MALL integrated with metacognitive skills to promote preservice English teachers’ intercultural communicative competence

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Abstract

Utilizing mobile phones for education, particularly in mobile-assisted language learning (MALL), enhances comprehensive learning, intercultural communication, and metacognitive skill development among preservice teachers. This approach fosters the acquisition of intercultural communicative competence (ICC). Therefore, this study aims to investigate the effect of MALL integrated with metacognitive skills to promote preservice English teachers’ ICC. This pre-experimental study with one group design involved 28 preservice English teachers at a university in Mataram, Indonesia. The ICC and metacognitive questionnaires were utilized to collect the data, and the collected data were analyzed using descriptive and inferential statistical analysis using IBM SPSS devices. The results show that MALL helped preservice English teachers become autonomous learners and actively engage in self-regulating their cognitive abilities to think critically, adapt, and interact within diverse cultural contexts. MALL integrated with metacognitive skills significantly affected preservice teachers’ ICC, and the level of metacognitive skills influenced the success of improving their ICC. The implication of MALL can delve into the pedagogical approaches and design principles that optimize MALL interventions within mobile learning environments.

Keywords: intercultural communicative competence (ICC); intercultural competence; intercultural learning; metacognitive skills; mobile-assisted language learning (MALL)
Introduction

Mobile-assisted language learning (MALL) is a pedagogical approach that facilitates learners’ language learning and skill development (Azar & Nasiri, 2014; Haerazi et al., 2020; Moreno & Vermeulen, 2015). Specifically, it encompasses the utilization of mobile devices for the teaching of language skills, thus falling within the domain of mobile learning (m-Learning). This relatively novel instructional methodology has garnered substantial attention from researchers, capitalizing on the premise that learners are consistently on the move and frequently employ mobile phones, cell phones, handheld devices, and smartphones. The increased adoption of m-learning can be attributed to the mobility, portability, functionality, and compactness offered by these devices (Alkhezzi & Al-Dousari, 2016; Al-Sabbagh et al., 2019). Consequently, m-learning for language acquisition has been widely recognized as mobile-assisted language learning (Alotaibi et al., 2015; Avci & Adiguzel, 2017). This approach presents fresh opportunities for English teachers and learners alike. In the MALL context, educators enjoy heightened interactivity with preservice English teachers, enabling them to regulate and devise dynamic learning activities.

The integration of technology within the educational setting has the potential to foster self-regulated instruction (Dettori & Persico, 2011; Sha et al., 2012), necessitating learners’ digital literacy (Bicen, 2015; Bilal & Ibriz, 2020) and their capacity to exercise discernment when selecting and utilizing mobile applications. To this end, it becomes imperative that devices and applications exhibit intuitive interfaces and engrossing features. This is crucial as inadequately designed interfaces, as well as learning content or materials that fail to support users, can have adverse repercussions on learners (Burston, 2014; Cacchione et al., 2015). Specifically, such shortcomings can result in waning interest in the application and a decline in motivation to engage with the language learning process.
As a result of remarkable advancements in the communication of mobile and wireless technologies, smartphones have emerged as highly valuable means of communication that can also serve as effective tools for language learning and instruction (Drew & Mann, 2018; Gikas & Grant, 2013). The utilization of such mobile devices affords learners the unique advantage of assuming dual roles as both teachers and learners, thereby enabling them to exercise control over the learning process and determine their own progress within their personal cognitive framework (Krull & Duart, 2017; Lai & Zheng, 2018). Consequently, MALL capitalizes on the inherent qualities of enhanced mobility, seamless accessibility, and adaptable features offered by mobile technologies.

The utilization of mobile phones for instructional purposes capitalizes on the contextual nature of learning, which not only positively influences the learning style but also serves as a catalyst for comprehensive learning and instructional activities (Land & Zimmerman, 2015; Leelamma & Indira, 2017). Consequently, MALL has facilitated the accessibility of various free electronic materials, English-specific applications, and programs that aid language learners in enhancing their language skills (Elfeky & Masadeh, 2016; Kim, 2013), including pronunciation, communicative competence, grammar, and vocabulary. Furthermore, MALL endeavors to transcend the confines of the traditional classroom setting, enabling learners and educators to engage with the real world. Notably, there has been a recent surge in the adoption of MALL in the domain of English as a foreign language (EFL). This heightened adoption is attributed to the incorporation of intelligent technologies, such as 5G networks, WIFI connectivity, touch screens, photo and video capabilities, code scanning functionality, voice and image recognition, MP3/4 players, screen sharing features, GPS navigation, SMS messaging, MMS messaging, email correspondence, virtual gaming, internet access, and most recently, mobile-based applications (Shi et al., 2017; Traxler et al., 2015).

