Journal of Learning and Teaching in Digital Age, 2024, **9**(1), 115-122
https://dergipark.org.tr/en/pub/joltida
ISSN: 2458-8350 (online)

Review Paper

MALL with Young Learners: Methodological and Ethical Considerations in the Quasi-Experimental Research Design

Serdar Tekin*[a]

[a](ORCID ID: 0000-0003-4625-4324), Nevşehir Hacı Bektaş Veli University, Turkey, srdrtkn@gmail.com

*Corresponding author

ARTICLE INFO

Received: 13 June 2023
Revised: 8 November 2023
Accepted: 20 November 2023

Keywords:
Mobile-Assisted Language Learning
Quasi-Experimental Research Design
Young Language Learners

doi: 10.53850/joltida.1313998

ABSTRACT

The enormous developments in technology and hence the widespread use of hand-held devices in the last few decades have led to great interest in mobile-assisted language learning (MALL) as a new way of language education. MALL is considered an effective method particularly for young language learners due to their higher level of familiarity with the technology compared to their predecessors. Thus, an increasing number of mobile apps focusing on language education of children has been developed recently. It has also attracted researchers who carry out studies on MALL in terms of various perspectives such as learners' learning processes and perspectives. However, an important aspect of MALL which is the use of portable devices and apps individually out of school settings poses possible problems in terms of carrying out quasi-experimental studies. To this end, this paper combines three major areas in Applied Linguistics, namely, MALL, quasi-experimental research design, and young language learners and focuses on salient issues which are identified as lack of control, training, convenience of MALL activities for children, and ethical issues. Based on the TPACK framework, a new framework is proposed to incorporate young learners' characteristics in MALL studies. It is believed that the consideration of these points will be beneficial to future studies utilising quasi-experimental design in MALL with children.

INTRODUCTION

In line with the latest developments in technology in daily life, the use of technological devices in language learning and teaching has increased in the form of computer-assisted language learning (CALL) and its burgeoning subdivision which is mobile-assisted language learning (MALL) (Li, 2022). Although both terms put emphasis on the same issue which is the integration of language education with technology, MALL mainly differs by extending learning beyond the classroom setting and allowing continuity and spontaneity of access to learning in different contexts by means of accessing several portable devices (Chinnery, 2006; Jalilifar & Mashhadi 2013; Kukulska-Hulme & Shield, 2008). In this regard, language learning becomes on the move, allowing learners to engage in learning in any context, including home, work, travel, and so on. Since learners can work independently with no external support and have active roles in the process of learning, MALL is regarded as fostering learner autonomy (Little, 2007). Considering such benefits, a growing amount of attention is given to MALL for its successful implementation and hence successful language learning process.

The growing popularity of MALL has sparked several research studies focusing on various aspects of language learning such as improving reading (Wu et al., 2011), writing (García Botero et al., 2021), vocabulary (Esit, 2011; Lin & Lin, 2019), and improving self-regulation skills (Yang & Song, 2022) utilising different methods, including quasi-experimental design. However, most of the recent studies have been conducted with upper age groups (Wong et al., 2020) and some in school settings (Li, 2022) or both in and after class in schools (Yang & Song, 2022). In this regard, the number of MALL studies carried out in informal settings is considerably low compared to the ones in formal or a mix of formal and informal settings (Lin & Lin, 2019). Considering the distinctive aspect of MALL which enables learners to engage in learning "in outdoor settings or in places where everyday life and leisure activities merge with learning" (Kukulska-Hulme et al., 2017 p. 217), it is necessary to take into consideration possible challenges and issues on research design in MALL-related studies carried out in extramural settings. Variables in research carried out in school settings can be somewhat observed in quasi-experimental design, while mobility in extramural settings could be argued to necessitate extra consideration due to lack of control. Kukulska-Hulme et al. (2017) list some of these possible issues as linguistically challenging situations, the chance of using mobile devices or apps, and external help that could affect the data. When such factors are combined with the young age of children, their distinctive characteristics, and challenges in teaching English to young learners (TEYL) (Garton & Tekin, 2022; Pinter, 2017), it would be useful to discuss details of using a quasi-experimental design on MALL with children based on the framework of technological pedagogical content (TPACK). In this respect, combining three important areas, namely, MALL, quasi-experimental research design, and TEYL, this paper discusses salient issues that should be considered in the process of planning and applying quasi-experimental studies with children in extramural settings with an attempt

to help future studies utilise this research design and produce more reliable results. In order for these salient points to be taken into consideration, a new framework is proposed based on TPACK.

