolios, and technology-supported data collection. Such an approach aligns with the multidimensional nature of learning in PBL and supports the evaluation of both cognitive and socio-cultural outcomes.

For cross-cultural management education in particular, assessment strategies must be sensitive to cultural diversity and capable of capturing changes in students' intercultural awareness, skills, and behaviors. These considerations inform the assessment framework adopted in the present study and provide methodological justification for the research instruments and data analysis procedures described in subsequent chapters.

Interactive Presentation Technology and Its Impact on Student Engagement

Student engagement—commonly defined as the degree of attention, curiosity, interest, and cognitive investment that students demonstrate during the learning process—has long been recognized as a critical predictor of academic success and learning outcomes (Fredricks et al., 2004). In higher education, particularly in business and management disciplines, sustaining student engagement presents a persistent challenge due to large class sizes, culturally diverse cohorts, and the prevalence of passive lecture-based instruction.

In the digital era, interactive presentation technologies (IPTs), such as Mentimeter, Kahoot!, Miro, and Nearpod, have emerged as pedagogical tools designed to transform traditional lectures into interactive, learner-centered environments. These technologies enable real-time polling, anonymous response collection, collaborative brainstorming, and multimedia-supported activities, thereby facilitating active participation and immediate feedback. Rather than serving merely as technological enhancements, IPTs are increasingly conceptualized as instructional affordances that support key engagement mechanisms within contemporary learning theories.

This section reviews the literature on IPTs with a focus on their impact on student engagement in higher education. Drawing on the multidimensional engagement framework proposed by Fredricks et al. (2004), the review synthesizes empirical findings related to behavioral, emotional, and cognitive engagement, examines the pedagogical functions of different IPTs, and highlights their relevance for culturally diverse and interactive learning environments. Particular attention is paid to how IPTs can support participatory learning models, such as Problem-Based Learning (PBL), by addressing engagement-related challenges in cross-cultural management education.

Types of Interactive Presentation Technologies

Interactive presentation technologies differ in their pedagogical functions, modes of interaction, and alignment with learning objectives. Rather than categorizing IPTs solely by software name, existing research suggests that they can be more meaningfully classified according to the learning mechanisms they primarily support. In business and management education, IPTs are commonly grouped into three functional categories: response aggregation tools, gamified engagement tools, and collaborative knowledge construction platforms.

Response aggregation tools are designed to collect and visualize student input in real time. Mentimeter is a prominent example, allowing instructors to integrate live polls, word clouds, ranking questions, and quizzes into instructional sessions. A key feature of Mentimeter is response anonymity, which has been shown to significantly increase participation rates, particularly among introverted students and learners from high power-distance cultures who may be reluctant to speak openly in class (Wang & Tahir, 2020). By lowering participation anxiety and democratizing classroom interaction, such tools enhance inclusivity and provide instructors with immediate diagnostic feedback on student understanding.

Gamified engagement tools, such as Kahoot!, emphasize competition, time pressure, and scoring mechanisms to stimulate emotional engagement. Kahoot!'s game-like interface has been associated with increased enjoyment, motivation, and short-term attention, especially in large lecture settings (Wang et al., 2020). While

gamification can be effective in stimulating affective engagement, studies caution that its impact on deeper learning depends on alignment with instructional goals rather than novelty alone.

Collaborative knowledge construction platforms support shared meaning-making and collective problem-solving. Miro provides a digital whiteboard environment in which learners can visually map ideas, develop conceptual frameworks, and iteratively refine solutions. Empirical studies indicate that such tools enhance collaboration and collective cognition, particularly in MBA and project-based courses that require integrative analysis and interdisciplinary thinking (Fernández et al., 2022). Visual and non-verbal representation features are especially beneficial in multicultural classrooms, where language proficiency and communication styles may vary.

Nearpod represents a hybrid category by integrating presentation slides with embedded quizzes, simulations, and immersive media, including virtual reality elements. Its design allows instructors to scaffold interaction throughout a lesson, supporting continuous engagement rather than episodic participation.

Overall, the literature suggests that IPTs should not be viewed as interchangeable tools but as pedagogical resources with distinct affordances. Their effectiveness depends on intentional alignment with learning objectives, instructional design, and the social dynamics of the classroom.

Impact of Interactive Presentation Technologies on Student Engagement

Student engagement is widely conceptualized as a multidimensional construct encompassing behavioral, emotional, and cognitive components (Fredricks et al., 2004). This framework provides a useful lens for examining how IPTs influence learning processes in higher education. Empirical research consistently demonstrates that IPTs exert differentiated but complementary effects across these dimensions.

Behavioral engagement refers to observable participation, such as contributing to discussions, responding to questions, and engaging in learning activities. Numerous studies report that IPTs substantially increase participation rates compared to traditional hand-raising or verbal questioning. A meta-analysis by Kay and LeSage

(2009) found that the use of interactive response systems led to a 30–50% increase in student response frequency. Mentimeter’s anonymous input mechanism further mitigates participation inequality by reducing the dominance of outspoken students and encouraging contributions from quieter learners (Tan & Neo, 2021).

Emotional engagement encompasses students’ interest, enjoyment, and affective reactions to learning activities. Gamified IPTs, such as Kahoot!, enhance emotional engagement by introducing elements of challenge, competition, and immediate reward. Empirical evidence suggests that such features increase motivation and positive affect, particularly in large or otherwise impersonal learning environments (Wang et al., 2020). Similarly, multimedia-rich platforms like Nearpod have been shown to stimulate curiosity and sustain attention by diversifying instructional stimuli.

Cognitive engagement involves deep processing, critical thinking, and the strategic regulation of learning. IPTs contribute to this dimension by providing immediate feedback and supporting metacognitive awareness. For example, Mentimeter’s real-time visualization of collective responses enables instructors to identify misconceptions and adjust instruction accordingly, fostering deeper conceptual understanding (Wang & Tahir, 2020). Collaborative platforms such as Miro further support cognitive engagement by externalizing thinking processes and facilitating iterative problem-solving. Fernández et al. (2022) reported that student groups using digital whiteboards produced more analytically sophisticated and innovative solutions than those relying solely on face-to-face discussion.

Importantly, engagement should not be equated with entertainment. Research emphasizes that student engagement functions as a mediating mechanism between instructional design and learning outcomes, rather than as an outcome in itself (Kahu, 2013). Interactive presentation technologies do not inherently improve learning; their effectiveness depends on how they are embedded within pedagogical frameworks that promote inquiry, reflection, and application.

Several scholars also caution against technological determinism. Without careful instructional integration, IPTs may lead to superficial or short-lived

engagement driven by novelty effects (Clark, 1983; Kirkwood & Price, 2014). This underscores the necessity of aligning IPT use with robust learning models—such as Problem-Based Learning—to ensure that increased engagement translates into meaningful learning and skill development, particularly in complex domains such as cross-cultural management.

Factors That Moderate the Effectiveness of Interactive Presentation Technologies

Although interactive presentation technologies (IPTs) have demonstrated considerable potential to enhance student engagement, empirical research consistently shows that their effectiveness is not uniform across learning contexts. Rather, the impact of IPTs on student engagement is shaped by a set of moderating factors related to instructional practice, learning environments, and sociocultural conditions. Understanding these factors is essential for interpreting prior findings and for designing effective technology-enhanced instructional models in higher education.

Instructor Pedagogical and Technological Proficiency

Instructor proficiency plays a central moderating role in determining whether IPTs contribute to meaningful engagement or remain superficial add-ons. Research suggests that student engagement is significantly higher when instructors possess not only technical competence in operating IPT tools, but also pedagogical expertise in integrating them purposefully into lesson design (Scherer et al., 2019).

When IPTs are aligned with learning objectives—such as using real-time polling to diagnose misconceptions or stimulate problem framing—students are more likely to engage cognitively rather than merely respond mechanically. Conversely, when instructors lack training or rely on IPTs for novelty, engagement gains tend to be short-lived. This finding underscores that IPT effectiveness depends less on the technology itself than on instructors' instructional design decisions.

Size of Class

In large lectures with more than fifty students, where typical interaction is challenging, IPTs have the most significant impact. Tools such as Mentimeter enable scaled participation without logistical hurdles (Kay & LeSage, 2009).

Class Size and Learning Scale

Class size is another important contextual moderator. In large lecture settings, typically exceeding fifty students, opportunities for direct interaction between instructors and learners are inherently limited. Studies indicate that IPTs exert their strongest impact in such contexts by enabling scalable participation without increasing instructional complexity (Kay & LeSage, 2009).

Tools such as Mentimeter allow all students to contribute simultaneously, thereby reducing interaction bottlenecks and mitigating participation inequality. In smaller classes, where face-to-face discussion is already feasible, the relative advantage of IPTs is less pronounced. This suggests that IPTs are particularly valuable as engagement-enabling mechanisms in large, diverse classrooms—an increasingly common feature of business education programs.

Cultural Background and Communication Norms

Cultural context significantly moderates how students perceive and utilize interactive technologies. In high power distance cultures, such as Thailand, students may be reluctant to question instructors or openly challenge peers due to norms emphasizing hierarchy and respect for authority. Research shows that anonymous response systems, such as Mentimeter, are especially effective in such contexts, as they lower social risk and encourage participation without violating cultural expectations (Zhang & Mao, 2020).

In contrast, competitive platforms like Kahoot! appear to align more closely with individualistic cultures that emphasize personal achievement and public performance, such as those commonly found in the United States (Wang et al., 2020). These findings indicate that cultural norms shape not only participation patterns but also the suitability of specific IPT features. As a result, culturally responsive instructional design is essential when implementing IPTs in cross-cultural management education.

Challenges, Criticisms, and Research Gaps

Despite the growing adoption of interactive presentation technologies, scholars have raised several concerns regarding their pedagogical limitations and

unintended consequences. One frequently cited criticism relates to overstimulation and distraction. Gamification elements—such as animations, sound effects, and competitive leaderboards—may increase short-term engagement but risk diverting attention away from deeper cognitive processing if not carefully managed (Wang et al., 2020). In such cases, engagement may remain behavioral or emotional without translating into meaningful learning.

Technical and infrastructural constraints also pose significant challenges. Unstable internet connectivity, limited access to digital devices, and varying levels of digital literacy can disrupt instructional flow and exacerbate educational inequalities. These barriers are particularly salient in developing or resource-constrained contexts, where the inclusive potential of IPTs may be undermined by structural limitations.

Another major criticism concerns the risk of superficial engagement, often described as a “clicker culture,” in which students prioritize rapid responses over reflective thinking. Empirical evidence suggests that increased participation does not automatically lead to enhanced cognitive engagement unless IPT use is embedded within sound pedagogical frameworks that promote inquiry, reflection, and application (Bennett & Pence, 2023).

Case-based evidence further illustrates the context-dependent nature of IPT effectiveness. For example, a blended Problem-Based Learning course at Nanyang Business School reported a substantial increase in participation following the integration of Mentimeter, with students highlighting reduced anxiety and increased willingness to contribute (Tan & Neo, 2021). However, such outcomes were closely linked to purposeful instructional design rather than technology use alone.

Despite accumulating evidence on short-term engagement outcomes, several research gaps remain. First, longitudinal studies examining whether IPT-induced engagement leads to sustained learning gains and skill development are limited. Second, most empirical studies are situated in Western educational contexts, creating a need for more cross-cultural research to assess the generalizability of findings. Finally, the emergence of AI-driven IPTs raises new questions regarding

personalization, data privacy, and algorithmic bias, which remain underexplored in current literature.

In summary, while interactive presentation technologies offer meaningful opportunities to enhance student engagement, their effectiveness is contingent upon pedagogical alignment, contextual sensitivity, and equitable implementation. These considerations reinforce the need for instructional models—such as technology-supported Problem-Based Learning—that integrate IPTs as pedagogical tools rather than standalone solutions.

Technology Use in Cross-Cultural Management Classrooms

Beyond organizational practice, the role of technology in cross-cultural education has evolved substantially over the past decades. Early models of intercultural learning relied heavily on long-term physical immersion, requiring learners to live and work in foreign cultural environments for extended periods. While effective, such approaches were time-consuming, costly, and accessible to only a limited number of participants (Shadiev et al., 2021).

With advances in digital technology and the widespread availability of online resources, intercultural education has gradually shifted toward technology-supported learning environments. These environments allow learners to access culturally diverse information, communicate across borders, and engage in intercultural learning activities without requiring physical relocation (Shadiev et al., 2021). As a result, technology has become an increasingly important medium for facilitating intercultural learning in higher education, including business and management programs.

Shadiev et al. (2021) proposed a widely cited framework for technology-supported intercultural learning that emphasizes three interconnected dimensions: cultural orientation, domain knowledge, and social space. Cultural orientation refers to learning activities that enable participants to explore and understand cultural similarities and differences. Domain knowledge relates to discipline-specific content, such as language, professional skills, or subject knowledge. Social space represents the interactive environments in which learners exchange personal experiences,

cultural backgrounds, and perspectives. Together, these dimensions highlight how technology can support intercultural learning by integrating content knowledge with meaningful social interaction.

Empirical studies applying this framework demonstrate that technology-mediated interaction can enhance learners' intercultural awareness and communicative competence. For example, Shadiev et al. (2021) documented online intercultural exchanges in which students from different countries collaborated in English while learning about each other's cultural practices. Such studies illustrate how digital platforms can create structured social spaces that support cultural orientation and knowledge development simultaneously. Although much of this research originates from language education contexts, the underlying mechanisms—exposure to cultural diversity, guided interaction, and reflective engagement—are equally relevant to cross-cultural management education.

In the context of business and management classrooms, technology-supported intercultural learning serves a distinct but related purpose. Rather than focusing primarily on language acquisition, cross-cultural management courses aim to develop students' ability to interpret cultural differences, communicate effectively in professional settings, and make informed decisions in multicultural business environments. Digital platforms enable students to engage with culturally diverse perspectives, analyze intercultural business scenarios, and reflect on their own assumptions in a structured learning setting. Studies have shown that technology-supported environments can enhance intercultural awareness by helping students interpret behaviors, values, and social cues across cultural contexts (Angelova & Zhao, 2016; Shadiev et al., 2018; Yang, 2014).

Emerging technologies such as virtual reality (VR) and augmented reality (AR) have further expanded the possibilities for intercultural learning by offering simulated cultural environments. Research suggests that immersive simulations can foster cultural awareness, adaptability, and appropriate behavioral responses in cross-cultural situations (Mukhtarkyzy, 2022; Sembayev, 2021). However, despite their potential, such technologies often require substantial resources and technical

infrastructure, limiting their practical adoption in large undergraduate business classrooms. As a result, more accessible interactive presentation technologies remain a pragmatic choice for most higher education institutions.

Overall, existing research highlights the important role of technology in supporting intercultural learning by facilitating cultural orientation, enabling domain-specific learning, and creating interactive social spaces. Nevertheless, much of the literature focuses on language learning or general intercultural education, with relatively limited attention to cross-cultural management classrooms in business education. In particular, there is a lack of empirical research examining how interactive presentation technologies can be systematically integrated into instructional models—such as Problem-Based Learning—to enhance intercultural competence in large undergraduate business courses. This gap provides the foundation for the present study, which investigates the use of Mentimeter-supported PBL in a cross-cultural management course.

The Role of Mentimeter in Enhancing Learning Outcomes

In recent years, Mentimeter has gained increasing attention as an interactive presentation technology designed to facilitate real-time audience interaction through tools such as live polls, word clouds, quizzes, and anonymous question-and-answer functions. Within higher education, Mentimeter has been widely adopted across disciplines to address persistent challenges associated with large-class teaching, student disengagement, and limited opportunities for formative feedback. This section synthesizes empirical studies and theoretical perspectives to examine how Mentimeter contributes to learning outcomes across cognitive, behavioral, and affective domains, with particular attention to its relevance for cross-cultural management education.

Mentimeter's pedagogical value aligns closely with student-centered and active learning theories. From a constructivist perspective, learning is understood as a process of knowledge construction through social interaction and problem-solving rather than passive reception of information (Vygotsky, 1978). Mentimeter supports

this process by enabling students to collectively generate ideas, articulate viewpoints, and reflect on peer responses in real time. For example, in business and management courses, instructors have used word cloud functions to gather students' perspectives on market entry strategies or leadership challenges, allowing collective knowledge to emerge through shared contributions (Tan & Neo, 2021). Such practices encourage learners to actively engage with content and situate their understanding within a broader social context.

Self-Determination Theory (SDT) further explains Mentimeter's motivational impact by emphasizing the psychological needs of autonomy, competence, and relatedness (Ryan & Deci, 2000). Mentimeter's anonymous participation options enhance students' sense of autonomy by allowing them to contribute without fear of judgment, particularly in culturally hierarchical classrooms. Immediate visual feedback on responses reinforces perceptions of competence, while shared displays of collective input foster a sense of relatedness among learners. Empirical evidence suggests that when these psychological needs are met, students demonstrate higher engagement and persistence in cognitively demanding tasks (Wang & Tahir, 2020).

The Technology Acceptance Model (TAM) offers an additional explanatory lens by accounting for the adoption of Mentimeter by both instructors and students. According to TAM, perceived usefulness and perceived ease of use are critical determinants of technology acceptance (Davis, 1989). Studies in higher education contexts indicate that Mentimeter's intuitive interface and low technical threshold reduce instructors' preparation burden while increasing student participation, thereby reinforcing positive perceptions of usefulness (Zhang & Mao, 2020). These findings help explain the widespread uptake of Mentimeter in large and diverse classrooms.

Cognitive and Behavioral Learning Outcomes

A growing body of research demonstrates that Mentimeter positively influences cognitive outcomes such as comprehension, retention, and problem-solving. Interactive polling and quiz-based retrieval practices have been shown to enhance long-term memory and conceptual understanding by promoting active recall and immediate correction of misconceptions (Hattie, 2015). In large lecture

settings, instructors using Mentimeter to assess students' understanding during class were able to identify widespread misunderstandings and adjust instruction accordingly, resulting in measurable improvements in post-lecture performance.