Advancements in technology have significantly contributed to the realization of educational goals through the provision of learning management systems and the integration of MALL to enable a flipped classroom approach. It represents a pedagogical approach that leverages mobile phone technology to emphasize learner-centeredness and autonomy in the educational process (Xu et al., 2017; Zieni, 2019). Consequently, some teachers are integrating mobile devices within English language instruction, encompassing various teaching contexts such as face-to-face, blended, and online language learning programs. Dissatisfied with conventional learning methods, teachers have transcended the boundaries of the traditional classroom to establish globally networked learning environments, thereby affording learners the opportunity to engage in experiential learning.
encounters, particularly through intercultural learning activities (Lawrence, 2013; Lee & Song, 2020). In the context of MALL, interventions can be devised to facilitate the exposure of preservice teachers to intercultural learning activities, thereby fostering the development of their intercultural communicative competence (ICC).

In light of the escalating interconnectedness between cultures on a global scale, language educators face the imperative of nurturing intercultural competence to engage with learners possessing different cultural and linguistic backgrounds (Chun, 2011; Çiftçi & Savaş, 2018). Simultaneously, it becomes crucial for language teachers to integrate the cultivation of intercultural skills into their instructional objectives. The adoption of MALL affords preservice teachers the opportunity to actively participate in intercultural communication, thereby engaging with individuals hailing from diverse cultural backgrounds. Notably, direct interaction with individuals from different cultures and the critical engagement of intercultural speakers with the notion of otherness has been identified as influential factors that profoundly shape teachers' comprehension of intercultural communication dynamics (Fantini, 2020; Göbel & Helmke, 2010).

Prior research has underscored the efficacy of online exchange formats in fostering the acquisition of ICC (Chun, 2011; Çiftçi & Savaş, 2018; Göbel & Helmke, 2010; Lázár, 2015). Although the specific reference to social media platforms is absent, Lawrence (2013) highlights the broad spectrum of constructivist tools provided by online technologies, which facilitate the creation of interactive and stimulating learning environments. In the present study, I employ mobile-assisted learning as a means to enhance the ICC of preservice teachers. For this reason, M-learning has become an interesting device for communicating with online interaction anytime and anywhere (Naylor & Gibbs, 2018; Pandey & Singh, 2015). It is relevant to understand how the applications are used when carrying out intercultural communicative activities.

The attainment of ICC through MALL is contingent upon the involvement of metacognitive skills (Chamberlin-Quinlisk, 2013; Elboubekri, 2017), which exert influence over the acquisition and progression of ICC. Metacognitive complexity pertains to the capacity to establish connections, regulate, construct, and manage messages in a manner that ensures comprehension by the interlocutor (Anderson, 2012; Carvalho & Santos, 2021). It implies that learners actively engage in self-regulating their cognitive abilities to think critically, adapt, and interact within diverse cultural contexts. Through the use of mobile devices, learners can engage in reflective practices such as journaling, recording their spoken language (Al-Sabbagh et al., 2019; Elfeky & Masadeh, 2016; Kukulska-Hulme & Read, 2015), or participating in online discussion forums. These
activities encourage learners to think critically about their learning process of cultures, identify their own learning preferences of cultures and challenges, and develop metacognitive skills (Wang et al., 2009, 2013).

Metacognitive skills have a significant role in enhancing learners’ ICC. This competence refers to the ability to interact and communicate effectively with individual learners from various cultures (Elboubekri, 2017; Fantini, 2020). By developing metacognitive skills, learners gain a deeper understanding of their own cognitive processes and become more aware of their strengths and weaknesses in intercultural activities. This heightened self-awareness allows them to monitor and regulate their thoughts, feelings, and behaviors during cross-cultural interactions (Wang et al., 2009). Metacognitive skills enable learners to control and analyze their cultural assumptions, biases, and communication styles, leading to a greater appreciation and respect for cultural differences. Moreover, these skills empower learners to adapt their communication strategies and flexibly respond to cultural nuances, fostering successful and meaningful intercultural exchanges. Ultimately, metacognitive skills serve as a catalyst for learners to continuously improve their ICC, facilitating effective communication and collaboration in an increasingly diverse and interconnected world.

In the realm of higher education across the globe, there is a strong aspiration for ICC, which aligns with the principal aim of internationalizing higher education: generating graduates with global proficiency to navigate and engage effectively within an intricate and interconnected global environment (Biebricher et al., 2019; de Hei et al., 2020). In the previous studies, most researchers focused on the use of MALL, mobile applications, and EFL materials (Avci & Adiguzel, 2017; Azar & Nasiri, 2014; Elfeky & Masadeh, 2016; Lee & Song, 2020) but did not pay attention to learners’ metacognitive skills that might give effect on acquiring ICC. The novelty of this study lies in the use of mobile devices, which are firmly designed to improve preservice teachers’ ICC and the inclusion of metacognitive skills as a crucial part of the implementation of MALL. To attain a partial goal of developing ICC, this study employs the MALL approach in teaching English as a foreign language. It develops the crucial role of metacognitive skills in MALL learning processes. Therefore, the current study formulated the following research questions:

(1) Is there any significant effect of MALL on preservice teachers’ ICC?
(2) Is there any interaction between MALL and the level of metacognitive skills in influencing preservice teachers’ ICC?
Literature review

Mobile-assisted language learning (MALL)

MALL is categorized as a pedagogical approach used to help language learners enhance and develop their language skills (Chapelle, 2012; Loewen et al., 2019; Shi et al., 2017). This approach utilizes the development of technology, namely mobile devices. The proliferation of mobile devices has given rise to a significant interest in mobile learning, commonly referred to as m-learning, within the domain of language education. Consequently, MALL has emerged as a focal point, garnering considerable attention due to its perceived advantages over traditional computer-assisted language learning (CALL) approaches (Chapelle, 2012; Naylor & Gibbs, 2018). Central to this relatively new trend is the concept of mobility, encompassing various dimensions within the learning environment, including mobile technology, learner mobility, and the mobility of content, among others. MALL distinguishes itself from computer-assisted language learning through the utilization of personal, portable devices, which facilitate novel learning modalities, placing emphasis on seamless accessibility and interaction across diverse contextual settings (Alotaibi et al., 2015; Lai & Zheng, 2018).