QUASI-EXPERIMENTAL RESEARCH DESIGN

The quasi-experimental study design has long been used in language education to examine cause-effect relationships between various factors related to language learning and teaching. It aims to demonstrate causation or relationship between different factors which are often dependent and independent variables (Rogers & Révész, 2019). More specifically, the independent variable is the one that makes influence, and the independent variable is the variable that is being influenced (Loewen & Plonsky, 2016). As an illustrative example related to MALL, in a study investigating the effect of the use of a mobile app on students' development of speaking skills, the use of a mobile app is the independent variable while the development of speaking is the dependent variable. This relationship between dependent and independent variables is often measured with the help of pre- and post-tests applied to control and experimental groups. Both groups first take pre-tests, which are followed by the application of "treatment" in the experimental group through changing one or more variables, and finally, post-tests are applied to both groups to find out whether or to what extent there exists a difference stemming from the treatment (Rogers & Révész, 2019). In order to find out the true effect of treatment in the experimental group, it is crucial to restrict or keep other affecting factors or variables under control in both groups. In other words, the main difference between the two groups should be the treatment so that the results will be more reliable. However, it could be challenging for researchers to use random sampling in educational contexts to identify the treatment-caused differences between the two groups (Dörnyei, 2007). This is the main feature of a quasi-experimental design that distinguishes it from a true experimental design. Due to practical constraints, quasi-experimental design is much more preferred than experimental design in Applied Linguistics (Loewen & Plonsky, 2016). Although the use of convenience sampling in quasi-experimental designs might negatively affect the reliability and validity of the study (see Rogers & Révész, 2019 for details), Dörnyei (2007) suggests two main ways to minimise this effect. First, it is important to avoid the chances of participants' self-selection of groups (e.g., volunteering). Second, taking measures to eliminate or minimise the differences in pre-test between both groups. This could be done by matching the participants of both groups on a case-by-case basis based on specific variables (Dörnyei, 2007).

PREVIOUS QUASI-EXPERIMENTAL MALL STUDIES

In line with the growing use of mobile devices in language teaching and learning, the number of quasi-experimental studies on MALL is increasing in various contexts. Several papers have reviewed previous related empirical studies focusing on different aspects of language learning in MALL, including vocabulary development (Lin & Lin, 2019), reading comprehension (Li, 2022), and learning outcomes (Burston, 2015). Reviewing 69 empirical studies on MALL, Duman et al. (2014) revealed that the most commonly addressed topic was teaching vocabulary, which was followed by the usability of developed systems for MALL and attitudes towards MALL. The study also compared the use of quasi-experimental design in MALL with other research designs in quantitative, qualitative, and mixed method approaches and found that it was among the most commonly used designs in MALL.

Regarding the actual empirical MALL studies utilising a quasi-experimental design, several studies revealed a facilitative role of MALL for learners to improve their English. For example, Mays et al. (2020) conducted a study with 48 children studying in public primary schools in Taiwan and explored the use of a mobile Audience Response System (ARS) with student-generated questioning on EFL learners' reading comprehension. The study took place in a school context in which participants were divided into two groups. The control group presented their questions through PowerPoint, and the experimental group used Kahoot! as an ARS method. The findings indicated a much higher engagement and collaboration among experimental group members as well as a more active learning environment. Another study was carried out by García Botero et al. (2021) who investigated self-regulation in MALL and its effects on different skills which are writing, listening, and reading. The researchers used Duolingo as the MALL tool and examined the difference between control and experiment groups who were BA students studying French in Colombia. According to the results, there was a correlation between the high use of Duolingo and the development of writing skills; however, participants did not achieve high scores in listening and reading due to a lack of MALL training. In this regard, the study emphasised the importance of scaffolding and training in the use of MALL. Regarding the use of MALL for vocabulary learning, Thongsri et al. (2019) conducted a study with 200 tertiary-level EFL learners in China and compared the vocabulary scores of students across different academic majors such as electrical engineering, management, computer science, and so on. Training on English vocabulary was provided to them through a MALL tool named BW Vocabulary mobile application. The findings indicated that MALL improved vocabulary acquisition among students studying in the fields that are closely related to technology.

The review and empirical papers presented in this section indicate that MALL has been applied to various groups of participants in different contexts to examine several aspects of language learning and teaching such as reading, writing, and vocabulary development. While García Botero et al. (2021) and Thongsri et al. (2019) focused on the use of MALL with tertiary-level students, participants of Mays et al. (2020) were primary school children. It was carried out in a classroom setting with no follow-up design in an informal setting. However, mobile learning mostly occurs in outdoor settings rather than formal learning contexts, and younger learners are particularly interested in technology and actively engage with mobile devices in daily life (Tekin, 2023b). In this context, young language learners should be paid particular attention in terms of MALL studies conducted in extramural settings.