Behavioral outcomes are particularly evident in terms of participation and classroom interaction. Research comparing traditional hand-raising methods with anonymous polling indicates substantial increases in response rates when Mentimeter is used, especially in large classes (Kay & LeSage, 2009). Importantly, marginalized or less confident students—such as introverts and non-native speakers—are more likely to participate through anonymous digital channels. This democratization of participation is especially relevant in cross-cultural classrooms, where social norms and power dynamics may inhibit open discussion.

Emotional and Affective Engagement

Emotional engagement plays a critical role in sustaining learning efforts and shaping students' attitudes toward a course. Mentimeter's visually dynamic and interactive features contribute to increased enjoyment, reduced anxiety, and greater satisfaction with the learning experience. Studies have reported lower levels of participation anxiety and higher perceived classroom inclusiveness in courses that regularly integrate anonymous interactive tools (Fernández et al., 2022). In culturally hierarchical contexts, such as Thai university classrooms, Mentimeter has been shown to facilitate the expression of critical questions that students might otherwise hesitate to voice publicly, thereby supporting a more open learning climate (Tan & Neo, 2021).

Cultural and Contextual Considerations

The effectiveness of Mentimeter is influenced by cultural norms and educational contexts. In high power distance cultures, anonymous participation mechanisms help mitigate deference to authority and encourage candid expression of ideas (Hofstede, 1980; Wang & Tahir, 2020). Conversely, in more individualistic cultural settings, competitive features such as quizzes and leaderboards tend to resonate with students' motivational orientations (Wang et al., 2020). These findings

suggest that Mentimeter's flexible design allows it to be adapted to diverse cultural contexts, provided that instructors align its features with pedagogical goals.

However, disparities in technological access and infrastructure remain a challenge. Studies conducted in resource-constrained settings highlight that inconsistent internet access and limited device availability can restrict the equitable use of interactive technologies, potentially reinforcing existing educational inequalities. These limitations underscore the importance of contextual sensitivity when implementing Mentimeter across different institutional environments.

Challenges and Limitations

Despite its documented benefits, Mentimeter is not without limitations. Faculty resistance, often linked to unfamiliarity with digital tools, can hinder adoption. Training and institutional support have been shown to significantly increase instructors' willingness to integrate interactive technologies into their teaching practices (Scherer et al., 2019). Pedagogically, excessive reliance on quick polls or quizzes may lead to superficial engagement if not embedded within a coherent instructional design. Scholars caution that interactive tools should complement, rather than replace, deeper discussion and analytical activities (Bennett & Pence, 2023).

Related Research

Research Gaps and Implications for the Present Study

Although a substantial body of research supports Mentimeter's positive impact on engagement and learning outcomes, several gaps remain. First, much of the existing literature is situated in Western or STEM-focused educational contexts, with limited empirical investigation in cross-cultural management classrooms, particularly within Southeast Asia. Second, most studies focus on short-term engagement and performance indicators, leaving the long-term impact of Mentimeter-supported pedagogies on intercultural competence underexplored. Finally, few studies examine how Mentimeter functions as part of an integrated

instructional model, such as Problem-Based Learning, rather than as a standalone tool.

These gaps highlight the need for empirical research that examines how Mentimeter, when systematically embedded within a PBL framework, can support the development of intercultural competence and learning outcomes in large, multicultural business classrooms. Addressing these issues forms the central focus of the present study.

Chapter 3

Research Methodology

Through Chapter 2, Engagement Model and the Intercultural Competence Development Model (ICDM) were chosen as the theoretical underpinnings for this research. These frameworks informed the decision to employ a Problem-Based Learning (PBL) model, augmented by Mentimeter, to improve the educational efficacy within the realm of cross-cultural management. Specifically, the study was devised to assess the impact of integrating the Mentimeter-supported PBL model into the cross-cultural management curriculum at Private University.

Given the utilization of both the PBL model and interactive presentation technology, a dual approach of quantitative and qualitative data collection from students was deemed necessary to comprehensively analyze the outcomes. Accordingly, a mixed-methods research design was adopted. This approach enabled the evaluation of various factors influencing student learning, intercultural competencies, classroom engagement, and overall course satisfaction within the cross-cultural management course. The ultimate objectives were to ascertain the effectiveness of the Mentimeter-supported PBL model and to offer actionable recommendations for enhancing cross-cultural management education.

1. The population
2. Research Instruments
3. Data Collection
4. Data Analysis

Objective 1 To study current situation teaching outcome in Cross-Cultural Management course at undergraduate level.

Research step

This objective aims to examine the current teaching outcomes of Cross-Cultural Management courses before and during the initial implementation of Mentimeter-supported instruction. The research procedures were conducted in the following steps:

Step 1: Literature Review

A comprehensive review of relevant literature was conducted to establish the conceptual foundation of the study. This included studies on:

- Cross-Cultural Management education and expected learning outcomes;
- Intercultural competence development in higher education;
- Student engagement and learning outcomes in business education;
- The use of interactive presentation technologies, particularly

Mentimeter, in classroom settings.

The literature review informed the development of research instruments and ensured alignment between research objectives, theoretical frameworks, and data collection methods.

Step 2 Development of Research Instruments

Based on the literature review, research instruments were developed to collect baseline information on students' intercultural awareness students' cultural cognition related to cross-cultural management.

Step 3: Expert Interviews for Instrument Validation

The expert interview sample in the preliminary stage consisted of three experts selected through purposive sampling. These experts were chosen based on their academic or professional experience in cross-cultural management, instructional design, educational technology, or related areas. Their role was to provide suggestions for refining the research instruments, research process, and the initial design of the instructional model. These interviews focused on:

- Common classroom participation patterns;
- Typical pedagogical challenges in Cross-Cultural Management courses;
- The appropriateness of questionnaire items related to intercultural awareness and cultural cognition;
- The relevance of Mentimeter - generated data as indicators of engagement.

The interview findings were used only to refine and validate the research instruments, not as primary outcome data.

Step 4: Data Collection from Students

Baseline data were collected from undergraduate students enrolled in the Cross-Cultural Management course, including students' intercultural awareness and students' cultural cognition

These data were used to describe the current situation of intercultural competence among students.

Step 5: Data Preparation for Analysis

All collected data were organized, coded, and prepared for descriptive analysis to reflect the current teaching outcomes of the course.

Sampling Size

The sampling consisted of two groups:

Student Sample

The Population

The population of this study consisted of undergraduate students enrolled in the Cross-Cultural Management course in a private university in Thailand. Specifically, the target population comprised third-year Undergraduate of Business Administration (BBA) student in business school, private university. As the course included both local and international students, the learning environment was inherently multicultural, providing an appropriate context for examining the effectiveness of a Mentimeter-supported Problem-Based Learning (PBL) model in enhancing intercultural competence and learning engagement.

Sample Group

The sample was drawn from students who were officially registered in the Cross-Cultural Management course during the semester in which the PBL intervention was implemented. Based on the instructional design of the course, students were divided into two groups:

Experimental Group: Students who received instruction through the Mentimeter-supported PBL model throughout the semester.

Control Group: Students who received traditional lecture-based instruction without structured PBL activities or Mentimeter integration.

The grouping followed the existing class structure of the course; therefore, random assignment at the individual level was not applied. This design is consistent with a quasi-experimental approach, which is commonly adopted in educational research conducted in authentic classroom settings.

Sample Size Determination

The total population of third-year BBA students enrolled in the Cross-Cultural Management course at Private University during the semester was $N = 342$. To determine an appropriate sample size, Yamane's (1967) formula was used as a reference to ensure statistical adequacy at a 95% confidence level with a margin of error of 0.05:

Yamane's Formula: $n = N / (1 + Ne^2)$

n = Sample Size

N = Total population of student in 3rd year BBA in Private University

e = Margin of error, at the confidence interval at 95% which allowable deviation is 0.05.

Therefore, the sample size is

$$n = 342 / (1 + 342 (0.05)^2) = 184.36$$

$$n \approx 184$$

Thus, the recommended minimum sample size was approximately 184 students. To improve the resilience and dependability of the dataset, a marginally bigger sample was gathered than the minimum necessary. Consequently, a total of 186 students participated in the survey.

In practice, the actual sample size corresponded to the number of students who completed the course and provided complete datasets, including examination results, cultural cognition assessments, and Mentimeter-generated participation data. This approach ensured that the sample size met the minimum requirement for maintaining a 95% confidence level while reflecting real classroom conditions.

Expert Interview Sample

The first three experts were consulted during the preliminary stage to refine the research instruments. In the model evaluation stage, three experts were invited again to conduct a formal validation using the IOC method, which is commonly recommended in educational research.

To evaluate the quality and applicability of the Mentimeter-supported PBL instructional model, expert validation was conducted using the Item–Objective Congruence (IOC) method.

A panel of experts reviewed the instructional model, focusing on:

- Alignment with PBL principles
- Integration of interactive technology
- Suitability for cross-cultural management education
- Clarity of instructional procedures

Table 3.1 Expert Profile

Expert	Background	Years of Experience
Expert 1	Cross-cultural education	15
Expert 2	PBL instructional design	18
Expert 3	Cross-cultural in business	10

Research Instruments

1. Research on the factors intercultural competence skills of management graduates.

2. The first draft of the questionnaire was given to experts to check the correctness and completeness of the questionnaire.

The validity of the questionnaire was assessed by three experts using the Item-Objective Consistency (IOC) index to ensure alignment with the research objectives and intercultural competence constructs.

+1 = Determine that the content is relevant to the topics

0 = Unsure that the content is relevant to the topics

-1 = Content is irrelevant to the topics

Acceptable items must have an IOC value of no less than 0.5. The IOC calculated from the validation measures will be used to determine the relevance of each questionnaire question to the research objectives and ensure the quality of the collected data.

Data Collection and Analysis

Data collection was conducted with 186 undergraduate students enrolled in the Cross-Cultural Management course at a private university. The data were collected at the beginning of the course.

Students completed a questionnaire designed to measure their baseline intercultural awareness and cultural cognition related to cross-cultural management. The questionnaire items were developed based on the theoretical frameworks of intercultural competence identified in the literature review.

After data collection, all responses were carefully checked for completeness and accuracy. The valid questionnaires were coded and entered into the statistical analysis software SPSS.

Descriptive statistical methods were applied to analyze the collected data. The analysis included the calculation of frequency, percentage, mean, and standard

deviation in order to describe the current situation of students' intercultural awareness and cultural cognition in the course.

The results of the analysis were used to provide baseline information for the subsequent development of the instructional model in the next research phase.

Objective 2 To design a Problem-Based Learning (PBL) model using MENTIMETER as an Interactive Presentation Technology in Cross-Cultural Management course

Research step

Step 1: Synthesis of findings from Objective 1

Findings from Objective 1 were synthesized to identify key instructional problems, engagement gaps, and areas requiring pedagogical improvement.

Step 2: Drafting the Mentimeter-supported PBL model

Based on the theoretical frameworks and baseline empirical findings from Objective 1, a preliminary PBL instructional model integrating Mentimeter was developed.

Step 3: Expert review and refinement

The draft model was reviewed by three experts in business and cross-cultural management education. The experts evaluated:

- Alignment with PBL principles,
- Feasibility in large undergraduate classrooms,
- Appropriateness of Mentimeter integration.

Step 4: Model revision and finalization

The instructional model was revised based on expert feedback and finalized for implementation in Objective 3.

The population

The study was conducted over one academic semester (15 weeks). Each class session lasted approximately 180 minutes and was held once per week.

The instructional intervention was implemented from Week 2 to Week 14, following a pre-test administered in the first week. In total, students in the

experimental group participated in 13 weeks of Mentimeter-supported PBL instruction, while the control group received traditional lecture-based teaching over the same period.

For Objective 2, three experts of experience in management education and curriculum design were purposively selected. Their role was limited to instructional model validation and refinement, not statistical evaluation.

Table 3.2 Expert Background

Expert	Background	Years of Experience
Expert 1	Cross-cultural education	15
Expert 2	PBL instructional design	18
Expert 3	Cross-cultural in business	10

Research Instruments

Cross-Cultural Management course Teaching Content

The syllabus introduction about this course is: Effects of local cultures upon global interactions of business trading, marketing and operations. Difficulties in market analysis considering cultural factors in various countries.

The course under study (INTRODUCTION CROSS-CULTURAL MANAGEMENT) focuses on the effects of local cultures on global interactions in business trading, marketing, and operations.

The course is structured into three sections: Business Trading, Marketing, and Operations. The experimental group is exposed to PBL methodologies supported by Mentimeter. The control group undergoes conventional lecture-based instruction.

Use INTRODUCTION CROSS-CULTURAL MANAGEMENT, a series of textbooks of the Leading Program for the Construction of First-class Undergraduate Programs in Shanghai Higher Education Institutions, as the content of the textbook for teaching.

These teaching contents served as the contextual foundation for designing authentic PBL scenarios and Mentimeter-based interactive activities.

The content of textbook

- Chapter 1 Culture and Management
Section I Culture, Section II National Culture, Section III Corporate Culture
- Chapter 2 Cultural Difference Theory
Section 1 Cultural Dimension Theory, Section 2: Cultural Architecture Theory, Section 3 Six Value Orientation Theory, Section 4 Individualism-Collectivism Theory
- Chapter 3 Intercultural Communication
Section 1 The Impact of Cultural Differences on Intercultural Communication, Section 2 Intercultural Differences in Verbal Communication, Section 3 Intercultural Differences in Nonverbal Verbal Communication, Section 4 Intercultural Negotiation
- Chapter 4 Cultural Integration in Multinational Corporations
Section 1 The Cultural Environment of Multinational Corporations, Section 2 Cultural Management in Multinational Corporations, Section 3 Managing Cross-Cultural Teams
- Chapter 5 Cross-cultural Marketing
Section 1 Cross-cultural Market Research, Section 2 Cross-cultural Products and Pricing, Section 3: Cross-cultural Promotion, Section 4 Cross-cultural Distribution
- Chapter 6 Cross-cultural Human Resource Management
Section 1 Cross-cultural Staffing, Section 2 Cross-cultural Employee Training, Section 3 Cross-cultural Performance Appraisal, Section 4 Cross-cultural Compensation Management, Section 5 Cross-Cultural Labor Relations

Data collection and Analysis

Data for Objective 2 were collected through expert interviews conducted face-to-face or by phone. Expert feedback was analyzed qualitatively and used to revise the instructional model

Expert Interview Questions for Preliminary Model Review

Q1. In your opinion, is the overall structure of the Mentimeter-supported PBL model clear and logically sequenced? Why or why not?

Q2. Are the five learning stages appropriate for developing students' intercultural competence in a Cross-Cultural Management course?

Q3. Do the proposed Mentimeter activities match the purpose of each PBL stage? Please explain.

Q4. Is this model feasible for implementation in a large multicultural undergraduate classroom? What challenges do you foresee?

Q5. Which stage or activity needs revision or further clarification?

Q6. What suggestions do you have to improve the model before implementation?

Objective 3 To implement the designed model in Cross-Cultural Management course at Private University

Research step

The teaching Integration with the PBL framework

To evaluate the effectiveness of the Mentimeter-supported Problem-Based Learning (PBL) model in the Cross-Cultural Management course, Mentimeter was systematically integrated into each core stage of the PBL process. The research procedure was designed not only to support instructional implementation, but also to generate empirical data for evaluating student engagement, learning processes, and learning outcomes. The research steps are described as follows.

Step 1. Problem Identification and Question Setting Phase

Teacher Activities

At the beginning of each PBL cycle, the instructor designed open-ended questions and authentic cross-cultural management cases aligned with the course content, such as cultural differences in business communication, decision-making, and workplace practices. These questions and cases were published through Mentimeter to initiate student inquiry and problem identification.

The instructor guided students to analyze the problem context, clarify key cultural issues, and connect the problem to theoretical concepts introduced in the course.

Student Activities

Students individually or collectively submitted their preliminary ideas, interpretations, and viewpoints through Mentimeter. By responding to open-ended questions and polls, students articulated their initial understanding of cross-cultural issues and identified possible problem dimensions.

Research Data Generated

This phase generated Mentimeter response data reflecting students' initial cultural cognition, participation levels, and engagement in problem identification, which were later used as descriptive evidence of learning engagement in the PBL process.

Step 2: Data Collection and Information Exploration Phase

Teacher Activities

The instructor designed structured data collection tasks, including short questionnaires, guided prompts, or information-search tasks related to the cross-cultural problem scenario. These tasks were delivered through Mentimeter to support systematic information gathering.

The instructor provided scaffolding by clarifying data sources, explaining analytical perspectives, and offering guidance on how to organize and interpret collected information.

Student Activities

Students used Mentimeter to submit collected information, summarize relevant cultural data, and report observed patterns or contrasts across cultural contexts. In some activities, students analyzed aggregated Mentimeter results to identify key trends and shared insights.

Research Data Generated

This phase produced participation frequency data and content-based responses, which demonstrated students' active involvement in information exploration and their ability to analyze cross-cultural data within the PBL framework.

Step 3: Hypothesis Generation Phase

Teacher Activities

To promote higher-order thinking, the instructor designed guiding questions through Mentimeter to encourage students to propose explanations or hypotheses related to cross-cultural phenomena observed in the problem scenario. Group discussion was facilitated to support collaborative hypothesis development.

Student Activities

Students discussed possible explanations in small groups and submitted their hypotheses via Mentimeter. Through peer comparison and instructor prompts, students refined their hypotheses and considered alternative cultural interpretations.

Research Data Generated

Mentimeter submissions from this phase reflected students' analytical reasoning and intercultural interpretation skills, providing qualitative support for evaluating cognitive engagement during the PBL process.

Step 4: Solution Development Phase

Teacher Activities

The instructor designed problem-solving tasks that required students to propose practical solutions or managerial strategies for addressing the identified cross-cultural issues. Mentimeter was used to collect proposed solutions and facilitate peer feedback.