One distinctive characteristic of MALL is its use of portable devices that learners can conveniently carry and utilize in various settings (Gikas & Grant, 2013; Land & Zimmerman, 2015). These devices are expected to possess attributes such as user-friendliness, personalization, affordability, and ease of use, aligning them with the requirements for mobile learning (M-learning) applications. Consequently, MALL entails the utilization of ubiquitous handheld technology devices, accompanied by mobile networks, to support, enhance, and facilitate the scope of teaching and learning endeavors, with a particular focus on technology and connectivity (Avci & Adiguzel, 2017; Naylor & Gibbs, 2018). In the context of this study, MALL primarily highlights its accessibility, interactivity, and instantaneous sharing capabilities. Furthermore, MALL places a strong emphasis on the active roles of learners within the learning process. The kind of mobile devices applied in this study are smartphones, which have features such as email, Google Meet, WhatsApp devices, YouTube, and Zoom meetings.

Intercultural communicative competence (ICC)

The concept of ICC builds upon the earlier notion of communicative competence (CC), which has been widely employed in the field of language education to encompass the various dimensions involved in proficient communication within a given language-culture context (Barnatt et al., 2020; Elboubekri, 2017; Fantini, 2020).
These dimensions include linguistic branches such as pieces of extralinguistic, paralinguistic (i.e., non-verbal), and sociolinguistic (Fantini, 2020; Haerazi & Irawan, 2020). The combination of one's native communicative competence with the acquisition of a second communicative competence gives rise to the concept of "inter-cultural" communicative competence, wherein both communicative competence 1 (CC1) and communicative competence 2 (CC2) interact and influence each other (Abduh & Rosmaladewi, 2018; de Hei et al., 2020). The term ICC places language at the core of intercultural skills, a factor that is often disregarded in many existing models and overlooked by scholars in the intercultural field.

ICC encompasses a range of components that contribute to their overall development. These components include possessing certain characteristics or attributes, such as being open-minded, patient, motivated, flexible, adaptable, and tolerant, among others (Baicchi & Erviti, 2018; Nadeem, 2022). Additionally, ICC entails three dimensions of capability: relations, communication, and collaboration, which collectively enable effective intercultural engagement (Fantini, 2020; Liddicoat, 2008). Furthermore, ICC consists of four distinct areas: attitude/affect, skill, knowledge, and awareness, all of which play integral roles in fostering intercultural competence (Haerazi et al., 2018; Haerazi & Irawan, 2020). It is crucial to recognize that the ICC development is a continual and longitudinal process characterized by periods of progress, occasional stagnation, and even regression. Central to this development is the cultivation of awareness, including self-awareness, which is nurtured through various means, such as discussions, introspection, and reflective practices (Kazemian et al., 2022, 2023). Moreover, it is essential to acknowledge that target language development holds significance within the realm of ICC despite its limited inclusion in many of the component frameworks associated with intercultural competence (a piece of linguistic and sociolinguistic).

**Metacognitive skills**

Metacognition pertains to the monitoring and controlling processes of one’s own learning and remembering (Anderson, 2012; Cartner & Cameron, 2022). It encompasses learners’ knowledge and understanding of their cognitive processes, products, and any factors associated with them (Anderson, 2012). Within the framework proposed by Teng and Zhang (2021), metacognition comprises two fundamental components: metacognitive monitoring and control. Metacognitive monitoring involves the tracking and assessment of cognitive processing, while metacognitive control entails making informed decisions regarding the types of cognitive processes to engage in subsequently (Carvalho
At the heart of metacognition research lies the concept of metacognitive judgment. Metacognitive skills play a significant role in facilitating successful language activities, as students' understanding of themselves, the tasks they undertake, and the strategies available to them directly influence their decision-making processes throughout the learning journey (Haerazi & Kazemian, 2021; Kazemian et al., 2021). Metacognitive skills encompass both a knowledge component and a strategic component. The strategic element of metacognition pertains to the general skills utilized by learners to effectively manage, direct, regulate, and guide their learning endeavors (Kane et al., 2014; Ohtani & Hisasaka, 2018). These skills encompass activities such as planning, monitoring, and evaluating. Tuysuzoglu and Greene (2015) highlight the significance of metacognitively active engagement in the learning process, asserting that self-regulation of learners is individuals who exhibit the capacity to carry out metacognitive activities.