The instructor provided formative feedback to help students evaluate feasibility, cultural appropriateness, and managerial effectiveness of their solutions.

Student Activities

Students collaborated in groups to develop solutions and submitted their final proposals through Mentimeter. Based on feedback and comparison of ideas, students revised and refined their solutions in preparation for course assessment.

Research Data Generated

This phase generated solution-oriented responses and participation records, supporting the evaluation of students' application of cross-cultural knowledge and problem-solving abilities.

Step 5: Reflection and Summary Phase

Teacher Activities

At the conclusion of each PBL cycle, the instructor designed reflective questions through Mentimeter to guide students in reviewing their learning processes, challenges encountered, and cultural insights gained.

The instructor summarized common learning patterns and provided feedback on both learning processes and outcomes.

Student Activities

Students responded to reflective prompts via Mentimeter, sharing their learning experiences, perceived improvements in cultural understanding, and areas requiring further development.

Research Data Generated

Reflective response data were used as supplementary evidence to interpret students' learning engagement and perceived development of intercultural awareness throughout the Mentimeter-supported PBL process.

The population

Rationale for Group Comparison

The division into experimental and control groups enabled a comparative analysis of learning outcomes, classroom participation, and intercultural cognition. By comparing students exposed to the Mentimeter-supported PBL model with those receiving traditional lecture-based instruction, the study aimed to determine the effectiveness of integrating interactive presentation technology with PBL in Cross-Cultural Management education.

Research Instruments

To evaluate the effectiveness of the Mentimeter-supported Problem-Based Learning (PBL) model in enhancing student engagement and learning outcomes, multiple research instruments were employed to collect both quantitative and qualitative data. The instruments were designed in alignment with the Engagement Model and the research objectives of Objective 3.

1. Mentimeter-Based Classroom Interaction Data

Mentimeter was used as the primary interactive presentation technology throughout the experimental teaching process. The platform generated real-time digital records of student participation during PBL activities, including:

- Number of student responses to polls and questions

- Frequency of participation during problem identification, discussion, and reflection phases

- Distribution patterns of student responses (e.g., word clouds, multiple-choice polls)

These system-generated data provided objective indicators of behavioral engagement, particularly classroom participation and interaction frequency, and served as a key data source for comparing the experimental and control groups.

2. Student Engagement Questionnaire

A structured questionnaire was developed using Google Forms to assess students' engagement in the Cross-Cultural Management course. The questionnaire was constructed based on the three dimensions of the Engagement Model:

- Behavioral engagement (e.g., participation, involvement in activities)

- Emotional engagement (e.g., interest, motivation, enjoyment)

- Cognitive engagement (e.g., effort, deep thinking, problem-solving)

All items were designed to reflect students' learning experiences within the Mentimeter-supported PBL environment. The questionnaire was administered at the end of the instructional intervention to capture students' overall engagement perceptions.

3. Expert Validation of Research Instruments

To ensure content validity and alignment with the research objectives, the questionnaire items and examination questions were reviewed by two subject-matter experts with extensive experience in business education and cross-cultural management. The experts evaluated each item for clarity, relevance, and consistency with the engagement dimensions and course learning outcomes.

Based on the experts' feedback, items identified as ambiguous, overlapping, or misaligned with the intended constructs were revised or removed. This expert review process enhanced the validity and reliability of the instruments and ensured that the collected data accurately reflected student engagement and learning outcomes.

4. Observation Checklist

A structured observation checklist was used as a supplementary qualitative instrument to support the interpretation of quantitative findings. The checklist focused on observable indicators of student engagement during classroom sessions, including:

Participation: frequency of voluntary contributions, responses to questions, and engagement in Mentimeter activities

Interaction: quality of student–student and student–instructor interactions during group discussions

Engagement: visible attention, focus, and involvement during PBL tasks

Observational notes were used to contextualize Mentimeter participation data and survey results rather than as a standalone statistical dataset.

Data collection and Analysis

This study employed a mixed-methods approach to collect and analyze data in order to evaluate the effectiveness of the Mentimeter-supported Problem-Based Learning (PBL) model on student engagement and learning outcomes in a Cross-Cultural Management course. Data were collected from multiple sources, including Mentimeter system records, student questionnaires, classroom observations and were analyzed in alignment with the Engagement Model.

Data Collection Procedures

Mentimeter System Data

During the instructional intervention, Mentimeter was used throughout the PBL teaching process to facilitate student interaction. The system automatically recorded students' participation data. These data provided objective indicators of

behavioral engagement and were collected for each teaching session in the experimental group.

Classroom Observation

Classroom observations were conducted during PBL sessions to document students' observable engagement behaviors when participating in Mentimeter-supported activities. Observations focused on the following PBL phases:

Observation Content:

1. Problem Identification: Whether students are able to identify the core of the problem through the Mentimeter activity.
2. Data Collection: Whether students were able to effectively send and organize data using the Mentimeter.
3. Hypothesis generation: Whether students are able to generate diverse hypotheses through Mentimeter activities.
4. Solution Development: Can students collaborate to develop a solution through Mentimeter activities.

The observation indicators included the frequency of student participation, such as voluntary speaking, responding to questions, and engagement in group discussions. A five-point scale was used as a guiding framework to structure observation notes, ranging from minimal participation (score 1) to highly active participation (score 5).

The observation data were used as supportive qualitative evidence to contextualize and triangulate findings from Mentimeter records and questionnaire results, rather than as a primary statistical dataset.

Scoring Criteria:

Score 1: The student rarely initiates speaking and participates in class discussions fewer than two times per session.

Score 2: Student occasionally initiates speaking and has 2 - 3 interventions in some class discussions.

Score 3: Student has some active speaking initiative and speaks 3 - 4 times in most class discussions.

Score 4: Student is frequently active and speaks actively 4 - 5 times in every class discussion.

Score 5: Student is very active, takes the initiative many times, actively expresses ideas and speaks more than 5 times in class discussions.

Student questionnaires

A structured questionnaire was administered to both the experimental group and the control group at the end of the course. The questionnaire was developed based on the Engagement Model of Learning and consisted of three dimensions:

- Behavioral engagement
- Emotional engagement
- Cognitive engagement

Each dimension included five items measured on a five-point Likert scale (1 = very low, 5 = very high). The questionnaire was used to capture students' self-reported engagement experiences and perceptions of learning in the course.

Intercultural Competence Test

This intercultural competence test was designed as a multi-dimensional assessment framework, rather than a single standardized test. Different dimensions were measured using different instruments, including written tests, questionnaires, classroom observations, and Mentimeter-generated behavioral data.

The examination design of focus on those students' competence.

Table 3.3 Intercultural Competence Test Dimensions

	Dimensions	Conclude	Reference
Intercultural Competence Core Dimensions	Knowledge (K)	The primary focus is on how well students understand business etiquette, communication styles, values, belief systems, and global business cultural differences across cultures.	(Byram, 1997) (Deardorff, 2006) (Earley & Ang, 2003) (Hofstede, 1980) (Shadiev et al., 2021)
	Attitude (A)	Focuses on students' comfort level with different cultures, openness, respect for cultural differences, and perceptions of the importance of cross-cultural management skills in career development.	(Deardorff, 2006) (Earley & Ang, 2003) (Byram, 1997) (Fantini, 2000) (Livermore, 2011)
	Skills (S)	Assesses students' ability to communicate and collaborate in cross-cultural teamwork, conflict resolution, and business negotiations, as well as their ability to express opinions and ideas in cross-cultural settings.	(Byram, 1997) (Earley & Ang, 2003) (Thomas & Peterson, 2017) (Fantini, 2000) (Deardorff, 2006)
	Cognition & Metacognition (M)	Focuses on students' self-awareness, critical thinking, and behavioral strategy adjustment in cross-cultural interactions, as well as the understanding of complex situations in cross-	(Byram, 1990) (Deardorff, 2006) (Earley&Ang, 2003) (Shadiev et al., 2021)

Table 3.3 (Continued)

Dimensions		Conclude	Reference
Supporting / Manifested Dimensions	Behavior (B)	cultural management and the monitoring of learning progress	(Fantini, 2000)
		Students were observed to demonstrate cultural sensitivity, engagement, team role-taking, and behavioral responses to conflict in cross-cultural interactions.	(Deardorff, 2006) (Earley & Ang, 2003) (Byram, 199) (Fantini, 2000) (Thomas & Peterson, 2017)
	Motivation (MO)	Explore students' interest in learning about different cultures, intrinsic drive, career motivation, and persistence in the face of difficulties and external motivators.	(Gardner, 1985) (Ryan & Deci, 2000) (Dörnyei, 2005) (Dweck, 2006) (Vallerand, 2010)
		Measures a student's ability to adapt quickly and work effectively in different cultural contexts, including the ability to interpret nonverbal cues, adapt communication styles, build trusting and cooperative relationships, and make informed decisions.	(Earley & Ang, 2003) (Livermore, 2011) (Van der Zee&Van Oudenhoven, 2000) (Ang et al., 2007) (Thomas & Peterson, 2017)

Data Analysis Procedures

Analysis of Mentimeter Participation Data

Mentimeter participation data were analyzed using descriptive statistics to examine patterns of student engagement, including:

- Average number of responses per student
- Participation trends across different PBL phases
- Comparison of engagement intensity across sessions

These indicators were used to assess the extent to which Mentimeter facilitated active participation during PBL activities.

Questionnaire Data Analysis

Questionnaire responses were analyzed using descriptive statistical methods. Mean scores and standard deviations were calculated for each engagement dimension. Comparative analysis between the experimental group and the control group was conducted to examine differences in behavioral, emotional, and cognitive engagement.

The results were used to determine whether students exposed to the Mentimeter-supported PBL model demonstrated higher levels of engagement than those in the traditional lecture-based course.

Quantitative Analysis

Quantitative data collected from tests, questionnaires, classroom observations, and Mentimeter activity records were analyzed using appropriate statistical techniques to examine the effectiveness of the Mentimeter-supported PBL model in enhancing students' intercultural competence.

Descriptive Statistics

Descriptive statistical methods, including mean, standard deviation, and frequency distribution, were used to summarize students' responses to questionnaires and overall performance in intercultural competence dimensions. These statistics provided an overview of students' engagement levels, learning outcomes, and participation patterns.

Comparative Analysis (t-tests)

Independent-sample t-tests were employed to compare pre-test and post-test results, as well as differences between the experimental group (Mentimeter-supported PBL) and the control group (traditional instruction). These analyses were conducted to identify significant changes in students' intercultural competence and engagement outcomes following the instructional intervention.

Analysis of Variance (ANCOVA)

ANCOVA was applied, where appropriate, to examine differences in mean scores across groups and selected dimensions of intercultural competence. This analysis was used to explore variations in learning outcomes associated with different instructional approaches.

Regression Analysis

Regression analysis was used in an exploratory manner to examine the extent to which participation in Mentimeter-supported learning activities contributed to variations in students' intercultural competence outcomes. This analysis aimed to identify significant associations rather than establish causal relationships.

Qualitative Data Integration

Observation notes transcripts were analyzed thematically to identify recurring patterns related to student participation, learning experiences, and perceptions of Mentimeter use. These qualitative findings were used to explain and enrich the quantitative results, particularly in cases where statistical differences required contextual interpretation.

Objective 4 To evaluate and revised the designed model effectiveness in enhancing cross-cultural competency and learning outcomes

The Population

Three experts were invited to conduct formal IOC validation of the instructional model and research instruments

The population for Objective 4 consisted of three experts, including:

Table 3.4 Expert Background

Expert	Background	Years of Experience
Expert 1	Cross-cultural education	15
Expert 2	PBL instructional design	18
Expert 3	Cross-cultural in business	10

Item-Objective Coherence (IOC) Testing

The Item-Objective Coherence (IOC) method was employed in Objective 4 to evaluate the alignment between the designed Mentimeter-supported PBL instructional model, the assessment instruments, and the research objectives. This process aimed to ensure that each component of the model appropriately reflected the intended dimensions of intercultural competence and learning engagement.

Three experts were invited to conduct the IOC evaluation, including two academic experts specializing in cross-cultural management education and PBL pedagogy, and one industry expert with extensive experience in multinational corporate environments. Prior to the evaluation, the experts were provided with detailed information regarding the research objectives, the structure of the Mentimeter-supported PBL model, and the conceptual framework of intercultural competence.

Each expert reviewed the instructional model, questionnaire items, and test components to determine whether they were clearly aligned with the targeted dimensions of intercultural competence, including knowledge, attitudes, skills, cognition and metacognition, behavior, motivation, and cultural intelligence. The IOC rating criteria were defined as follows:

+1 = The item is clearly relevant to the objective

0 = The relevance of the item to the objective is unclear

-1 = The item is not relevant to the objective

IOC values were calculated by summing the expert ratings for each item and dividing by the number of experts. Items with IOC values of 0.50 or above were

considered acceptable. Items that did not meet this criterion were revised based on expert feedback to improve clarity, relevance, and alignment with the research objectives.

The Mentimeter-supported PBL model and related assessment instruments were refined to enhance conceptual coherence and practical applicability. This expert validation process contributed to the overall rigor and credibility of the instructional model.

Qualitative Analysis

Qualitative analysis was conducted to gain deeper insights into students' learning experiences and engagement processes when participating in the Mentimeter-supported PBL model. This analysis aimed to complement the quantitative findings and to provide explanatory evidence for evaluating and refining the instructional model.

Thematic Analysis

Thematic analysis was applied to qualitative data collected from classroom observation records and semi-structured student interviews. The analysis followed a hybrid approach, combining theory-driven and data-driven coding. Initial coding categories were informed by the stages of the PBL framework (problem identification, data collection, hypothesis generation, solution development, and reflection) and the dimensions of student engagement. Additional themes were inductively generated from recurring patterns in student responses and observed behaviors.

This process enabled the identification of key themes related to students' perceived engagement, learning challenges, collaboration experiences, and the role of Mentimeter in facilitating participation and intercultural understanding at different stages of the PBL process.

Observational Analysis

Classroom observation data were systematically analyzed to examine trends in student engagement, participation frequency, and student-teacher interactions during Mentimeter-supported PBL activities. Particular attention was given to

observable behaviors such as voluntary participation, responsiveness to Mentimeter prompts, group interaction dynamics, and instructor facilitation strategies.

The observational analysis helped to contextualize quantitative engagement scores and revealed how specific Mentimeter activities supported or constrained student involvement in different phases of PBL implementation.

Integration of Qualitative Findings

Findings from thematic and observational analyses were integrated to provide a comprehensive understanding of the instructional model's effectiveness and limitations. These qualitative insights informed expert evaluations and contributed to targeted revisions of the Mentimeter-supported PBL model, ensuring greater alignment between instructional design, student engagement processes, and intercultural competence development.

Research Ethics

This study was conducted in accordance with ethical principles for educational research. Participation of students in questionnaires, classroom activities, and assessments was entirely voluntary. Prior to data collection, students were informed of the purpose of the research, the procedures involved, and their right to withdraw at any time without academic penalty. All data collected were anonymized and used solely for academic research purposes.

Students' examination scores and Mentimeter participation records were obtained from regular course assessments and classroom activities, and were analyzed in aggregate form to ensure confidentiality. The researcher ensured that no personal identifiers were disclosed in any stage of data analysis or reporting.

Reliability and Validity of Research Instruments

To ensure the rigor and credibility of the research findings, multiple strategies were employed to establish the reliability and validity of the research instruments. Content validity was ensured through expert review and Item-Objective Congruence (IOC) testing, whereby academic and industry experts evaluated the alignment between questionnaire items, examination questions, and the research objectives. Items with IOC values below the acceptable threshold were revised or removed.

Construct validity was supported by grounding all instruments in established theoretical frameworks, including the Engagement Model of Learning, the Intercultural Competence Development Model (ICDM), and Cultural Intelligence theory. Reliability was further strengthened through consistent administration procedures across experimental and control groups.

In addition, methodological triangulation was applied by integrating multiple data sources, including examination scores, Mentimeter participation data, student questionnaires, classroom observations. This triangulated approach enhanced the trustworthiness of the findings by allowing cross-validation of results across quantitative and qualitative evidence.

Summary of Data Analysis Framework

Based on the research design and data collection procedures described in this chapter, data analysis was conducted in alignment with each research objective. Quantitative data, including examination scores, intercultural competence test results, and Mentimeter participation records, were analyzed using descriptive and inferential statistical methods. Qualitative data obtained from classroom observations analyzed using thematic analysis to capture students' learning experiences and engagement patterns.

The results of these analyses are presented in the following chapter. Chapter 4 reports the findings corresponding to each research objective, providing empirical evidence to evaluate the effectiveness of the Mentimeter-supported PBL model in enhancing learning outcomes and intercultural competence in cross-cultural management education.

Chapter 4

Results of Analysis

Results Related to Objective 1: To study the current teaching outcomes in the Cross-Cultural Management course at undergraduate level

Data Sources for Objective 1

To address Objective 1, this study utilized multiple data sources collected prior to the implementation of the Mentimeter-supported Problem-Based Learning (PBL) model. These data represent the baseline teaching and learning conditions in the Cross-Cultural Management course and provide a reference point for subsequent comparisons.

The data sources used for Objective 1 include:

Control Group Students' examination scores

Data were obtained from the final examination results of control group undergraduate students enrolled in the Cross-Cultural Management course at Private University. These scores reflect students' academic performance under conventional lecture-based instruction.

Students' intercultural cognition baseline data

Pre-course assessment data were collected to measure students' initial levels of intercultural knowledge and awareness. These data served as baseline indicators of students' understanding of cultural differences, global business practices, and cross-cultural management concepts before the intervention.

Descriptive Analysis of Students' Academic Performance

Analysis of examination score data revealed variations in students' academic performance under traditional instructional approaches. The results indicate that while a portion of students achieved satisfactory outcomes, a considerable number demonstrated difficulties in applying cross-cultural management concepts to problem-solving and case-based questions. This suggests that conventional lecture-

based teaching may be insufficient in fostering higher-order thinking and applied intercultural competence.

The distribution of scores highlights the need for instructional strategies that support deeper engagement, critical analysis, and practical application of cross-cultural knowledge.

Baseline Intercultural Cognition of Students

Baseline intercultural cognition data indicate that most students possessed basic awareness of cultural differences; however, their understanding tended to remain at a descriptive level. Students showed limited ability to interpret cultural behaviors within complex business contexts or to propose adaptive strategies for cross-cultural interactions.

Table 4.1 Descriptive Statistics of Pre-test Intercultural Cognition

Basic Indicator Pre-Test Intercultural Cognition

Item	n	Min.	Max.	Mean	S.D.	Median
PRE-K1	186	1.000	5.000	2.978	0.764	3.000
PRE-K2	186	1.000	5.000	3.011	0.764	3.000
PRE-K3	186	1.000	5.000	3.070	0.771	3.000
PRE-K4	186	2.000	5.000	3.059	0.699	3.000
PRE-K5	186	1.000	5.000	3.086	0.766	3.000
PRE-A1	186	1.000	5.000	3.129	0.815	3.000
PRE-A2	186	1.000	5.000	3.097	0.743	3.000
PRE-A3	186	1.000	5.000	3.048	0.745	3.000
PRE-A4	186	1.000	5.000	3.118	0.703	3.000
PRE-A5	186	2.000	5.000	3.183	0.712	3.000
PRE-S1	186	1.000	5.000	2.957	0.712	3.000
PRE-S2	186	2.000	4.000	3.022	0.665	3.000
PRE-S3	186	1.000	5.000	3.005	0.701	3.000
PRE-S4	186	1.000	5.000	3.043	0.763	3.000

Table 4.1 (Continued)

Item	n	Min.	Max.	Mean	S.D.	Median
PRE-S5	186	1.000	5.000	2.914	0.676	3.000
PRE-M1	186	1.000	5.000	3.027	0.753	3.000
PRE-M2	186	1.000	5.000	3.000	0.832	3.000
PRE-M3	186	1.000	4.000	2.930	0.713	3.000
PRE-M4	186	1.000	5.000	3.038	0.808	3.000
PRE-M5	186	1.000	4.000	2.968	0.735	3.000
PRE-B1	186	1.000	5.000	3.000	0.750	3.000
PRE-B2	186	1.000	5.000	3.027	0.767	3.000
PRE-B3	186	1.000	5.000	2.957	0.791	3.000
PRE-B4	186	1.000	5.000	3.054	0.741	3.000
PRE-B5	186	1.000	5.000	3.038	0.731	3.000
PRE-MO1	186	1.000	4.000	2.973	0.724	3.000
PRE-MO2	186	1.000	5.000	3.011	0.778	3.000
PRE-MO3	186	1.000	5.000	2.946	0.790	3.000
PRE-MO4	186	2.000	5.000	3.000	0.705	3.000
PRE-MO5	186	1.000	5.000	3.022	0.735	3.000
PRE-CI1	186	2.000	5.000	3.065	0.747	3.000
PRE-CI2	186	1.000	5.000	3.038	0.752	3.000
PRE-CI3	186	1.000	5.000	3.086	0.773	3.000
PRE-CI4	186	1.000	5.000	3.118	0.803	3.000
PRE-CI5	186	1.000	5.000	3.113	0.787	3.000

These findings suggest that while students had prior exposure to cross-cultural concepts, systematic instructional support was required to develop higher-level intercultural competence, including analytical, reflective, and strategic dimensions.

Descriptive analysis of the pre-test results shows that most items had mean scores close to 3.0, indicating a moderate level of intercultural awareness among

students at the baseline stage. The relatively consistent means and standard deviations suggest that students shared a similar level of understanding across different aspects of intercultural competence.

However, the absence of higher mean scores implies that students' initial competence remained at a basic level, without strong evidence of advanced understanding. This suggests that their intercultural knowledge may be limited to general awareness rather than deeper cognitive or behavioral integration.

Overall, the findings indicate that students entered the course with a foundational but not highly developed level of intercultural competence, providing a basis for further improvement through instructional intervention.

Summary of Objective 1 Findings

The findings related to Objective 1 indicate that the existing teaching approach in the Cross-Cultural Management course faces several challenges. These include uneven student participation, limited application of intercultural knowledge, and variations in academic performance. While students demonstrated foundational cultural awareness, deeper levels of intercultural competence and active engagement were not consistently observed.

These results provide empirical justification for the development and implementation of a Mentimeter-supported PBL instructional model and justified the need for a structured intervention to enhance intercultural competence and student engagement.

Results Related to Objective 2: To design a Problem-Based Learning (PBL) model using MENTIMETER as an Interactive Presentation Technology in Cross-Cultural Management course

Empirical Basis for Model Design

The design of the Mentimeter-supported Problem-Based Learning (PBL) model was grounded in the empirical findings obtained from Objective 1, which examined the current teaching outcomes of the Cross-Cultural Management course at the undergraduate level.

The analysis of baseline data revealed several recurring instructional issues. First, student participation in traditional lecture-based classrooms was uneven, with a small number of students dominating discussions while a majority remained passive. Second, although students demonstrated basic conceptual knowledge of cultural theories, their ability to apply such knowledge to practical cross-cultural business situations was limited. Third, existing instructional approaches provided insufficient opportunities for structured reflection, peer interaction, and iterative problem-solving—key components for developing intercultural competence.

Taken together, these findings highlighted the need for an instructional model that:

- i. Actively structures student participation across all stages of learning
- ii. Integrates real-world cross-cultural problems as the core learning driver
- iii. Embeds interactive presentation technology to support engagement, feedback, and reflection

These empirical insights provided a clear rationale for designing a PBL model systematically supported by Mentimeter.

Overall Structure of the Mentimeter-Supported PBL Model

Based on the findings above and the theoretical foundations outlined in Chapter 2, a five-stage Mentimeter-supported PBL instructional model was developed for the Cross-Cultural Management course.

The model consists of the following sequential stages:

- Problem Identification
- Data Collection and Exploration
- Hypothesis Generation
- Solution Development
- Reflection and Learning Consolidation

Each stage corresponds to a key phase of the PBL learning cycle and is intentionally supported by specific Mentimeter functions, such as word clouds, live polls, quizzes, and anonymous Q&A. The role of the instructor shifts from knowledge

transmitter to learning facilitator, while students take primary responsibility for inquiry, discussion, and problem-solving.

This structure ensures that learning progresses from surface understanding to deeper cognitive and intercultural engagement through iterative inquiry and feedback.

Integration of Mentimeter Functions Within Each PBL Stage

The integration of Mentimeter within the PBL framework was not incidental but purposefully aligned with learning objectives and engagement dimensions.

Each stage of the designed model was mapped against: Engagement Model dimensions (behavioral, affective, cognitive), Intercultural competence components (knowledge, skills, attitudes, metacognition)

For example, anonymous polling in the problem identification stage was designed to reduce participation anxiety, while collaborative word clouds in the hypothesis generation stage supported collective meaning-making across cultural perspectives.

This alignment ensures that the model is theoretically grounded and pedagogically coherent.

During the Problem Identification stage, Mentimeter word clouds and open-ended questions are used to elicit students' initial perceptions of cross-cultural business problems. Anonymous responses reduce participation anxiety and allow diverse viewpoints to emerge simultaneously.

In the Data Collection and Exploration stage, Mentimeter polls and short quizzes are employed to gather information, assess prior knowledge, and visualize response distributions. These functions help students identify patterns and gaps in understanding while providing instructors with real-time diagnostic feedback.

The Hypothesis Generation stage emphasizes collaborative reasoning. Students submit proposed explanations or strategies through Mentimeter, which are then collectively reviewed and refined through guided discussion. This stage supports higher-order thinking and exposure to alternative cultural perspectives.

During Solution Development, Mentimeter is used to prioritize strategies, evaluate alternatives, and justify decisions. Polling and ranking features help groups converge on feasible solutions while maintaining transparency in decision-making.

Finally, the Reflection and Learning Consolidation stage uses Mentimeter reflection questions and exit polls to encourage metacognitive awareness. Students reflect on what they learned, how their thinking evolved, and how cultural assumptions influenced their decisions.

Alignment With Engagement and Intercultural Competence Frameworks

The designed model demonstrates strong alignment with both the Engagement Model and intercultural competence development frameworks.

From an engagement perspective:

- Behavioral engagement is promoted through frequent, structured participation opportunities
- Affective engagement is supported by anonymity, gamification, and immediate feedback
- Cognitive engagement is strengthened through problem analysis, hypothesis testing, and reflection

From an intercultural competence perspective, the model systematically addresses:

- Knowledge acquisition through contextualized problems
- Attitude development through exposure to diverse viewpoints
- Skills enhancement through collaborative problem-solving
- Metacognitive growth through reflection and feedback

This alignment ensures that the instructional model is theoretically coherent and pedagogically meaningful

Expert Review and Model Refinement

To ensure instructional validity and feasibility, the preliminary version of the Mentimeter-supported PBL model was reviewed through semi-structured interviews with three purposively selected experts. The experts specialized in cross-cultural education, PBL instructional design, and cross-cultural business practice, with 15, 18,

and 10 years of experience, respectively. Overall, the experts agreed that the model had a clear and logical sequence and was appropriate for supporting intercultural competence development in a Cross-Cultural Management course. They also considered the use of Mentimeter suitable for increasing participation in large multicultural undergraduate classrooms.

However, several suggestions for refinement were provided. These included clarifying task instructions in the hypothesis generation stage, strengthening explanation and justification during the solution development stage, allowing more time for structured reflection, and using more authentic business-related cross-cultural scenarios. Based on these comments, minor revisions were made to improve clarity, feasibility, and instructional flow before implementation.

Finalized PBL Instructional Model

Following empirical grounding and expert validation, the Mentimeter-supported PBL model was finalized and adopted for classroom implementation. The model serves as the instructional foundation for Objective 3, where its effectiveness in enhancing student engagement and intercultural competence is empirically evaluated.

Theoretical Explanation of How the Five-Stage Model Supports Intercultural Competence

The optimized five-stage PBL–Mentimeter instructional model is theoretically grounded in the premise that intercultural competence develops through a progressive sequence of affective, cognitive, and reflective learning mechanisms. Rather than treating intercultural competence as a single outcome, the model conceptualizes it as the cumulative result of structured learning stages that activate complementary psychological processes.

The first stage establishes **affective safety**, which is a prerequisite for intercultural dialogue. Anonymous participation tools reduce social risk and participation anxiety, enabling students to express culturally sensitive perspectives without fear of judgment. This emotionally secure environment promotes openness

and willingness to engage with cultural differences, forming the foundation for subsequent learning.

The second stage facilitates **cognitive calibration** by exposing misconceptions and knowledge gaps through structured comparison and feedback. Immediate feedback encourages students to reassess prior assumptions and reconstruct their cultural understanding. This process shifts learning from passive reception to active reorganization of knowledge structures, which is essential for interpreting unfamiliar cultural frameworks.

The third stage develops **perspective taking**, a core component of intercultural competence. By requiring learners to generate multiple culturally grounded explanations, the model encourages cognitive flexibility and recognition of alternative viewpoints. Students move beyond single-perspective reasoning and begin to appreciate the coexistence of diverse cultural logics.

The fourth stage emphasizes cultural reasoning and justified decision making. Students must articulate the **cultural rationale behind their choices, transforming** intuitive judgments into explicit, analyzable reasoning. This stage operationalizes intercultural competence as a transferable decision-making skill applicable to real-world professional contexts.

The final stage supports **metacognitive integration** through structured reflection. By examining how their perspectives have evolved, students consolidate learning and internalize intercultural growth. Reflection transforms situational performance into durable competence by linking experience with self-awareness.

Together, these stages form a coherent developmental sequence in which emotional readiness enables cognitive restructuring, perspective taking supports culturally informed decision making, and reflection ensures long-term integration. The instructional model therefore functions as an integrated system that systematically translates engagement into intercultural competence.

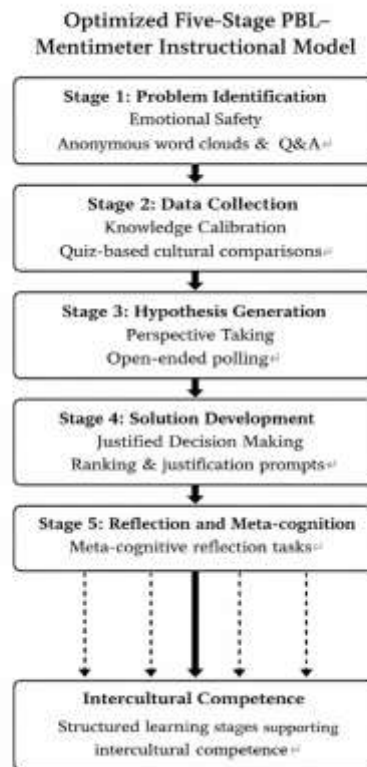


Figure 4.1 Metacognitive Integration

Results Related to Objective 3: To implement the designed model in Cross-Cultural Management course at Private University

This section presents an overview of students' overall academic performance in the Cross-Cultural Management course. Final examination scores were collected from institutional assessment records and analyzed using descriptive statistics to provide an initial understanding of learning outcomes before conducting comparative and inferential analyses.

The dataset included final examination scores of undergraduate students enrolled in the course. Descriptive statistics, including mean score, standard deviation, and score range, were calculated to examine the general performance level of students.

The results indicate that students achieved a moderate to high level of academic performance overall, suggesting that the instructional activities were

aligned with course learning objectives. However, variations in scores were observed, indicating differences in individual learning outcomes, which warranted further comparative analysis between instructional approaches in subsequent sections.

Mentimeter classroom log data were reorganized and operationalized into measurable engagement indicators, including participation frequency, response rate, cognitive output, and PBL process engagement. These indicators were used to support subsequent statistical analyses examining the relationship between classroom engagement and academic performance.

The Observation check the students show most student are more engage in Mentimeter tools when have competition and share them opinions.

Sample Characteristics

The participant pool comprised 186 international undergraduate BBA students registered in a cross-cultural management course at a private university in Thailand. The class structure determined the division into two groups: an experimental group receiving the Mentimeter-supported PBL intervention ($n = 93$) and a control group receiving traditional lecture-based instruction ($n = 93$).

Table 4.2 Sample Group Information

Option	Group	
	Frequency	Percent
Control Group	93	50.00%
Experimental Group	93	50.00%
Total	186	100.0%

The sample included 127 male students (68.28%) and 59 female students (31.72%), reflecting the heterogeneous cultural composition characteristic of internationally oriented business programs.

Table 4.3 Sample Gender Information

Gender		
Option	Frequency	Percent
Male	127	68.28%
Female	59	31.72%
Total	186	100.0%

Descriptive Statistics of Post-test Scores

To evaluate the effectiveness of the Mentimeter-supported PBL model, students' intercultural competence was measured using post-test assessments. The descriptive statistics are presented in Table 7.

Table 4.4 Descriptive Statistics of Post-test Intercultural Cognition

Basic Indicator Post-Test Intercultural Cognition						
Item	n	Min.	Max.	Mean	S.D.	Median
POST-K1	186	2.000	5.000	3.962	0.938	4.000
POST-K2	186	2.000	5.000	3.919	0.947	4.000
POST-K3	186	2.000	5.000	3.968	0.918	4.000
POST-K4	186	2.000	5.000	3.903	0.919	4.000
POST-K5	186	2.000	5.000	3.903	0.937	4.000
POST-A1	186	2.000	5.000	3.903	0.954	4.000
POST-A2	186	2.000	5.000	3.914	0.943	4.000
POST-A3	186	2.000	5.000	3.909	0.974	4.000
POST-A4	186	2.000	5.000	4.011	0.912	4.000
POST-A5	186	2.000	5.000	3.935	0.973	4.000
POST-S1	186	2.000	5.000	3.946	0.946	4.000
POST-S2	186	2.000	5.000	3.914	0.908	4.000
POST-S3	186	2.000	5.000	3.914	0.977	4.000
POST-S4	186	2.000	5.000	3.898	0.939	4.000

Table 4.3 (Continued)

Item	n	Min.	Max.	Mean	S.D.	Median
POST-S5	186	2.000	5.000	3.914	0.938	4.000
POST-M1	186	2.000	5.000	3.914	0.972	4.000
POST-M2	186	2.000	5.000	3.903	0.937	4.000
POST-M3	186	2.000	5.000	3.968	0.975	4.000
POST-M4	186	2.000	5.000	3.903	0.965	4.000
POST-M5	186	2.000	5.000	3.957	0.952	4.000
POST-B1	186	2.000	5.000	3.946	0.934	4.000
POST-B2	186	2.000	5.000	3.914	0.966	4.000
POST-B3	186	2.000	5.000	3.984	0.956	4.000
POST-B4	186	2.000	5.000	3.925	0.927	4.000
POST-B5	186	2.000	5.000	3.935	0.962	4.000
POST-MO1	186	2.000	5.000	3.957	0.923	4.000
POST-MO2	186	2.000	5.000	3.914	0.977	4.000
POST-MO3	186	2.000	5.000	3.925	0.956	4.000
POST-MO4	186	3.000	5.000	3.962	0.897	4.000
POST-MO5	186	2.000	5.000	3.909	0.905	4.000
POST-CI1	186	2.000	5.000	3.978	0.894	4.000
POST-CI2	186	2.000	5.000	3.957	0.958	4.000
POST-CI3	186	2.000	5.000	3.952	0.937	4.000
POST-CI4	186	2.000	5.000	3.973	0.950	4.000
POST-CI5	186	2.000	5.000	3.952	0.926	4.000

The descriptive statistics indicate that both groups improved from pre-test to post-test. However, the experimental group demonstrated substantially higher post-test performance compared to the control group. The experimental group also exhibited lower variability in post-test scores, suggesting more consistent learning outcomes under the Mentimeter-supported PBL model.