Method

Research design

This study aimed to investigate the efficacy of mobile-assisted language learning (MALL) integrated with metacognitive skills to promote preservice English teachers' intercultural communicative competence (ICC). To know the quality of MALL, the present study used a pre-experimental study to examine the implementation of MALL integrated with metacognitive skills (Cohen et al., 2018). The pre-test was done to see the preservice teachers' initial ability and knowledge of ICC. Another crucial variable which is considered as a dominant factor affecting preservice teachers' ICC is metacognitive skills. The metacognitive skills of preservice teachers are assessed using indicators of metacognitive dimensions (planning, monitoring, and evaluating). Before doing the post-test, the preservice English teachers in the fourth semester are subjected to mobile learning. At the end of the learning process, I distributed the ICC tests.

Participants

This study involved a cohort of 29 prospective English teachers in their fourth semester, all of whom were enrolled in the Study Program of English Language Education at a university in Mataram, Indonesia. The participants were chosen in purposive sampling. They ranged in age from 21 to 23 years old. The
participants are 60% female and 40% male. Since this study employed a one-
group design, every semester had an equal opportunity to be selected as the
research participant. The selection process of participants was conducted with
utmost care to ensure privacy protection and maintain strict adherence to the
principles of confidentiality. The criteria for participant selection were primarily
based on the feasibility of data collection. Ultimately, I deliberately chose a single
class as a representative sample to examine the impact of MALL. The information
of the research participants can be presented in Table 1.

Table 1
Demographic data of the research participants

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Details</th>
<th>Coverage</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>17</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>Semester</td>
<td>Fourth</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

Data collection

The dataset utilized in this study constitutes a quantitative category specifically
derived from the assessment of ICC and metacognitive skills among preservice
teachers. Data were collected through ICC questionnaires (Deardorff, 2006;
Fantini, 2020) and metacognitive tests (Garrett et al., 2007; Rivers et al., 2020). The
ICC questionnaire was designed to capture key indicators of intercultural
competence, including characteristics or attributes of communicative
competence (CC), making relations, creating communication, collaborating,
having attitudes/effects, skills, knowledge, and awareness, all of which are
integral to intercultural development. In contrast, the metacognitive skill tests
focused on indicators that gauge preservice teachers’ abilities to plan, regulate,
monitor, and control their pieces of cognition, motivation, and behavior, taking
into account their goals and the contextual features present within the learning
environment. A total of 29 students participated in the study, and the tests were
administered at different time points. The scores obtained from both summative
and formative tests were aggregated to calculate the cumulative performance of
the preservice teachers. The summative tests are designed to see the preservice
teachers’ ICC input, while the formative tests were conducted throughout the
learning process and at the conclusion of each treatment phase, which employed
mobile learning as the instructional approach.
Treatment

The treatment phase of the study spanned over a series of nine sessions, with each session lasting 2x45 minutes. Central to this study was the implementation of the MALL model (Wang et al., 2009), which served as the primary intervention. To ensure the effective execution of the MALL model, the lecturer relied on carefully designed lesson plans provided by me. Throughout the treatment period, I assumed the role of an observer, closely monitoring the learning processes. The purpose of the observation was to evaluate the lecturer's proficiency in implementing the designated lesson plans and appropriately utilizing the MALL model. To facilitate accurate documentation of the observations, I maintained a set of paper notes, enabling the identification and notation of important activities that influenced the implementation of MALL. By utilizing these notes, I sought to capture the nuances and significant aspects of the MALL implementation process.

The thematic content addressed during the treatment sessions focused on cultural subjects, with a specific emphasis on traditional music, traditional foods, and wedding ceremonies. This selection of topics was purposeful and deliberate, with the intention of stimulating learners to actively engage and demonstrate their ICC. By centering the treatments around these cultural subjects, the aim was to create a learning environment that encouraged learners to explore and interact with diverse cultural practices and traditions. Through the study of traditional music, learners were exposed to different musical styles, instruments, and cultural contexts, fostering an appreciation for cultural diversity. Similarly, exploring traditional foods allowed learners to discover culinary traditions, ingredients, and cooking methods associated with different cultures. Lastly, the inclusion of wedding ceremonies as a thematic focus allowed learners to gain insights into the rituals, customs, and symbolism surrounding marriage in various cultural contexts. By immersing learners in these culturally rich topics, the treatment sessions aimed to promote intercultural understanding, empathy, and the development of ICC, enabling learners to navigate and engage effectively in diverse cultural settings.

Data analysis

The collected data are subjected to both descriptive analysis showing mean scores of learners and inferential statistical analyses using t-test and ANOVA analysis (Beins, 2018; Miles et al., 2016) to gain insights into the research findings. The descriptive analysis focuses on examining the mean scores of ICC among preservice teachers in the pre-test and post-test phases. Meanwhile, metacognitive skills are collected through a test. This analysis provides a
comprehensive overview of the participants' performance in these areas. On the other hand, the inferential analysis employs two statistical techniques: the t-test and analysis of variance (one-way ANOVA). The t-test is employed to assess the impact of the MALL approach on preservice teachers' ICC. By comparing the pre-test and post-test scores, this analysis examines whether there is a significant difference in ICC scores before and after implementing the MALL approach.

Additionally, the one-way ANOVA is utilized to investigate the interaction between the MALL approach and metacognitive skills in influencing preservice teachers' ICC. This analysis explores whether there are variations in ICC scores among the participants based on their metacognitive skills and exposure to the MALL approach. It is important to note that the collected data are assumed to follow a normal distribution, which is a necessary assumption for conducting these statistical analyses. The research hypothesis is accepted if the sig. level of 0.05 is greater than the p-value.

Findings

*The effect of MALL on preservice English teachers' ICC*

The primary objective of this study is to assess the effectiveness of mobile-assisted language learning (MALL) in enhancing the metacognitive skills of preservice English teachers, ultimately leading to an improvement in their intercultural communicative competence (ICC). To ensure the integrity and validity of the research instruments, rigorous measures were taken. The content validity of the instruments was determined by evaluating the sample's appropriateness and the test's overall presentation in accordance with the guidelines proposed by Cohen et al. (2018). The reliability of the tests was recognized by using inter-rater reliability. The result of this study showed that the use of mobile-assisted language learning has a significant effect on metacognitive skills to improve English learners' ICC. It was in line with the mean score of preservice teachers after giving the treatments. Figure 1 presents the mean score of ICC and metacognitive skills in pre-test and post-tests.

The analysis of the pre-test and post-test mean scores of preservice teachers' ICC reveals noteworthy findings. In the pre-test, the mean ICC score was determined to be 72.03, indicating the initial level of competence prior to the implementation of the special treatment. However, following the intervention, the post-test mean score significantly increased to 82.24. This notable improvement suggests that the special treatment had a positive impact on the development and enhancement of the preservice teachers' ICC.
Additionally, the evaluation of the preservice teachers’ metacognitive skills in Figure 1 indicated that they exhibited a high level of proficiency in this domain. The level was enacted based on the results of metacognitive tests. The metacognitive skills were assessed and found to have a mean score of 79.24, denoting a robust level of competency. These metacognitive skills encompass the ability to monitor, regulate, and exert control over one’s cognition, motivation, and behavior, guided by personal goals and contextual factors within the learning environment. The considerable improvement observed in the post-test ICC scores, coupled with the preservice teachers’ high level of metacognitive skills, highlights the potential effectiveness of the intervention in promoting both intercultural competence and metacognitive skills. Furthermore, Table 2 presents the significant effect of MALL on the ICC of preservice teachers.

Table 2 underscores the significant impact of incorporating MALL on the ICC of preservice teachers. The statistical analysis, conducted through a two-tailed t-test, revealed a substantial difference in the ICC scores before and after the implementation of MALL. The p-value obtained from the t-test was 0.00, which is significantly lower than the predetermined alpha level of 0.05. The significance of this result suggests that the use of MALL has a notable effect on enhancing the preservice teachers’ ICC. By utilizing mobile devices as a pedagogical tool, learners were able to engage in interactive and contextually relevant language learning activities, enabling them to develop a deeper understanding of intercultural communication dynamics. The statistically significant difference observed in the ICC scores demonstrates the efficacy of MALL in fostering intercultural competence among preservice teachers.
Table 2
Summary of t-test

<table>
<thead>
<tr>
<th></th>
<th>Independent samples test</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene's test for equality of variances</td>
<td>t</td>
<td>df</td>
<td>Sig. (2-tailed)</td>
<td>Mean difference</td>
<td>Std. Error difference</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>5.597</td>
<td>56</td>
<td>0</td>
<td>10.207</td>
<td>1.824</td>
</tr>
<tr>
<td>ICC</td>
<td>5.597</td>
<td>44.425</td>
<td>0</td>
<td>10.207</td>
<td>1.824</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The interaction between MALL and metacognitive skills

The implementation of MALL was found to be influenced by the varying levels of metacognitive skills among preservice teachers. The findings revealed that students with a high level of metacognitive skills demonstrated superior ICC compared to those with lower levels of metacognitive skills. Metacognitive skills encompass the ability to plan, monitor, and regulate one's own cognitive processes, including awareness of one's learning strategies, understanding of learning goals, and self-reflection on learning outcomes. In the context of MALL, these metacognitive skills play a crucial role in guiding learners' engagement with the mobile learning materials, self-assessment of their language proficiency and intercultural understanding, and adjustment of their learning strategies to meet their specific needs. The interaction between MALL and metacognitive skills was analyzed using ANOVA analysis.