Independent Samples t-Test on Post-test Scores

An independent samples t-test was conducted to compare post-test intercultural competence scores between the experimental and control groups.

Table 4.5 Independent Samples t-Test Results

	Group (Mean $\pm$ S.D.)		t	p Value
	Control Group (n = 93)	Experimental Group (n = 93)		
POST-CI	3.146 $\pm$ 0.288	4.778 $\pm$ 0.227	-42.931	p<0.001
POST-MO	3.120 $\pm$ 0.262	4.746 $\pm$ 0.264	-42.129	p<0.001
POST-B	3.110 $\pm$ 0.290	4.772 $\pm$ 0.253	-41.683	p<0.001
POST-M	3.086 $\pm$ 0.314	4.772 $\pm$ 0.258	-40.003	p<0.001
POST-S	3.090 $\pm$ 0.274	4.744 $\pm$ 0.235	-44.176	p<0.001
POST-A	3.101 $\pm$ 0.274	4.768 $\pm$ 0.227	-45.122	p<0.001
POST-K	3.110 $\pm$ 0.271	4.753 $\pm$ 0.279	-40.744	p<0.001

* p<0.05 ** p<0.01 *** p<0.001

An independent-samples t-test was conducted to compare post-test intercultural competence between the control and experimental groups across multiple dimensions.

The results showed that the experimental group scored significantly higher than the control group on all dimensions, including cultural intelligence, motivation, behavior, mindfulness, sensitivity, attitude, and knowledge (all p < 0.001).

The mean scores of the experimental group ranged from 4.744 to 4.778, while the control group scores ranged from 3.086 to 3.146, indicating substantial differences between the two groups. The large t-values (ranging from -40.003 to -45.122) further confirm the strength of these differences.

These findings suggest that the Mentimeter-supported PBL instructional model had a significant and consistent impact on all aspects of intercultural

competence, leading to a comprehensive improvement in students' learning outcomes.

Analysis of Covariance (ANCOVA) Post-test Controlling Pre-test

Table 4.6 ANCOVA Results for Post-test Controlling Pre-test

ANCOVA					
Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	76.516	1	76.516	1134.954	<0.001
Group	123.753	1	123.753	1835.627	<0.001
PRE-CI	0.031	1	0.031	0.456	0.500
Residual	12.337	183	0.067		

Note: R-squared = 0.909

The ANCOVA results showed that, after controlling for pre-test CI scores, the effect of group remained statistically significant, $F = 1835.627$, $p < .001$. This indicates that the experimental and control groups differed significantly in the outcome even after adjusting for baseline performance. In contrast, pre-test CI was not a significant covariate, $F = 0.456$, $p = .500$. The model explained 90.9% of the variance in the dependent variable ($R^2 = .909$).

ANCOVA					
Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	76.079	1	76.079	1092.655	<0.001
Group	122.624	1	122.624	1761.126	<0.001
PRE-MO	0.000	1	0.000	0.006	0.937
Residual	12.742	183	0.070		

Note: R-squared = 0.906

Similarly, for MO, the ANCOVA results indicated a significant group effect after controlling for pre-test MO, $F = 1761.126$, $p < .001$. The covariate PRE-MO was not

statistically significant, $F = 0.006$, $p = .937$. The model accounted for 90.6% of the variance in the dependent variable ($R^2 = .906$).

ANCOVA

Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	71.112	1	71.112	956.330	<0.001
Group	127.622	1	127.622	1716.283	<0.001
PRE-B	0.001	1	0.001	0.010	0.919
Residual	13.608	183	0.074		

Note: R-squared = 0.904

ANCOVA

Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	85.055	1	85.055	1024.364	<0.001
Group	131.672	1	131.672	1585.794	<0.001
PRE-M	0.004	1	0.004	0.052	0.821
Residual	15.195	183	0.083		

Note: R-squared = 0.897

ANCOVA

Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	60.535	1	60.535	924.087	<0.001
Group	126.165	1	126.165	1925.954	<0.001
PRE-S	0.003	1	0.003	0.040	0.841
Residual	11.988	183	0.066		

Note: R-squared = 0.914

The ANCOVA results for B, M, and S showed that the group effect remained statistically significant after controlling for pre-test performance. For B, the effect of group was significant, $F = 1716.283$, $p < .001$, while the covariate PRE-B was not significant, $F = 0.010$, $p = .919$. For M, the group effect was also significant, $F = 1585.794$, $p < .001$, whereas PRE-M was not significant, $F = 0.052$, $p = .821$. Similarly,

for S, the group effect remained significant, $F = 1925.954$, $p < .001$, while PRE-S was not significant, $F = 0.040$, $p = .841$. These findings indicate that the differences in post-test performance were primarily associated with the instructional intervention rather than baseline differences.

ANCOVA

Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	69.030	1	69.030	1091.964	<0.001
Group	129.151	1	129.151	2042.983	<0.001
PRE-A	0.104	1	0.104	1.653	0.200
Residual	11.569	183	0.063		

Note: R-squared = 0.918

ANCOVA

Source	Sum of Squares	df	Mean Square	F	p Value
Intercept	75.749	1	75.749	997.419	<0.001
Group	125.515	1	125.515	1652.720	<0.001
PRE-K	0.015	1	0.015	0.201	0.655
Residual	13.898	183	0.076		

Note: R-squared = 0.900

For the A dimension, the ANCOVA results showed a statistically significant group effect after controlling for PRE-A, $F = 2042.983$, $p < .001$. This indicates that the post-test scores differed significantly between the experimental and control groups even after adjusting for baseline performance. The covariate PRE-A was not statistically significant, $F = 1.653$, $p = .200$. The model explained 91.8% of the variance ($R^2 = .918$). For the K dimension, the ANCOVA results also indicated a significant group effect after controlling for PRE-K, $F = 1652.720$, $p < .001$. The covariate PRE-K was not statistically significant, $F = 0.201$, $p = .655$. This suggests that the difference in post-test K scores was primarily associated with the instructional

intervention rather than baseline differences. The model explained 90.0% of the variance ($R^2 = .900$).

After controlling for pre-test scores, group membership remained a statistically significant predictor across all post-test dimensions. This suggests that the post-test differences were mainly associated with the intervention effect rather than baseline differences.

Participation and Engagement

Participation frequency was analyzed to measure classroom engagement.

Table 4.7 Engagement Dimension Means

Summary (Mean)			
Item	Group		Total
	Control Group	Experimental Group	
ae	2.276	4.047	3.161
ce	2.324	4.047	3.185
be	2.267	4.081	3.174

The experimental group showed dramatically higher participation frequency, reflecting the active engagement promoted by Mentimeter integration. This behavioral engagement aligns with the Engagement Model and supports the hypothesis that interactive technology fosters sustained classroom involvement.

Table 4.8 Participation Frequency by Group

Item	Summary (Mean)		Total
	Group		
	Control Group	Experimental Group	
Participation Frequency	8.516	58.903	33.710

Correlation Analysis

Pearson correlation analysis was conducted to examine the relationship between participation frequency and key learning variables.

Table 4.9 Correlation Matrix

Pearson Coefficient (Standard Format)	
Participation_Frequency	
ae	0.867***
ce	0.865***
be	0.873***
POST-Test Intercultural Cognition	0.921***
Final_Grade	0.661***

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

The results revealed a strong positive correlation between participation frequency and post-test intercultural competence ($r = 0.921$, $p < 0.001$), indicating that students who participated more actively tended to achieve higher levels of intercultural learning outcomes.

Participation frequency was also moderately correlated with final course grades ($r = 0.661$, $p < 0.001$), suggesting that increased engagement was associated with overall academic performance.

In addition, participation frequency showed strong positive correlations with all three dimensions of student engagement, including affective ($r = 0.867$), cognitive ($r = 0.865$), and behavioral engagement ($r = 0.873$), all at $p < 0.001$. These findings indicate that participation is closely linked to multiple aspects of student involvement in the learning process.

Overall, the results provide strong evidence that participation plays a central role in shaping both engagement and learning outcomes.

Regression Analysis

A multiple linear regression analysis was conducted to examine whether Mentimeter participation predicted post-test intercultural competence scores while controlling for students' initial ability.

Table 4.10 Regression Model

Linear Regression (n = 186)							
	Unstandardized Coefficient		Standardized Coefficient	t	p Value	Collinearity Diagnostic	
	B	Std. Error	Beta			VIF	Tolerance
Constant	3.109	0.021	-	148.986	0.000***	-	-
Group	1.653	0.030	0.972	56.006	0.000***	1.000	1.000
R-squared	0.945						
Adjust R-squared	0.944						
F Test	F (1, 184) = 3136.658, p = 0.000						
D-W	2.360						

Note: Dependent Variable = POST-Test Intercultural Cognition

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

A linear regression analysis was conducted to examine the effect of the instructional model on post-test intercultural competence.

The results indicated that the group variable was a highly significant predictor of post-test scores ($B = 1.653$, $\beta = 0.972$, $p < 0.001$). This finding suggests that students in the experimental group achieved substantially higher levels of intercultural competence compared to those in the control group.

The model demonstrated very strong explanatory power ($R^2 = 0.945$), indicating that the instructional model accounted for a large proportion of the variance in students' learning outcomes. In addition, no multicollinearity issues were observed ($VIF = 1.000$), confirming the stability of the model.

Overall, these results provide strong evidence that the Mentimeter-supported PBL instructional approach had a substantial positive impact on students' intercultural competence development.

Table 4.11 Linear Regression (n = 186)

	Unstandardized Coefficient		Standardized Coefficient	t	p Value	Collinearity Diagnostic	
	B	Std. Error	Beta			VIF	Tolerance
Constant	2.958	0.039	-	75.696	0.000***	-	-
Participation_Frequency	0.029	0.001	0.921	32.066	0.000***	1.000	1.000
R-squared	0.848						
Adjust R-squared	0.847						
F Test	F (1, 184) = 1028.235, p = 0.000						
D-W	2.007						

Note: Dependent Variable = POST-Test Intercultural Cognition

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

The results indicated that participation frequency was a highly significant predictor of post-test scores ($B = 0.029$, $\beta = 0.921$, $p < 0.001$). This finding suggests that students who engaged more frequently in Mentimeter-supported activities achieved substantially higher levels of intercultural competence.

The model demonstrated strong explanatory power ($R^2 = 0.848$), indicating that participation alone accounted for a large proportion of the variance in learning outcomes. In addition, no multicollinearity issues were observed ($VIF = 1.000$), confirming the stability and reliability of the regression model.

Overall, these results highlight the critical role of active participation in mediating the effectiveness of the instructional model, suggesting that increased engagement is a key mechanism driving improvements in intercultural competence.

Reliability of Measurement Scales

Cronbach's alpha was calculated to assess the internal consistency of the intercultural competence scale.

Table 4.12 Intercultural Competence Cronbach Alpha

Item	Corrected item-total correlation (CITC)	Alpha if Item Deleted	Cronbach Alpha
POST-CI	0.841	0.898	0.914
POST-MO	0.852	0.898	
POST-B	0.842	0.898	
POST-M	0.842	0.898	
POST-S	0.843	0.898	
POST-A	0.855	0.898	
POST-K	0.843	0.898	
PRE-CI	0.323	0.916	
PRE-MO	0.347	0.916	
PRE-B	0.385	0.915	
PRE-M	0.371	0.915	
PRE-S	0.408	0.914	
PRE-A	0.326	0.916	
PRE-K	0.326	0.916	

Note: Standardized Cronbach's $\alpha = 0.905$

The results indicated a high level of reliability ($\alpha = 0.905$), suggesting that the instrument demonstrated strong internal consistency. The corrected item-total correlation (CITC) values for the post-test items ranged from 0.841 to 0.855, indicating that all dimensions were strongly associated with the overall construct.

In contrast, the pre-test items showed moderate CITC values (ranging from 0.323 to 0.408), suggesting greater variability in students' baseline responses. This

pattern is consistent with the expectation that students' intercultural competence becomes more structured and coherent following instructional intervention. The "alpha if item deleted" values remained stable across all items, indicating that no single item significantly affected the reliability of the scale.

Overall, the findings confirm that the instrument used in this study is reliable for measuring intercultural competence, with improved internal consistency observed in the post-test results.

Table 4.13 Student Engagement Cronbach Alpha

Item	Corrected item-total correlation (CITC)	Alpha if Item Deleted	Cronbach Alpha
ae	0.960	0.959	0.977
ce	0.947	0.968	
be	0.944	0.971	

Note: Standardized Cronbach's α = 0.977

Cronbach's alpha was calculated to assess the internal consistency of the student engagement scale.

The results indicated a very high level of reliability (α = 0.977), suggesting that the scale demonstrated excellent internal consistency. In addition, all items showed strong corrected item-total correlations (ranging from 0.944 to 0.960), indicating that each dimension contributed positively to the overall construct.

The "alpha if item deleted" values remained high across all items, suggesting that no single dimension significantly reduced the reliability of the scale.

However, the high level of internal consistency may also indicate substantial overlap among the affective, cognitive, and behavioral dimensions. This suggests that while these components are conceptually distinct, they are closely related in practice and may collectively represent a unified construct of student engagement.

Overall, the findings confirm that the engagement scale used in this study is highly reliable for measuring students' involvement in the learning process.

Results Related to Objective 4: Evaluation and Revision of the Instructional Model

Item–Objective Congruence (IOC) Results

Experts rated each component of the instructional model using IOC criteria.

Table 4.14 IOC Evaluation Results

Item	Expert 1	Expert 2	Expert 3
Stage 1: Identification	+1	+1	+1
Stage 2: Collection	+1	+1	+1
Stage 3: Generation	0	+1	+1
Stage 4: Development	+1	0	+1
Stage 5: Evaluation	+1	+1	0
Attitude	+1	+1	+1
Knowledge	+1	+1	+1
Skills	+1	0	+1
Metacognition	+1	+1	0

Three experts evaluated the congruence of the proposed PBL-Mentimeter integrated model with the research objectives and theoretical framework. Overall, the model received positive ratings across the five instructional stages and the four expected ICC outcome domains. Most items were rated +1, indicating clear consistency with the objectives. Several items received 0 from individual experts, mainly in relation to the need for clearer task instructions in Stage 3, stronger justification in Stage 4, and more concrete reflection prompts in Stage 5. Across the three expert reviews, the main recommendations included clarifying activity instructions, strengthening reasoning and explanation during decision-making, adding

a possible feedback loop between stages, and combining digital participation with face-to-face discussion to avoid over-reliance on technology.

Expert Feedback and Model Revision

Qualitative feedback from experts suggested several improvements to strengthen the clarity, feasibility, and intercultural relevance of the model. The revisions were informed by both the preliminary expert interviews and the formal IOC validation conducted in the final evaluation stage. The main recommendations included clearer scaffolding in the hypothesis generation stage, enhanced reflection prompts, structured feedback loops between stages, and the use of more authentic cross-cultural business scenarios. These recommendations were incorporated into the revised instructional model while maintaining the original five-stage PBL structure.

Qualitative feedback from experts suggested several improvements:

- clearer scaffolding in hypothesis generation to guide students from idea sharing to evidence-based interpretation
- enhanced reflection prompts to support metacognitive awareness and attitudinal development
- structured feedback loops to allow students to revisit earlier stages when solutions were not feasible
- more authentic cross-cultural business scenarios to strengthen practical relevance in management education

These recommendations were incorporated into the revised instructional model.

Table 4.15 Summary of Expert Recommendations

Feedback Area	Revision Implemented
Reflection stage	Added guided reflection prompts
Engagement tracking	Standardized Mentimeter templates
Hypothesis generation	Clarified task instructions and scaffolding
Problem identification	Revised tasks using more authentic cross-cultural business scenarios

Final Version of the Revised Model

The final instructional model integrates expert feedback while preserving core PBL principles. The revised framework strengthens engagement consistency, instructional clarity, assessment alignment, intercultural relevance, and practical suitability for large multicultural undergraduate classrooms.

Chapter 5

Conclusion Discussion and Recommendations

Summary of Key Findings

This study examined the effectiveness of a Mentimeter-supported Problem-Based Learning (PBL) model in enhancing intercultural competence and engagement in an undergraduate cross-cultural management course. The findings demonstrate three major outcomes.

First, students exposed to the Mentimeter-supported PBL model achieved significantly higher post-test intercultural competence scores than those receiving traditional lecture-based instruction. Second, engagement indicators derived from Mentimeter participation were strongly associated with learning outcomes. Third, expert validation confirmed the instructional coherence and pedagogical value of the model after refinement.

These results suggest that the integration of interactive presentation technology within a structured PBL framework can meaningfully enhance intercultural learning. Rather than functioning as a mere technological add-on, Mentimeter acted as a mediator of cognitive and affective engagement across all learning stages.

The discussion that follows interprets these findings through theoretical, pedagogical, and practical lenses.

Interpretation of Results

The results presented in Chapter 4 demonstrate that the Mentimeter-supported Problem-Based Learning (PBL) model significantly enhanced students' engagement and intercultural competence in the cross-cultural management course. This section interprets these findings from a pedagogical and practical perspective, focusing on how specific classroom mechanisms contributed to measurable learning improvements.

Rather than viewing the statistical differences between the experimental and control groups as isolated numerical outcomes, this discussion situates the results within the lived classroom experience. The integration of Mentimeter did not simply introduce a technological novelty; instead, it restructured interaction patterns, redistributed participation opportunities, and transformed the emotional climate of learning.

Transformation of Classroom Participation Dynamics

One of the most striking findings of the study was the substantial increase in participation rates within the experimental group. Mentimeter logs revealed that nearly all students contributed responses during each session whereas participation in the traditional lecture group was concentrated among a small subset of vocal students.

In large multicultural classrooms, participation inequality is a persistent challenge. Students from high power-distance cultures often hesitate to speak publicly due to fear of making mistakes or losing face (Zhao & McDougall, 2008; Hallinger & Lu, 2011). The anonymity of Mentimeter functioned as a psychological safety mechanism. Students could express ideas without social risk, which reduced performance anxiety and encouraged experimentation with unfamiliar perspectives.