In applying the ANOVA, the data were normally distributed in the research sample. The normality was applied for both pre-test and post-test scores. The normality test was carried out using the Kolmogorov-Smirnov formula with the sig. level of 0.05. If the sig. level is higher than 0.05, the data are normally distributed. The homogeneity of variance is employed to declare whether the variance in the sample is equal or not. It is done by looking at the Levene’s test. If the P-value is higher than 0.05, the variance is homogeneous. The summary of the ANOVA analysis can be presented in Table 3.
Table 3
*Summary of one-way ANOVA analysis*

<table>
<thead>
<tr>
<th>Intercultural communicative competences</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>1522.740</td>
<td>2</td>
<td>761.370</td>
<td>38.321</td>
<td>0.000</td>
</tr>
<tr>
<td>Within groups</td>
<td>516.571</td>
<td>26</td>
<td>19.868</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2039.310</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows that the sig. value was significantly lower than the significant level of 0.05. It means a significant difference exists between MALL and metacognitive skills in enhancing preservice English teachers' ICC. The findings presented highlight MALL's significant positive impact on preservice teachers' ICC. Statistical analysis using a two-tailed t-test revealed a substantial difference in ICC scores before and after implementing MALL. The obtained p-value of 0.00, below the significance level of 0.05, indicates that MALL significantly enhances preservice teachers' ICC. Through the use of mobile devices, learners engaged in interactive and contextually relevant language learning activities, fostering a deeper understanding of intercultural communication dynamics. In addition, findings in Table 3 demonstrate a noteworthy difference in ICC achievement among preservice teachers based on their levels of metacognitive skills. The statistical analysis supports this observation, with the p-value of 0.00 being lower than the predetermined significance level.

The finding showed that preservice teachers with higher levels of metacognitive skills could utilize the MALL resources effectively, set clear learning goals, monitor their progress, and make necessary adjustments to optimize their language and intercultural learning experiences. On the other hand, students with lower levels of metacognitive skills struggled with self-regulation, often exhibiting challenges in planning their learning activities, monitoring their comprehension, and adapting their strategies to overcome difficulties. These findings highlight the importance of nurturing and enhancing metacognitive skills among preservice teachers to facilitate the successful implementation of MALL and foster the development of intercultural communicative competencies.

The findings in Table 4 highlight a noteworthy difference in the achievement of ICC among preservice teachers based on their varying levels of metacognitive skills. The statistical analysis, with the p-value of 0.00 being lower than the predetermined significance level of 0.05, provides substantial evidence to support this observation. To find out which level has a significant difference, I
applied a Post Hoc Test analysis. Table 4 presents the summary of the Post Hoc Test. Each level of metacognitive skills has significant differences in preservice teachers’ ICC.

**Table 4**  
*Summary of Post Hoc Test*

<table>
<thead>
<tr>
<th>(I-J) Metacognitive</th>
<th>Mean difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>High</td>
<td>2.824</td>
<td>3.332</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sufficient</td>
<td>17.700*</td>
<td>3.453</td>
<td>0</td>
</tr>
<tr>
<td>High</td>
<td>Very high</td>
<td>-2.824</td>
<td>3.332</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sufficient</td>
<td>14.876*</td>
<td>1.776</td>
<td>0</td>
</tr>
<tr>
<td>Sufficient</td>
<td>Very high</td>
<td>-17.700*</td>
<td>3.453</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>-14.876*</td>
<td>1.776</td>
<td>0</td>
</tr>
</tbody>
</table>

* The mean difference is significant at the 0.05 level.

Table 4 indicates that preservice teachers who possess very high metacognitive skills demonstrated significantly higher ICC achievement compared to their counterparts with high, sufficient, or low metacognitive skills. The level was determined based on the criterion made by me. This significant difference suggests that metacognitive skills play a crucial role in shaping the development of ICC. Table 3 further reveals that preservice teachers with very high metacognitive skills achieved significantly higher ICC compared to those with high, sufficient, or low metacognitive skills. This finding underscores the crucial role of metacognitive skills in shaping the development of ICC.

**Discussion**

The effectiveness of mobile-assisted language learning (MALL) in enhancing the proficiency of preservice English teachers can be observed through the examination of their intercultural communicative competence (ICC) in relation to their levels of metacognitive skills. The utilization of diverse mobile devices, including smartphones, allows these teachers to transcend the limitations of time.
and space, offering them unparalleled convenience in accessing a wide array of resources for engaging with intercultural materials (Göbel & Helmke, 2010; Wang et al., 2013). By employing MALL, preservice English teachers are afforded the flexibility to engage in language learning activities beyond the confines of traditional classroom settings (Loewen et al., 2019). The portable mobile devices enable them to seamlessly integrate language learning into their daily routines, fostering continuous exposure and interaction with intercultural content (Lázár, 2015). This enhanced accessibility empowers lecturers in EFL classes to take control of their own learning process, promoting autonomy and self-directedness.

Furthermore, unrestricted access to a vast range of digital resources using mobile devices enables preservice teachers to explore diverse intercultural materials, including authentic texts, multimedia content, and interactive applications. The incorporation of such resources into their language-learning endeavors enhances their intercultural sensitivity, knowledge, and communicative abilities. It is in line with Ngai et al. (2020), who investigated how using online devices facilitates immersive and interactive learning experiences, enabling preservice teachers to actively engage with intercultural content through multimedia features, collaborative tools, and real-time communication platforms. In this study, the efficacy of MALL lies in its ability to leverage the advantages of mobile technology, providing preservice English teachers with unparalleled convenience, flexibility, and interactivity in accessing and engaging with intercultural materials (Sha et al., 2012; Zieni, 2019). By harnessing the potential of mobile devices, teachers can effectively enhance their ICC, thereby equipping themselves with the necessary skills and competences to navigate intercultural contexts and promote effective communication across cultural boundaries.