From a teaching standpoint, this shift altered the instructor's role. Instead of waiting for volunteers, the instructor received instant input from the entire class. This enabled real-time adjustment of explanations and allowed misconceptions to surface earlier in the learning process.

Practically, this suggests that technology-mediated participation can democratize classroom interaction. When every student has an equal channel for expression, quieter learners gain visibility, and group discussions become more representative of the collective understanding.

Enhancement of Cognitive Engagement Through Structured PBL Phases

The structured five-stage PBL model provided a scaffold that guided students through increasingly complex cognitive tasks. Mentimeter supported each stage with tools that matched the cognitive demands of the activity.

During the problem identification stage, word clouds helped visualize shared concerns. Students immediately saw which cultural conflicts were most salient to the group. This collective visualization stimulated curiosity and anchored abstract concepts in concrete classroom experiences.

In the data collection stage, quizzes exposed gaps in cultural knowledge. Instead of passively receiving information, students actively tested their assumptions. When incorrect answers appeared on screen, they became entry points for discussion.

The hypothesis generation stage encouraged perspective-taking. Open-ended responses allowed students to propose alternative interpretations of cross-cultural scenarios. The diversity of answers demonstrated that cultural problems rarely have single solutions, reinforcing the complexity of intercultural decision-making.

Finally, ranking and justification tasks in the solution development stage required students to defend their reasoning. This step was crucial because it moved learning beyond preference expression toward evidence-based argumentation.

Together, these stages cultivated deeper cognitive engagement than traditional lectures. Students were not merely absorbing information; they were repeatedly applying, evaluating, and revising their understanding (Hmelo-Silver, 2004; Hmelo-Silver, Duncan, & Chinn, 2007).

Emotional Climate and Motivation in Multicultural Learning Environments

Beyond cognitive gains, the experimental group reported higher levels of emotional engagement and course satisfaction. Observational notes indicated that the classroom atmosphere became more collaborative and less hierarchical.

Mentimeter's interactive features introduced moments of shared excitement. Seeing collective results appear instantly created a sense of group participation. Students often reacted visibly to surprising outcomes, which sparked spontaneous discussion.

In cross-cultural education, emotional safety is essential. Students must feel comfortable expressing culturally sensitive viewpoints. The structured anonymity and

equal participation mechanisms helped reduce interpersonal tension and foster mutual respect (Kahu, 2013).

Motivation was also influenced by the perception of relevance. Because PBL tasks were connected to real business scenarios, students recognized the practical value of intercultural skills. This alignment between classroom activities and future professional contexts strengthened intrinsic motivation (Ryan & Deci, 2000).

Development of Intercultural Competence Through Experiential Interaction

The improvement in intercultural competence scores can be linked to repeated exposure to culturally diverse perspectives within structured problem-solving tasks.

Instead of learning cultural theories in isolation, students encountered situations that required negotiation between competing values. Group discussions revealed how cultural assumptions shape interpretation and decision-making.

Reflection activities at the end of each session encouraged students to examine their own biases. Writing brief reflections forced learners to articulate changes in their thinking. Over time, these micro-reflections accumulated into a habit of meta-cognitive awareness (Byram, 1997; Deardorff, 2006).

This iterative cycle—experience, discussion, reflection—mirrors real-world intercultural adaptation processes. By simulating authentic interactions, the classroom became a safe laboratory for practicing cultural flexibility.

Integration of Technology and Pedagogy

A key insight from the study is that technology alone does not guarantee improved learning outcomes. The effectiveness of Mentimeter depended on its integration within a coherent pedagogical framework (Belland, 2014).

When interactive tools were aligned with clear learning objectives, they amplified the strengths of the PBL model. Conversely, when used without structure, technology risked becoming superficial entertainment (Kirschner, Sweller, & Clark, 2006).

The success of the experimental course lay in the deliberate pairing of each Mentimeter activity with a specific pedagogical purpose. This intentional design ensured that technology served learning rather than distracting from it.

For educators, this underscores the importance of instructional planning. Interactive tools should be selected based on how well they support desired competencies, not simply because they are available.

Implications for Large-Scale Undergraduate Teaching

The findings have practical implications for institutions facing increasing class sizes and cultural diversity. Traditional lecture formats struggle to maintain engagement in such environments.

The Mentimeter-supported PBL model offers a scalable solution. Because participation occurs through personal devices, logistical barriers are minimized. Instructors can gather input from hundreds of students simultaneously.

This scalability is particularly relevant for universities seeking to internationalize their curricula. Interactive technologies enable inclusive participation without requiring radical infrastructure changes.

However, scalability must be accompanied by instructor training. Teachers need support in designing meaningful activities and interpreting real-time data. Without pedagogical competence, technological adoption may produce inconsistent results (Scherer et al., 2019).

Summary of Interpretive Insights

In summary, the improved outcomes observed in the experimental group stem from multiple interacting factors:

- Democratized participation
- Structured cognitive scaffolding
- Emotionally supportive classroom climate
- Experiential intercultural interaction
- Intentional technology integration

These elements collectively transformed the learning environment from passive reception to active collaboration.

The results suggest that effective cross-cultural education requires not only content knowledge but also carefully designed interaction systems that support engagement across cognitive, emotional, and social dimensions.

Mechanisms: How the Optimized Five-Stage Model Facilitates Learning

The optimized five-stage PBL-Mentimeter model provides a structured pathway through which engagement translates into competence. Each stage supports a distinct dimension of intercultural development.

Stage 1: Problem Identification — Emotional Safety

The use of anonymous word clouds and Q&A tools establishes psychological safety. Students surface cultural tensions without fear of judgment. This stage primarily activates affective engagement, which is essential for reducing intercultural anxiety.

By visually representing shared concerns, the class collectively recognizes common challenges. This reduces individual isolation and encourages openness.

Stage 2: Data Collection — Knowledge Calibration

Quiz-based cultural comparisons expose misconceptions and knowledge gaps. Immediate feedback helps students recalibrate their understanding of cultural frameworks.

This stage transforms abstract theory into actionable knowledge. Students begin to see culture not as stereotype but as analytical structure.

Stage 3: Hypothesis Generation — Perspective Taking

Open-ended polling requires students to generate multiple culturally grounded explanations. The requirement to submit alternative perspectives forces cognitive flexibility.

This stage is critical for developing empathy and viewpoint diversity. Students learn to inhabit perspectives beyond their own cultural defaults.

Stage 4: Solution Development — Justified Decision Making

The addition of justification after ranking transforms voting into reflective reasoning. Students must articulate cultural logic behind decisions.

This step operationalizes intercultural skills. Decision making becomes explicit, analyzable, and defensible.

The feedback loop allowing return to hypothesis generation reinforces iterative thinking. Students learn that intercultural solutions are provisional and negotiable.

Stage 5: Reflection and Meta-cognition

Meta-cognitive reflection consolidates learning. By explicitly identifying how their perspectives changed, students internalize intercultural growth.

This stage shifts learning from situational performance to durable competence.

Together, these mechanisms demonstrate that the instructional model functions as an integrated developmental system rather than a collection of activities.

Contribution to Cross-Cultural Management Education

This study contributes to cross-cultural management education in three ways.

First, it provides empirical evidence linking interactive technology with intercultural competence development. Many prior studies document engagement gains without demonstrating competence outcomes.

Second, the five-stage model offers a replicable instructional framework. Educators can adopt or adapt the structure without requiring extensive technological infrastructure.

Third, the model bridges theory and practice. Cultural frameworks become tools for solving real problems rather than abstract content.

This integration is particularly relevant in multicultural classrooms where experiential learning opportunities are limited.

Practical Implications

The findings of this study offer several practical implications for educators designing cross-cultural management courses.

Designing Inclusive Participation Mechanisms

Instructors should intentionally design participation mechanisms that reduce social barriers. Anonymous digital interaction tools can help students express ideas without fear of judgment. However, anonymity should be paired with structured discussion to transform individual responses into collective learning.

Structuring Experiential Learning Cycles

Effective intercultural education requires repeated engagement with authentic scenarios. The five-stage model provides a replicable framework that instructors can adapt to various subjects. By sequencing activities from exploration to reflection, teachers can scaffold increasingly sophisticated thinking.

Institutionalizing Reflection

Reflection should not be treated as an optional add-on. Short, consistent reflection tasks help students internalize lessons and recognize changes in their attitudes. Over time, this practice cultivates self-awareness essential for intercultural competence.

Supporting Instructor Development

Technology integration demands pedagogical training. Institutions should invest in professional development programs that help instructors design meaningful interactive activities and interpret engagement data.

Limitations of the Study

Despite its contributions, this study has several limitations that should be acknowledged.

The research was conducted within a single private university and focused on one course during one semester. Findings may not fully generalize to different institutional contexts or academic disciplines.

Although the sample size was adequate for statistical analysis, the study covered only one semester. Longer-term research is needed to determine whether observed improvements persist over time.

Intercultural competence is a complex construct. While multiple dimensions were assessed using validated instruments, no single measure can capture its full depth. Future studies may benefit from longitudinal qualitative tracking or performance-based assessments.

The success of the model partially depends on reliable digital infrastructure. Technical issues or unequal access to devices could affect implementation in other settings.

Finally, while group assignment followed intact classroom boundaries, the use of quasi-experimental design constrains causal precision compared to randomized controlled trials.

Recommendations for Future Research

Future research should expand on this study in several directions.

Researchers should investigate the long-term impact of PBL-Mentimeter instruction on professional intercultural performance. Tracking graduates into workplace environments would provide valuable insights.

Replicating the model across universities and cultural contexts would test its adaptability. Comparative studies could identify contextual factors influencing effectiveness.

Emerging technologies such as AI-assisted feedback systems could enhance personalized learning. Future studies might explore how adaptive tools support intercultural skill development.

Investigating how instructor preparation influences outcomes would strengthen implementation strategies. Professional development programs deserve systematic evaluation.

Multi-site studies would evaluate the resilience of these trends across varied institutional environments.

Final Concluding Remarks

In an increasingly globalized educational landscape, universities must prepare students to navigate complex cultural environments. This study demonstrates that thoughtfully designed interactive learning systems can significantly enhance both engagement and intercultural competence.

The PBL-Mentimeter instructional model offers a practical pathway toward more inclusive and participatory classrooms. By combining experiential problem-solving with digital interaction, educators can create learning environments that reflect the realities of multicultural collaboration.

While continued refinement is necessary, the findings suggest that technology-enhanced pedagogy holds substantial promise for the future of cross-cultural education.

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Appendices

Appendix A

Student Learning and Intercultural
Competence Survey

Appendence 1

Student Learning and Intercultural Competence Survey

This survey aims to understand your learning engagement and intercultural competence development. There are no right or wrong answers. Please be as honest as possible. **Part A:** Fill in or check the appropriate box. **Part B - C:** Indicate your level of agreement on a scale of 1 to 5.

(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

PART A: Background Information

A1. Gender: [] Male [] Female

PART B: STUDENT ENGAGEMENT SCALE

NO.	STATEMENT	1	2	3	4	5
Behavioral engagement						
BE1	I actively contribute during classroom discussions.	☐	☐	☐	☐	☐
BE2	I respond to interactive classroom activities.	☐	☐	☐	☐	☐
BE3	I collaborate actively in group tasks.	☐	☐	☐	☐	☐
BE4	I volunteer to share ideas.	☐	☐	☐	☐	☐
BE5	I complete learning tasks consistently.	☐	☐	☐	☐	☐
BE6	I remain attentive during class activities.	☐	☐	☐	☐	☐
Cognitive engagement						
CE1	I analyze problems deeply during learning.	☐	☐	☐	☐	☐
CE2	I apply theoretical knowledge to practical situations.	☐	☐	☐	☐	☐
CE3	I connect new ideas to prior knowledge.	☐	☐	☐	☐	☐
CE4	I evaluate different perspectives critically.	☐	☐	☐	☐	☐
CE5	I reflect on my understanding regularly.	☐	☐	☐	☐	☐
CE6	I attempt to solve complex challenges independently.	☐	☐	☐	☐	☐
Affective engagement						
AE1	I feel emotionally invested in this course.	☐	☐	☐	☐	☐
AE2	I enjoy participating in learning activities.	☐	☐	☐	☐	☐
AE3	I feel safe expressing opinions.	☐	☐	☐	☐	☐

PART B: STUDENT ENGAGEMENT SCALE

NO.	STATEMENT	1	2	3	4	5
AE4	I am motivated to learn in this class.	☐	☐	☐	☐	☐
AE5	I find the course stimulating.	☐	☐	☐	☐	☐
AE6	I feel confident engaging with classmates.	☐	☐	☐	☐	☐

PART C: INTERCULTURAL COMPETENCE SCALE

NO.	Statement	1	2	3	4	5
Knowledge						
K1	I understand cultural differences in communication.	☐	☐	☐	☐	☐
K2	I recognize cultural influences on business behavior.	☐	☐	☐	☐	☐
K3	I understand global cultural norms.	☐	☐	☐	☐	☐
K4	I identify cultural values in professional contexts.	☐	☐	☐	☐	☐
K5	I understand cultural frameworks used in management.	☐	☐	☐	☐	☐
Attitude						
A1	I respect diverse cultural perspectives.	☐	☐	☐	☐	☐
A2	I am open to unfamiliar cultural practices.	☐	☐	☐	☐	☐
A3	I value intercultural collaboration.	☐	☐	☐	☐	☐
A4	I am willing to adapt culturally.	☐	☐	☐	☐	☐
A5	I appreciate cultural diversity.	☐	☐	☐	☐	☐
Skills						
S1	I communicate effectively across cultures.	☐	☐	☐	☐	☐
S2	I manage misunderstandings constructively.	☐	☐	☐	☐	☐
S3	I collaborate in multicultural teams.	☐	☐	☐	☐	☐
S4	I negotiate cultural differences.	☐	☐	☐	☐	☐
S5	I adapt interaction styles appropriately.	☐	☐	☐	☐	☐
Metacognition						
M1	I reflect on my cultural assumptions.	☐	☐	☐	☐	☐
M2	I monitor my intercultural learning.	☐	☐	☐	☐	☐
M3	I adjust thinking based on new perspectives.	☐	☐	☐	☐	☐
M4	I evaluate my behavior in cultural contexts.	☐	☐	☐	☐	☐

PART C: INTERCULTURAL COMPETENCE SCALE

NO.	Statement	1	2	3	4	5
M5	I recognize personal biases.	☐	☐	☐	☐	☐
	Behavior					
B1	I demonstrate cultural sensitivity.	☐	☐	☐	☐	☐
B2	I engage respectfully with others.	☐	☐	☐	☐	☐
B3	I adjust behavior in multicultural settings.	☐	☐	☐	☐	☐
B4	I respond appropriately to cultural conflict.	☐	☐	☐	☐	☐
B5	I take initiative in cross-cultural interaction.	☐	☐	☐	☐	☐
	Motivation					
MO1	I am motivated to learn about cultures.	☐	☐	☐	☐	☐
MO2	I seek intercultural experiences.	☐	☐	☐	☐	☐
MO3	I persist when facing cultural challenges.	☐	☐	☐	☐	☐
MO4	I value intercultural competence for my career.	☐	☐	☐	☐	☐
MO5	I am curious about other cultures.	☐	☐	☐	☐	☐
	Cultural Intelligence					
CI1	I adapt quickly in new cultural settings.	☐	☐	☐	☐	☐
CI2	I interpret nonverbal cues accurately.	☐	☐	☐	☐	☐
CI3	I build trust across cultures.	☐	☐	☐	☐	☐
CI4	I feel confident internationally.	☐	☐	☐	☐	☐
CI5	I function effectively in diverse environments.	☐	☐	☐	☐	☐

Appendix B

Expert Interview for Problem-Based Learning
Instructional Design Using Interactive Presentation
Technology in Cross-Cultural Management Course

Expert Interview Questions for Preliminary Model Review

Q1. In your opinion, is the overall structure of the Mentimeter-supported PBL model clear and logically sequenced? Why or why not?

Q2. Are the five learning stages appropriate for developing students' intercultural competence in a Cross-Cultural Management course?

Q3. Do the proposed Mentimeter activities match the purpose of each PBL stage? Please explain.

Q4. Is this model feasible for implementation in a large multicultural undergraduate classroom? What challenges do you foresee?

Q5. Which stage or activity needs revision or further clarification?

Q6. What suggestions do you have to improve the model before implementation?

Interview Responses

Expert 1: Cross-Cultural Education, 15 years

Q1. Is the overall structure clear and logically sequenced?

Answer:

Yes, the overall structure is clear and generally well sequenced. The progression from problem identification to reflection follows a meaningful learning flow. Students first become aware of the issue, then explore information, discuss possible explanations, develop solutions, and finally reflect on what they have learned. This sequence supports intercultural learning because students need both exposure and reflection. However, the transition between the hypothesis generation stage and the solution development stage should be made more explicit so that students understand how discussion moves toward decision-making.

Q2. Are the five learning stages appropriate for developing intercultural competence?

Answer:

Yes, the five stages are appropriate. Intercultural competence is not developed through content memorization alone. Students need opportunities to express

viewpoints, hear culturally different responses, compare perspectives, and reflect on assumptions. The proposed stages allow these processes to happen. In particular, the reflection stage is very important because students often notice cultural differences during class but do not automatically turn those experiences into deeper understanding unless they are guided to reflect.

Q3. Do the Mentimeter activities match each PBL stage?

Answer:

Most of the proposed activities are appropriate. Word clouds and open-ended questions are effective at the beginning because they allow students to respond without fear of being judged. This is especially helpful in multicultural classrooms where some students may hesitate to speak openly. Polls and ranking tasks are also suitable in later stages. However, the teacher should make sure that Mentimeter is used not only to collect answers but also to stimulate discussion. Otherwise, students may focus only on submitting responses rather than thinking deeply about intercultural issues.

Q4. Is the model feasible in a large multicultural undergraduate classroom?