During intercultural activities, preservice teachers actively engage in the process of reading English cultural texts originating from inner-circle countries. This deliberate practice aims to cultivate their cultural knowledge and foster a deeper understanding of the insights embedded within the texts. Through the examination of these texts, teachers are encouraged to critically analyze and interpret the cultural values intricately woven into the narrative (Bartosh et al., 2021; Bose & Gao, 2022). This analysis is further facilitated through small group discussions, where teachers collaboratively explore and elucidate the cultural nuances and perspectives depicted in the texts (de Hei et al., 2020; Lawrence, 2013). Simultaneously, engagement with English cultural texts offers preservice teachers the opportunity to expand their vocabulary repertoire and develop a deeper understanding of grammatical intricacies. As they encounter unfamiliar
words and grammatical structures, teachers are prompted to actively seek meaning and contextualize these linguistic elements within the broader cultural context. This process of vocabulary acquisition and grammar exploration enhances their language proficiency, enabling them to express themselves more effectively and accurately in intercultural settings.

The incorporation of cultural texts into intercultural activities serves as a multifaceted approach to language learning and cultural competence development (Erickson, 2022; Haerazi et al., 2018). By immersing themselves in authentic cultural materials, preservice teachers not only acquire essential cultural insights and knowledge but also refine their language skills in terms of vocabulary usage and grammatical complexity (Azar & Nasiri, 2014; Kim, 2013). This integrated approach promotes a holistic understanding of language and culture, equipping teachers with the necessary tools to effectively navigate intercultural interactions and facilitate meaningful cross-cultural communication.

In the implementation of MALL, preservice teachers have the opportunity to enhance their willingness to communicate by utilizing the WeChat application for listening and speaking practice (Al-Sabbagh et al., 2019; Chen et al., 2019; Kohnke et al., 2019). During in-class discussion sessions, they actively engage in communicative activities that revolve around cultural content. While the teachers prepare the topics, preservice teachers are asked to access additional information and details from the internet using their internet smartphones. Moreover, they actively engage with a variety of English videos and podcasts that explore different cultural aspects. This exposure to diverse cultural content not only facilitates the development of listening and speaking skills but also enables preservice teachers to adapt their own cultural perspectives while interacting with individuals from different cultural backgrounds.

By incorporating WeChat as a tool for language practice, preservice teachers can foster their communication skills in a supportive and interactive environment (Shi et al., 2017; Situmorang & Simanjuntak, 2023). They are encouraged to engage in conversations, exchange ideas, and express their thoughts using the target language. This practical application of language skills enables them to develop greater fluency and proficiency in listening and speaking (Kim, 2013; Kukulska-Hulme & Read, 2015). Additionally, the incorporation of cultural topics within the discussions allows preservice teachers to deepen their understanding of cultural diversity and cultivate intercultural competences.

The utilization of mobile devices and online resources facilitates self-directed learning and empowers preservice teachers to explore a wide range of authentic
materials related to cultural topics (Dettori & Persico, 2011; Sha et al., 2012). Through active engagement with these resources, preservice teachers gain exposure to different perspectives, cultural practices, and linguistic variations. This exposure further broadens their cultural awareness and enhances their ability to navigate intercultural interactions effectively. It is in line with Haerazi et al. (2020), who argue the implementation of MALL through platforms like WhatsApp and websites empowers preservice teachers to develop their language skills and intercultural competence. By engaging in listening and speaking practices, accessing relevant cultural information, and interacting with individuals from diverse cultural backgrounds, preservice teachers can enhance their communication abilities and adapt their own cultural perspectives within intercultural contexts.

When it comes to completing learning assignments, preservice teachers typically engage in collaborative activities and communication with lecturers and fellow preservice English teachers. This communication takes place through various online platforms, including email, chat rooms, WhatsApp video calls, discussion boards, instant messaging, and electronic forums. This finding is in line with Lawrence (2013), who argues such digital tools offer convenience and flexibility, allowing preservice teachers to work either on campus or from the comfort of their homes. Within this context, preservice teachers are able to engage in metacognitive practices that involve regulating their own learning process. They have the autonomy to control their learning pace, ensuring that they grasp the content and instructions provided by their lecturers (Lai & Zheng, 2018; Lai et al., 2020). By utilizing these communication channels, preservice teachers can seek clarification, ask questions, and engage in discussions to deepen their understanding of the assigned tasks.