Answer:

Yes, it is feasible, especially because anonymous participation can reduce speaking anxiety and increase inclusiveness. In large classes, many students remain silent in normal discussion, so Mentimeter can help broaden participation. The main challenge is time management. If too many activities are used in one class, students may respond quickly but not reflect enough. Another challenge is that students from different language backgrounds may interpret questions differently, so prompts should be simple and clear.

Q5. Which stage needs revision or clarification?

Answer:

The hypothesis generation stage needs more clarification. Students may not immediately understand what kind of response is expected. Some may provide opinions, while others may provide solutions too early. The teacher should give clear instructions and perhaps one short example to guide students.

Q6. Suggestions for improvement

Answer:

I suggest three improvements. First, make the task instructions clearer in each stage, especially in the middle stages. Second, increase the reflective questions at the end so students can connect classroom discussion with their own cultural assumptions. Third, ensure that the teacher summarizes different viewpoints after each Mentimeter activity, so students can see the intercultural meaning behind the responses.

Expert 2: PBL Instructional Design, 18 years**Q1. Is the overall structure clear and logically sequenced?****Answer:**

Yes, the model has a logical PBL sequence. It begins appropriately with problem identification and moves through inquiry, interpretation, solution building, and reflection. From an instructional design perspective, the structure is consistent with inquiry-based learning logic. However, the boundary between data collection and hypothesis generation should be more clearly defined. Students should know that data collection is for gathering information and identifying patterns, while hypothesis generation is for proposing explanations or strategies based on that information.

Q2. Are the five learning stages appropriate?**Answer:**

Yes, the five stages are suitable and educationally sound. They reflect the core processes of problem-based learning. The model is particularly strong in including a final reflection stage, because reflection is often missing or too weak in classroom PBL. Reflection helps consolidate learning and turns activity into meaningful understanding. For intercultural competence, this is especially important because students need to examine not only what they answered, but also why they answered that way.

Q3. Do the Mentimeter activities match each PBL stage?**Answer:**

Generally yes. The selected activities correspond well to the purposes of each stage. For example, word clouds are appropriate for activating prior perceptions, polls are useful for gathering classroom-wide responses, and ranking activities can support

decision-making. Still, the instructional value depends on teacher facilitation. Technology itself does not guarantee learning. The teacher must explain why each activity is being used and what students should learn from it. Also, some stages may need follow-up discussion after the Mentimeter response to deepen reasoning.

Q4. Is the model feasible in a large classroom?

Answer:

Yes, it is feasible and actually more practical than traditional small-group PBL in very large classes. Mentimeter helps the instructor gather responses from many students quickly, which is a major advantage. However, feasibility depends on good pacing and classroom control. The teacher should avoid too many separate activities in one session. It would be better to use fewer but more focused activities, each connected to a clear instructional goal. Internet access and student familiarity with the platform should also be considered.

Q5. Which stage needs revision or clarification?

Answer:

The solution development stage could be strengthened. At present, students may rank options, but the model should also require them to justify why a certain option is better. Without justification, ranking may remain superficial. A short explanation component or peer comparison could make this stage more meaningful.

Q6. Suggestions for improvement

Answer:

I recommend clarifying teacher instructions in every stage, especially the learning objective of each Mentimeter task. I also suggest including brief teacher facilitation notes, such as when to pause for discussion and when to summarize student responses. Finally, the solution development stage should include a stronger reasoning component, and the reflection stage should be given enough time rather than being treated as a quick closing activity.

Expert 3: Cross-Cultural in Business, 10 years**Q1. Is the overall structure clear and logically sequenced?****Answer:**

Yes, the structure is clear and practical. From a business perspective, the stages resemble the way managers deal with real cross-cultural problems: identify the issue, gather information, interpret different viewpoints, decide on a strategy, and review the outcome. This gives the model practical relevance. The sequence is suitable for preparing students for international business situations.

Q2. Are the five stages appropriate for intercultural competence development?**Answer:**

Yes, they are appropriate. In business, intercultural competence means not only understanding cultural theory but also being able to respond appropriately in real situations. The proposed model supports this by encouraging students to analyze, compare, and choose strategies rather than only recalling concepts. This is particularly valuable in cross-cultural management courses.

Q3. Do the Mentimeter activities match each stage?**Answer:**

Yes, overall they do. The use of instant polling and ranking is very suitable for business education because it allows students to compare options and see different viewpoints quickly. This can simulate decision-making pressure in real managerial contexts. Open-ended responses are also useful because business problems rarely have only one correct answer. However, the teacher should ensure that business scenarios are realistic and not overly simplified.

Q4. Is the model feasible in a large multicultural undergraduate classroom?**Answer:**

Yes, it is feasible, especially because large business classes often struggle with low participation. Students who are quiet in face-to-face discussion may be more willing to contribute through an interactive platform. A challenge, however, is that some students may respond quickly without fully thinking through the intercultural implications. Therefore, business cases and questions should be specific enough to push students toward practical reasoning rather than general opinion.

Q5. Which stage needs revision or clarification?**Answer:**

The problem identification stage could be made more realistic by using stronger business-related scenarios. If the problem is too general, students may respond in abstract cultural terms without understanding the business consequences. The model would be stronger if the opening problems clearly reflected workplace situations such as negotiation, teamwork, leadership, or customer communication across cultures.

Q6. Suggestions for improvement**Answer:**

I suggest using more authentic cross-cultural business cases at the beginning of each learning cycle. I also recommend asking students to explain the business impact of their chosen solution, not only whether it is culturally appropriate. In addition, the teacher should connect the classroom discussion to real workplace practice so students can see the professional relevance of the model.

Appendix C

Expert Validation Form: Index of Item-Objective Congruence (IOC)

VALIDATION FORM

I. Instructions

Please evaluate the congruence between the proposed teaching model and the research objectives using the following scale:

+1: The item is clearly consistent with the objectives/theoretical framework.

0: Uncertain / Requires significant revision.

-1: The item is inconsistent with the objectives and should be removed.

II. Evaluation of the PBL-Mentimeter Integrated Model

PHASE / ITEM		DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/-1)	QUALITATIVE FEEDBACK / SUGGESTIONS
STAGE IDENTIFICATION	1:	Using Word Cloud to identify cultural conflicts to stimulate Affective Engagement and reduce communication anxiety.		
STAGE COLLECTION	2	Utilizing Polls/Quizzes to gather cultural data, supporting the Knowledge dimension of ICC.		
STAGE GENERATION	3:	Leveraging Open-ended Polls for hypothesis building to meet Cognitive Engagement requirements.		
STAGE DEVELOPMENT	4:	Using Ranking/Voting for solution selection to simulate real-world Professional Decision-making Skills.		
STAGE EVALUATION	5:	Conducting Exit Polls for meta-cognitive reflection to assess Attitudinal Changes.		

III. Evaluation of Intercultural Competence (ICC) Outcomes

OUTCOME DOMAIN	EXPECTED COMPETENCY STANDARD	SCORE (+1/0/-1)	EXPERT REMARKS
ATTITUDE	Demonstrating openness, respect, and curiosity toward cultural diversity.		
KNOWLEDGE	Mastery of cultural-specific norms and global business communication protocols.		
SKILLS	Ability to analyze, interpret, and resolve conflicts within multicultural teams.		
METACOGNITION	Ability to reflect on personal cultural biases and engage in self-correction.		

IV. Semi-Structured Interview Protocol (Qualitative Inquiry)

Industrial Alignment: From your professional perspective, do the skills cultivated in Stage 4 (e.g., collaborative decision-making) meet the current demands of multinational corporations?

Technological Impact: How does the anonymity feature of Mentimeter specifically influence the participation of students from "High Power Distance" cultural backgrounds?

Model Iteration: Do you recommend adding a "Feedback Loop" between the stages (e.g., returning to Stage 2 if the solution in Stage 4 is deemed unfeasible)?

Risk Assessment: What are the potential pedagogical risks of over-relying on digital tools regarding the development of face-to-face interpersonal skills?

V. Overall Expert Recommendations

(Please provide a summary of your suggestions for model optimization)

Expert Signature: _____ Date: _____

EVALUATION FORM ANSWERS

EXPERT 1 EVALUATION FORM

Expert 1: Cross-Cultural Education

Experience: 15 years

I. Instructions

Please evaluate the congruence between the proposed teaching model and the research objectives using the following scale:

+1: The item is clearly consistent with the objectives/theoretical framework.

0: Uncertain / Requires significant revision.

-1: The item is inconsistent with the objectives and should be removed.

II. Evaluation of the PBL-Mentimeter Integrated Model

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/ -1)	QUALITATIVE FEEDBACK / SUGGESTIONS
STAGE 1: IDENTIFICATION	Using Word Cloud to identify cultural conflicts to stimulate Affective Engagement and reduce communication anxiety.	+1	This stage is highly appropriate for multicultural classrooms. Anonymous word cloud participation can reduce fear of speaking and encourage students from different cultural backgrounds to express initial perceptions. I

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/-1)	QUALITATIVE FEEDBACK / SUGGESTIONS
			suggest the teacher use clear prompts to avoid overly general responses.
STAGE 2: COLLECTION	Utilizing Polls/Quizzes to gather cultural data, supporting the Knowledge dimension of ICC.	+1	This stage supports knowledge development well. Polls and quizzes can help students compare cultural assumptions and identify differences in interpretation. I recommend including short follow-up discussion after polling so students do not treat the activity as only a technical response task.
STAGE 3: GENERATION	Leveraging Open-ended Polls for hypothesis building to meet Cognitive Engagement requirements.	0	The idea is appropriate, but this stage requires clearer instructions. Students may confuse hypothesis generation with personal opinion sharing or immediate solution offering. It should be revised to provide more structured guidance and perhaps one model example.
STAGE 4: DEVELOPMENT	Using Ranking/Voting for solution selection to simulate real-world Professional Decision-making Skills.	+1	This stage fits the objective of helping students compare possible strategies and make decisions. It also encourages students to recognize that

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/-1)	QUALITATIVE FEEDBACK / SUGGESTIONS
			different cultural contexts may lead to different priorities. I suggest asking students to explain why a ranked choice is suitable.
STAGE 5: EVALUATION	Conducting Exit Polls for meta-cognitive reflection to assess Attitudinal Changes.	+1	This stage is very important because intercultural learning requires reflection. Exit polls can help students notice changes in perspective and assumptions. I recommend using at least one question focusing on personal cultural bias and one on learning transfer.

III. Evaluation of Intercultural Competence (ICC) Outcomes

OUTCOME DOMAIN	EXPECTED COMPETENCY STANDARD	SCORE (+1/0/-1)	EXPERT REMARKS
ATTITUDE	Demonstrating openness, respect, and curiosity toward cultural diversity.	+1	The model creates a psychologically safer space for students to encounter different viewpoints, which supports attitudinal openness and respect.

OUTCOME DOMAIN	EXPECTED COMPETENCY STANDARD	SCORE (+1/0/ -1)	EXPERT REMARKS
KNOWLEDGE	Mastery of cultural-specific norms and global business communication protocols.	+1	The collection stage can support intercultural knowledge, especially if the teacher links polling outcomes to theory and real examples.
SKILLS	Ability to analyze, interpret, and resolve conflicts within multicultural teams.	+1	The model supports analytical and interpretive skills, especially through discussion and solution selection. Conflict resolution could be strengthened through more scenario-based questioning.
METACOGNITION	Ability to reflect on personal cultural biases and engage in self-correction.	+1	Reflection is one of the strongest parts of the model. This outcome is well aligned, especially if reflection prompts are explicit and personal.

IV. Semi-Structured Interview Protocol (Qualitative Inquiry)

1. Industrial Alignment:

From my educational perspective, the skills cultivated in Stage 4 are relevant to multinational corporations because employees need to compare alternatives, consider diverse perspectives, and make collaborative decisions. However, the model should ensure that students justify decisions rather than simply vote.

2. Technological Impact:

The anonymity feature of Mentimeter is especially helpful for students from high power distance backgrounds. These students may hesitate to disagree publicly with peers or the teacher. Anonymous response reduces social pressure and encourages more honest participation.

3. Model Iteration:

Yes, I recommend adding a limited feedback loop. In authentic intercultural problem-solving, students often need to revisit earlier assumptions after seeing new information. Returning from Stage 4 to Stage 2 or Stage 3 could improve learning depth.

4. Risk Assessment:

One risk is that students may become more comfortable typing responses than speaking directly to others. If digital participation replaces oral interaction too much, interpersonal communication skills may not fully develop. Teachers should combine digital interaction with guided face-to-face discussion.

V. Overall Expert Recommendations

The model is appropriate and relevant for intercultural competence development in large multicultural classrooms. I recommend clarifying the hypothesis generation stage, strengthening reflective questioning, and ensuring that each Mentimeter activity is followed by teacher-facilitated interpretation. A limited feedback loop may also improve the model.

EXPERT 2 EVALUATION FORM

Expert 2: PBL Instructional Design

Experience: 18 years

I. Instructions

Please evaluate the congruence between the proposed teaching model and the research objectives using the following scale:

+1: The item is clearly consistent with the objectives/theoretical framework.

0: Uncertain / Requires significant revision.

-1: The item is inconsistent with the objectives and should be removed.

II. Evaluation of the PBL-Mentimeter Integrated Model

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/ -1)	QUALITATIVE FEEDBACK / SUGGESTIONS
STAGE 1: IDENTIFICATION	Using Word Cloud to identify cultural conflicts to stimulate Affective Engagement and reduce communication anxiety.	+1	This stage aligns well with problem activation and learner entry into the topic. Word cloud is suitable for eliciting prior perceptions. The teacher should summarize the generated terms to connect them to the formal problem scenario.
STAGE 2: COLLECTION	Utilizing Polls/Quizzes to gather cultural data, supporting the Knowledge dimension of ICC.	+1	This stage is pedagogically sound. Polls and quizzes can efficiently collect baseline perceptions and reveal misconceptions. To strengthen PBL logic, the data collection activity should clearly lead to

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/-1)	QUALITATIVE FEEDBACK / SUGGESTIONS
			evidence gathering rather than isolated fact recall.
STAGE 3: GENERATION	Leveraging Open-ended Polls for hypothesis building to meet Cognitive Engagement requirements.	+1	This stage is appropriate for deeper reasoning. Open-ended responses can support interpretation and hypothesis construction. I suggest adding clearer teacher instructions about what a “good hypothesis” look like in this context.
STAGE 4: DEVELOPMENT	Using Ranking/Voting for solution selection to simulate real-world Professional Decision-making Skills.	0	The stage is useful, but ranking alone may be too superficial. Decision-making in PBL requires justification, comparison criteria, and reflection on trade-offs. This stage should be revised by adding explanation or peer defense of selected options.
STAGE 5: EVALUATION	Conducting Exit Polls for meta-cognitive reflection to assess Attitudinal Changes.	+1	This is a strong closing stage and aligns with reflective learning. It is especially valuable because many PBL models underemphasize structured reflection. I recommend linking reflection questions directly to both process and outcome.

III. Evaluation of Intercultural Competence (ICC) Outcomes

OUTCOME DOMAIN	EXPECTED COMPETENCY STANDARD	SCORE (+1/0/ -1)	EXPERT REMARKS
ATTITUDE	Demonstrating openness, respect, and curiosity toward cultural diversity.	+1	The model has potential to support positive attitude development, particularly through exposure to peer perspectives and reflective closure.
KNOWLEDGE	Mastery of cultural-specific norms and global business communication protocols.	+1	The knowledge dimension is well represented, especially if theoretical input is embedded after polling and discussion.
SKILLS	Ability to analyze, interpret, and resolve conflicts within multicultural teams.	0	The model supports analysis and interpretation, but conflict resolution may require more explicit team-based practice or scenario interaction.
METACOGNITION	Ability to reflect on personal cultural biases and engage in self-correction.	+1	This outcome aligns well with Stage 5. Metacognitive reflection is one of the model's major strengths.

IV. Semi-Structured Interview Protocol (Qualitative Inquiry)

1. Industrial Alignment:

Stage 4 is relevant to multinational corporations because collaborative decision-making is a core workplace skill. However, to truly reflect industry demands, students should do more than vote; they should articulate reasons, defend choices, and evaluate feasibility.

2. Technological Impact:

Anonymity can increase participation among students who are less comfortable publicly disagreeing or presenting uncertain answers. This is particularly useful in classrooms shaped by hierarchical cultural expectations. It reduces the affective barrier to entry.

3. Model Iteration:

Yes, I strongly recommend a feedback loop. In well-designed PBL, learners often revisit earlier stages when initial solutions prove incomplete or unrealistic. A feedback loop would improve instructional authenticity and align more closely with inquiry-based learning.

4. Risk Assessment:

Over-reliance on digital tools may reduce the amount of spontaneous oral discussion and weaken face-to-face negotiation skills. To avoid this, the instructor should intentionally alternate between online response and spoken group interaction.

V. Overall Expert Recommendations

The model is instructionally sound and aligned with PBL principles. I recommend revising Stage 4 to include justification and evaluation criteria, clarifying expectations for Stage 3, and adding a feedback loop between stages when needed. Teacher facilitation notes should also be made more explicit.

EXPERT 3 EVALUATION FORM

Expert 3: Cross-Cultural in Business

Experience: 10 years

I. Instructions

Please evaluate the congruence between the proposed teaching model and the research objectives using the following scale:

+1: The item is clearly consistent with the objectives/theoretical framework.

0: Uncertain / Requires significant revision.

-1: The item is inconsistent with the objectives and should be removed.

II. Evaluation of the PBL-Mentimeter Integrated Model

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/-1)	QUALITATIVE FEEDBACK / SUGGESTIONS
STAGE 1: IDENTIFICATION	Using Word Cloud to identify cultural conflicts to stimulate Affective Engagement and reduce communication anxiety.	+1	This stage is useful because it quickly surfaces different perceptions of cross-cultural problems. It is a good starting point for business-related classroom scenarios. I suggest using workplace-based prompts, such as negotiation or teamwork cases, to make the task more practical.
STAGE 2: COLLECTION	Utilizing Polls/Quizzes to gather cultural data, supporting the Knowledge dimension of ICC.	+1	This stage is appropriate for helping students compare viewpoints and learn relevant concepts. It is particularly useful when linked to international business communication issues.

PHASE / ITEM	DESCRIPTION OF IMPLEMENTATION	SCORE (+1/0/-1)	QUALITATIVE FEEDBACK / SUGGESTIONS
STAGE 3: GENERATION	Leveraging Open-ended Polls for hypothesis building to meet Cognitive Engagement requirements.	+1	This stage supports analysis and strategic thinking. Open-ended hypothesis building resembles the early interpretation process in real business problem-solving. However, students may need examples to avoid vague answers.
STAGE 4: DEVELOPMENT	Using Ranking/Voting for solution selection to simulate real-world Professional Decision-making Skills.	+1	This stage is highly relevant to business practice. In multinational companies, employees often compare options and select the most appropriate strategy under constraints. I recommend connecting the ranking task to business impact, not only cultural appropriateness.
STAGE 5: EVALUATION	Conducting Exit Polls for meta-cognitive reflection to assess Attitudinal Changes.	0	Reflection is useful, but the wording “assess attitudinal changes” may be too broad for a short exit poll. It should be revised so that questions target concrete reflection, such as what assumptions changed and how students would act differently next time.

III. Evaluation of Intercultural Competence (ICC) Outcomes

OUTCOME DOMAIN	EXPECTED COMPETENCY STANDARD	SCORE (+1/0/ -1)	EXPERT REMARKS
ATTITUDE	Demonstrating openness, respect, and curiosity toward cultural diversity.	+1	The model supports respectful exposure to diverse viewpoints, especially through anonymous participation and guided comparison.
KNOWLEDGE	Mastery of cultural-specific norms and global business communication protocols.	+1	The model has good potential to build business-related intercultural knowledge if supported by strong examples and applied cases.
SKILLS	Ability to analyze, interpret, and resolve conflicts within multicultural teams.	+1	This is strongly aligned with the model, especially if realistic business cases are used. The decision-making and discussion process is professionally relevant.
METACOGNITION	Ability to reflect on personal cultural biases and engage in self-correction.	0	The model includes reflection, but more direct prompts may be needed to fully capture self-correction and bias awareness.

IV. Semi-Structured Interview Protocol (Qualitative Inquiry)

1. Industrial Alignment:

Yes, Stage 4 is relevant to multinational corporations. Collaborative decision-making is a necessary workplace skill, especially when team members bring different cultural assumptions. To improve alignment, students should connect selected solutions to professional consequences such as trust, efficiency, or client relations.

2. Technological Impact:

The anonymity feature is helpful because students from high power distance backgrounds may avoid openly challenging authority or disagreeing with classmates. Anonymous tools make them more willing to share honest opinions, which improves inclusion.

3. Model Iteration:

Yes, I recommend adding a feedback loop. In real business practice, teams often revise earlier assumptions when a proposed solution is not feasible. Allowing movement back to Stage 2 or Stage 3 would make the model more realistic.

4. Risk Assessment:

A major risk is that students may become efficient at digital response without improving direct interpersonal skills such as negotiation, active listening, and face-to-face persuasion. The model should therefore combine digital tasks with oral reporting or small-group discussion.

V. Overall Expert Recommendations

The model is suitable for cross-cultural business education and reflects many real-world skills needed in multinational settings. I recommend strengthening the use of authentic business cases, refining reflection questions to make attitudinal and metacognitive changes more visible, and ensuring that decision-making tasks include practical business consequences.

Appendix D

List of Specialists and Letters of Specialists Invitation for IOC Verification

List of Experts for the IOC Content Validity Assessment

No	Experts Name	Title	Work years	Working
1	Mrs Yao Lulin	Professor	20	University of the Thai Chamber of Commerce Thai- Chinese International School of Management
2	Mrs Qi Zhen	Associate Professor	18	University of the Thai Chamber of Commerce Thai- Chinese International School of Management
3	Mrs Li Zhe	HR Manager	12	King Power, Thailand

Appendix E
Official Letter



Ref.No. MHESI 0643.14/

Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

16 March 2025

Subject: Request permission to collect data by attending Interviews and Questionnaires

Dear

Mrs. Liangtiantian Wangi is a graduate student in doctor of Digital Technology Management for Education of Bansomdejchaopraya Rajabhat University. She is undertaking research entitled "Problem-Based Learning Instructional Design Using Interactive Presentation Technology in Cross-Cultural Management Course in Business School, Private University". There is a thesis advisory committee as follows:

1. Assistant Professor Dr. Prapai Sridama
2. Assistant Professor Dr. Kanakorn Sawangcharoen
3. Associate Professor Dr. Pong Horadal

In this regard, the student has applied the Item-Objective Congruence Method in her research. The thesis advisory committee and the student have considered that you are an expert in this field. Therefore, Graduate School would like to invite you to be an expert to provide the student with suggestions for her research.

Thank you for your kind considerations.

Yours faithfully,

Assistant Professor Dr. Thanaput Chanchaen
(Vice Dean of Graduate School for Dean of Graduate School)

Graduate School
Tel.+662-473-7000 ext. 1814
E-mail: grad@bsru.ac.th

Appendix F

Problem-Based Learning Instructional Design Using
Interactive Presentation Technology in Cross-Cultural
Management Course in Business School

1. Title of the Instructional Model

Problem-Based Learning Instructional Design Using Mentimeter as an Interactive Presentation Technology in a Cross-Cultural Management Course

2. Background and Purpose

This instructional design was revised based on expert feedback obtained from the preliminary expert interviews and the formal Item–Objective Congruence (IOC) evaluation. The purpose of the revision was to improve the clarity, feasibility, and intercultural relevance of the original model while maintaining the core principles of Problem-Based Learning (PBL).

The revised model was designed for implementation in a large multicultural undergraduate classroom in a Cross-Cultural Management course. It aims to improve students' intercultural competence, participation, engagement, and learning outcomes through the structured integration of Mentimeter into the PBL process.

3. Target Context

- **Course:** Cross-Cultural Management
- **Target learners:** Undergraduate BBA international students
- **Institutional setting:** Private university
- **Classroom type:** Large multicultural classroom
- **Instructional approach:** Problem-Based Learning (PBL)
- **Digital tool used:** Mentimeter

4. Instructional Objectives

The revised instructional design aims to enable students to:

1. identify and describe cross-cultural management problems in business contexts;
2. develop openness, respect, and curiosity toward cultural diversity;
3. apply intercultural knowledge to the analysis of multicultural situations;
4. generate possible explanations and solutions for cross-cultural conflicts;
5. evaluate and justify decisions in culturally diverse business scenarios;
6. reflect on their own assumptions, attitudes, and learning development.

5. Theoretical Basis

The revised model was developed based on the following conceptual foundations:

1. Problem-Based Learning (PBL):

Learning begins with authentic problems and develops through inquiry, discussion, solution development, and reflection.

2. Intercultural Competence:

Intercultural competence is viewed as a multidimensional construct involving attitudes, knowledge, skills, and metacognitive awareness.

3. Student Engagement:

The model supports affective, cognitive, and behavioral engagement through interactive and collaborative learning activities.

4. Interactive Presentation Technology:

Mentimeter is used to increase inclusive participation, visualize student thinking, reduce communication anxiety, and provide real-time feedback.

6. Structure of the Revised Model

The revised instructional model consists of five main stages:

1. Problem Identification
2. Data Collection and Exploration
3. Hypothesis Generation
4. Solution Development and Decision-Making
5. Reflection and Learning Consolidation

A structured **feedback loop** is included in the model. When students' responses or proposed solutions are insufficient, unclear, or unrealistic, the teacher may guide learners back to Stage 2 or Stage 3 for further inquiry and refinement.

7. Detailed Instructional Design by Stage

Stage 1: Problem Identification

Objective

To activate students' initial perceptions, introduce a cross-cultural business problem, and stimulate affective engagement.

Description

In this stage, students are introduced to an authentic cross-cultural management scenario related to a multicultural workplace, communication breakdown, negotiation conflict, or decision-making problem. Mentimeter is used to collect initial reactions and perceptions anonymously.

Teacher Role

- present a realistic cross-cultural business case;
- explain the task clearly;
- ask focused prompting questions;
- summarize common and contrasting student responses.

Student Role

- identify the key issue in the case;
- express initial perceptions or concerns;
- compare their ideas with classmates' responses.

Mentimeter Functions

- Word Cloud
- Open-ended Response

Example Prompts

- “What is the main cross-cultural issue in this case?”
- “Which cultural differences may be influencing this problem?”

Expected Outcomes

- increased willingness to participate;
- early awareness of cultural diversity in interpretation;
- stimulation of affective engagement.

Revision Implemented

- more authentic cross-cultural business scenarios were added;
- initial prompts were clarified to reduce vague or overly general responses.

Stage 2: Data Collection and Exploration

Objective

To gather relevant information, identify misconceptions, and support the knowledge dimension of intercultural competence.

Description

Students use Mentimeter polls and quizzes to explore key concepts, compare interpretations, and examine how different cultural assumptions shape understanding of the case. The teacher connects student responses to intercultural theories and business communication principles.

Teacher Role

- guide learners to identify relevant information;
- use polling results to reveal patterns and misconceptions;
- connect student responses to theory and course content.

Student Role

- respond to polls and quizzes;
- examine similarities and differences in interpretation;
- use information from the case to support analysis.

Mentimeter Functions

- Polls
- Multiple-choice Questions
- Quizzes

Example Prompts

- “Which cultural factor is most relevant in this case?”
- “Which communication problem is most visible?”
- “Which response best reflects a culturally appropriate interpretation?”

Expected Outcomes

- stronger intercultural knowledge;
- better recognition of assumptions and misunderstandings;
- improved readiness for analytical discussion.

Revision Implemented

- Mentimeter activity formats were standardized for clearer engagement tracking;
- links between polling outcomes and theoretical explanation were strengthened.

Stage 3: Hypothesis Generation

Objective

To promote cognitive engagement by asking students to propose explanations or preliminary strategies.

Description

In this stage, students move beyond recognition of the problem and begin to interpret why the issue occurred. Mentimeter open-ended questions are used to collect short explanatory responses. The teacher provides clearer scaffolding so that students understand how to move from simple opinion to evidence-based interpretation.

Teacher Role

- explain the meaning of “hypothesis” in the lesson context;
- provide one example if needed;
- encourage students to use information from the previous stage to support their responses.

Student Role

- propose explanations for the problem;
- identify possible cultural assumptions behind the conflict;
- begin to construct preliminary strategies.

Mentimeter Functions

- Open-ended Polls
- Short Text Response

Example Prompts

- “Why do you think this problem happened?”
- “What cultural assumptions may be influencing each side?”
- “What is your initial strategy for responding to the issue?”

Expected Outcomes

- deeper reasoning and interpretation;
- improved cognitive engagement;
- stronger connection between evidence and explanation.

Revision Implemented

- clearer scaffolding was added to the hypothesis generation stage;
- instructions were revised to distinguish explanation from general opinion.

Stage 4: Solution Development and Decision-Making

Objective

To help students compare alternatives, justify solutions, and simulate real-world professional decision-making.

Description

Students evaluate possible responses to the case and use Mentimeter ranking or voting tools to prioritize solutions. In the revised model, students are also required to explain why their selected option is the most suitable. This stage connects intercultural sensitivity with business practicality.

Teacher Role

- present several possible strategies;
- guide students to compare alternatives;
- ask for explanation and justification;
- connect classroom decisions to workplace relevance.

Student Role

- evaluate possible solutions;
- rank or vote on the most suitable option;
- justify their choices in relation to the case.

Mentimeter Functions

- Ranking
- Voting
- Polling

Example Prompts

- “Which option is the most appropriate response?”
- “Why is this option more suitable than the others?”
- “What practical business consequences may result from this decision?”

Expected Outcomes

- better decision-making skills;

- stronger integration of intercultural and professional reasoning;
- increased behavioral and cognitive engagement.

Revision Implemented

- justification of ranked choices was added;
- stronger emphasis was placed on business relevance and practical consequence.

Stage 5: Reflection and Learning Consolidation

Objective

To develop metacognitive reflection, reinforce attitudinal learning, and consolidate understanding.

Description

Students reflect on what they learned, how their views changed, and what assumptions they noticed during the process. Mentimeter exit polls and open-ended reflection questions are used to encourage students to connect the activity to personal development and future practice.

Teacher Role

- ask guided reflection questions;
- summarize key learning points;
- link student reflections to intercultural competence development.

Student Role

- reflect on learning outcomes and personal assumptions;
- describe how their views changed;
- identify how they would act in a similar situation in the future.

Mentimeter Functions

- Exit Polls
- Reflection Questions
- Open-ended Response

Example Prompts

- “What did you learn from today’s case?”
- “Did your understanding change during the discussion? How?”
- “What cultural assumption of your own did you notice?”

- “How would you respond differently next time?”

Expected Outcomes

- stronger metacognitive awareness;
- more visible attitudinal development;
- better consolidation of learning.

Revision Implemented

- guided reflection prompts were added;
- reflection questions were made more explicit in relation to attitude and self-awareness.

8. Feedback Loop in the Revised Model

Description

A structured feedback loop was added to the revised model to improve flexibility and authenticity in the learning process. If student responses are superficial, unsupported, or impractical, the teacher may guide students back to an earlier stage.

Possible Feedback Paths

- **Stage 4 → Stage 2** for further information gathering
- **Stage 4 → Stage 3** for refinement of hypotheses
- **Stage 5 → Stage 3** when reflection reveals weak reasoning or incomplete interpretation

Purpose

The feedback loop allows students to revisit and strengthen their thinking rather than treating learning as a fixed linear sequence. This revision was made in response to expert feedback recommending a more iterative learning process.

9. Summary of Revisions Based on Expert Feedback

Feedback Area	Revision Implemented
Problem identification	Added more authentic cross-cultural business scenarios
Data collection	Standardized Mentimeter templates and improved theory linkage
Hypothesis generation	Clarified task instructions and added scaffolding
Solution development	Added justification of ranked choices and business consequence analysis

Feedback Area	Revision Implemented
Reflection stage	Added guided reflection prompts
Overall process	Added structured feedback loops between stages

10 Instructional Flow Summary Table

Stage	Main Purpose	Teacher Role	Student Role	Mentimeter Tool	Expected Outcome
Stage 1: Problem Identification	activate prior perceptions and affective engagement	present case, clarify task, summarize ideas	identify issues, express first views	Word Cloud, Open-ended Response	initial awareness and inclusive participation
Stage 2: Data Collection and Exploration	gather information and support knowledge development	guide inquiry, explain theory, reveal misconceptions	respond to polls, compare interpretations	Polls, Quizzes	stronger intercultural knowledge
Stage 3: Hypothesis Generation	develop explanation and cognitive engagement	scaffold reasoning, model examples, guide interpretation	propose explanations and preliminary strategies	Open-ended Polls	deeper reasoning
Stage 4: Solution Development and Decision-Making	evaluate alternatives and justify decisions	compare options, ask for justification, connect to business	rank options, explain decisions	Ranking, Voting	improved problem-solving and professional

Stage	Main Purpose	Teacher Role	Student Role	Mentimeter Tool	Expected Outcome
		practice			judgment
Stage 5: Reflection and Learning Consolidation	support metacognition and attitudinal change	ask reflection questions, summarize learning	reflect on change and future action	Exit Polls, Open-ended Response	stronger reflection and learning transfer

11 Conclusion

The revised instructional design integrates expert recommendations while preserving the core structure of the original PBL model. It strengthens instructional clarity, intercultural relevance, reflective learning, and practical feasibility in large multicultural undergraduate classrooms. By combining PBL with Mentimeter, the model supports broad participation, real-time engagement, culturally informed reasoning, and the development of intercultural competence in Cross-Cultural Management education.

Appendix G
Certificate of English

BSRU BANSOMDEJCHAOPRAYA
RAJABHAT UNIVERSITY

This is to certify that

Wang Liangtiantian

Achieved BSRU English Proficiency Test (BSRU-TEP) level

C1

Given on 14th September 2024



(Assistant Professor Dr Kulsirin Aphiratoradej)

Director

Appendix H

The Document for Acceptance Research



วารสารคุณภาพชีวิตกับกฎหมาย
Quality of Life and Law Journal

วันที่ 23 กุมภาพันธ์ 2569

เรื่อง รับรองการพิจารณาบทความวิจัย

เรียน Liangtian Wang, Asst. Prof. Dr. Prapai Sridama,
Asst. Prof. Dr. Kanakorn Sawangcharoen, and Assoc. Prof. Dr. Pong Horadal

ตามที่ท่านได้ส่งบทความวิจัย เรื่อง Based Learning Instructional Design Using Interactive Presentation Technology in a Cross-Cultural Management Course at a Private University เพื่อตีพิมพ์ในวารสารคุณภาพชีวิตกับกฎหมายนั้น

บทความของท่านได้ผ่านการประเมินพิจารณาจาก Peer review เป็นที่เรียบร้อยแล้ว และดำเนินการตีพิมพ์ในวารสารคุณภาพชีวิตกับกฎหมาย ปีที่ 22 ฉบับที่ 1 (มกราคม - มิถุนายน 2569)

ทั้งนี้ วารสารคุณภาพชีวิตและกฎหมาย ได้ผ่านการประเมินคุณภาพจากศูนย์ดัชนีการอ้างอิงวารสารไทย (Thai-Journal Citation Index : TCI) โดยได้รับการจัดอยู่ในกลุ่มวารสารกลุ่มที่ 2 ไปจนถึงวันที่ 31 ธันวาคม 2572

จึงเรียนมาเพื่อทราบ

(ดร.วานิชย์ สำเภา)

บรรณาธิการวารสารคุณภาพชีวิตกับกฎหมาย

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