Electronic communication tools facilitate the exchange of information and resources and promote metacognitive reflection and self-regulation (Inpeng & Nomnian, 2022; Zieni, 2019). Preservice teachers can critically reflect on their own learning progress and strategize accordingly, adjusting their learning approaches and techniques based on feedback received from lecturers and peers. This metacognitive dimension allows them to construct a coherent comprehension of how to effectively complete their learning tasks and meet the expectations set by their lecturers (Carvalho & Santos, 2021; Haerazi & Kazemian, 2021). The availability of diverse digital platforms enhances the accessibility and immediacy of communication between preservice teachers and their instructors. The seamless exchange of ideas, feedback, and guidance fosters a collaborative learning environment, enabling preservice teachers to navigate their learning journey with confidence and efficacy.
Additionally, the integration of metacognitive practices within these digital communication channels empowers preservice teachers to take ownership of their learning process, promoting their development as independent and self-directed learners. It is in accordance with Haerazi et al. (2020), who argue the utilization of various online communication tools such as email, chat rooms, WhatsApp video calls, discussion boards, instant messaging, and electronic forums empowers preservice teachers to engage in metacognitive practices while accomplishing their learning assignments. These digital platforms facilitate effective communication with lecturers and peers, enabling preservice teachers to regulate their learning, control the learning pace, and construct a comprehensive understanding of how to complete their assigned tasks successfully.

The development of ICC encompasses various crucial aspects, including the cultivation of self-knowledge among preservice teachers. This growth in self-awareness is exemplified when preservice teachers engage in small discussions with partners who hold different perspectives on the given topic (Borghetti, 2013; Heggernes, 2021). By actively participating in these conversations, they gain insights into their own cultural biases and assumptions, thereby enhancing their intercultural understanding. Furthermore, preservice teachers’ ability to communicate effectively and appropriately in diverse cultural contexts becomes evident as they provide feedback to their peers during both in-class and out-of-class discussions facilitated through mobile devices (Piątkowska, 2015; Williamson, 2022). This process not only strengthens their intercultural communication skills but also fosters a sense of empathy and openness towards different cultural viewpoints.

However, it is important to acknowledge that certain key components of ICC, such as motivation, self- and other knowledge, and tolerance for uncertainty, may face challenges due to factors such as language learning anxiety or a low level of willingness to communicate. These obstacles can hinder the development of intercultural competences, as they may create barriers to engaging in meaningful intercultural interactions (Galleguillos et al., 2022; Poort et al., 2021). Addressing these challenges requires a supportive and inclusive learning environment encouraging preservice teachers to overcome their anxieties and increase their motivation to communicate across cultures. Instructors can play a pivotal role in fostering a safe space where preservice teachers feel comfortable taking risks and expressing their thoughts and opinions. Additionally, incorporating activities and resources that promote self-reflection, cultural exploration, and intercultural sensitivity can aid in enhancing key components of ICC.
The development of intercultural communicative competences among preservice teachers encompasses various dimensions, including self-knowledge. Engaging in small discussions with partners who possess different perspectives contributes to their intercultural growth. The ability to provide constructive feedback through mobile devices further demonstrates their effective communication skills in diverse cultural contexts (Elboubekri, 2017; Haerazi et al., 2018; Xu et al., 2017). However, it is crucial to address potential challenges such as language learning anxiety or low willingness to communicate, as they can impede the development of key ICC components. Creating a supportive learning environment and incorporating activities that foster self-reflection and intercultural sensitivity can help overcome these obstacles and facilitate the growth of ICC.

Conclusion

The implementation of MALL has proven to be effective in enhancing the proficiency of preservice English teachers, particularly in terms of their ICC and metacognitive skills. By utilizing various mobile devices, such as smartphones, teachers are able to transcend the constraints of time and space, accessing a wide range of resources that facilitate engagement with intercultural materials. MALL offers flexibility and convenience, allowing teachers to integrate language learning into their daily routines and fostering continuous exposure to intercultural content. The use of mobile devices and online resources enables preservice teachers to explore diverse intercultural materials, including authentic texts, multimedia content, and interactive applications. This exposure enhances their intercultural sensitivity, knowledge, and communicative abilities. Additionally, mobile devices facilitate immersive and interactive learning experiences, allowing teachers to actively engage with intercultural content through multimedia features, collaborative tools, and real-time communication platforms.

During intercultural activities, preservice teachers actively participate in reading English cultural texts from inner-circle countries. These texts serve as a means to acquire cultural knowledge and insights, while small group discussions enable teachers to analyze and interpret the cultural values embedded within the texts. This process also contributes to vocabulary mastery and the understanding of grammatical complexity, enhancing language proficiency. The incorporation of cultural texts into intercultural activities promotes a holistic approach to language learning and cultural competence development. It facilitates the
acquisition of cultural insights, vocabulary usage, and grammatical nuances, empowering teachers to navigate intercultural interactions and promote meaningful cross-cultural communication effectively.

The research implications of MALL for current studies are significant. First, future research can explore the effectiveness of MALL in enhancing language proficiency and acquisition among learners of different age groups and language levels. This can involve investigating the impact of various mobile applications, interactive features, and instructional strategies on language learning outcomes. Secondly, researchers can delve into the pedagogical approaches and design principles that optimize MALL interventions. This includes examining the integration of mobile technologies with existing language curricula, exploring the role of learner autonomy and self-regulated learning in MALL, and investigating the effectiveness of scaffolding and feedback mechanisms within mobile learning environments. Thirdly, the impact of MALL on intercultural competence development can be explored further. This can involve investigating the role of mobile technologies in fostering cross-cultural interactions, promoting intercultural understanding, and enhancing communication skills in multicultural contexts.

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