MALL AND YOUNG LANGUAGE LEARNERS

Although it only emerged in the last two decades, MALL has become popular in language teaching and learning in both formal and informal settings. It could be argued that it has considerably secured its place with the COVID-19 outbreak, as more people have depended on technology and mobile devices in both daily life and education. MALL is defined as the use of "mobile technologies in language learning, especially in situations where device portability offers specific advantages" (Kukulska-Hulme, 2013, p. 3701). Jarvis and Achilleos (2013) list some of the devices used in MALL as mobile phones, PDAs, MP3 players, and podcasting. Around one decade later, Stockwell (2022) extended these tools in line with the latest developments in technology and specified them as electronic dictionaries, vocabulary apps (e.g., Quizlet), QR codes enabling students to interact with each other, and Duolingo. Despite the variety of MALL devices, Duman et al. (2014) reveal in a review study that language learners primarily use only two tools which are mobile phones and PDAs (around 65%). As shown previously, there is a considerable amount of research on MALL in the form of empirical (Mays et al., 2020) and review articles (e.g., Lin & Lin, 2019) as well as book chapters (Kukulska-Hulme, 2013; Kukulska-Hulme et al., 2017) and a comprehensive book solely devoted to MALL (Stockwell, 2022). In this respect, it could be argued that recent studies are in line with the rapid spread of mobile devices in daily life, particularly among young adults and children (Stockwell, 2022).

In terms of the nature of MALL, it enables learners to improve and learn languages on their own at their own pace depending on their level and capability (Kukulska-Hulme et al., 2017). In one sense, it allows learners to be independent learners who have a high level of autonomy and motivation (Stockwell, 2022). In this way, learners can take responsibility for their own learning, make decisions on how much time to spend with mobile devices, set up goals, and monitor their progress and achievement. In some cases, learners may still need their teachers who have great responsibility for the evaluation of their learners' way of learning and progress, designing the classes accordingly, and giving mobile-based assignments to learners (Kukulska-Hulme et al., 2017). At this point, it is crucial to provide learners with training about the use of devices and applications so that they can effectively use every feature of MALL tools. This is one of the ten principles emphasised by Stockwell and Hubbard (2013). As previously stated, a negative outcome of lack of guidance in MALL was revealed by García Botero et al. (2021) who found that learners could not obtain high scores in certain language skills due to lack of training.

Considering that children are more familiar with technology and mobile devices than their predecessors (Tekin, 2023b), it could be argued that the use of mobile devices could be convenient for them for the purpose of language learning and teaching. Children can frequently be seen using mobile devices as young as one year old (sometimes even younger), and their familiarity and technological skills could be canalised into language learning through MALL. However, the process of MALL should be planned carefully, and the characteristics of children should be taken into consideration. Young language learners are considerably different from older learners in terms of many aspects such as behaviour, psychology, and concentration span (Garton & Tekin, 2022; Moon, 2005; Pinter, 2017). Thus, the characteristics of children should be taken into consideration during the implementation of MALL, as they could affect the effectiveness of mobile learning. For example, children can easily be distracted or bored in the process of language learning depending on several factors such as the length and type of the activity as well as the level of interactivity (Pinter, 2017). Moreover, children lack instrumental motivation to learn a new language (Garton & Tekin, 2022). It is difficult to motivate them extrinsically since they are not cognizant of the importance of knowing a new language in today's world. They do not have other instrumental reasons such as passing an exam or finding a good job. Instead, they should enjoy the learning process through enjoyable activities so that they continue it willingly. Furthermore, children's concentration span is considerably lower than adult learners (Garton & Tekin, 2022), and hence they can easily quit dealing with the MALL tool. This could adversely affect the data collected through the MALL tool and hence the results. In this regard, it is rather important to design the MALL tool accordingly. Probably more importantly, a carefully planned quasi-experimental design taking into consideration the main affecting factors could be regarded as necessary for a successful implementation of MALL. However, considering MALL's extramural settings which are somewhat uncontrolled or unobserved, there might still be distracting factors around them. If it occurs in a quasi-experimental MALL study, it has the potential to overshadow the reliability of research outcomes. To this end, it could be argued that children's characteristics have important implications.

Considering the abovementioned characteristics of children, it is important to pay attention to several factors in designing quasi-experimental MALL studies with children. While some considerations stem from participants' being young learners, there are also some other factors that should be paid particular attention due to the nature of quasi-experimental design and mobile learning that occurs in informal settings. It could be argued that a framework is needed to incorporate these considerations into the MALL studies with YLs. Therefore, based on the TPACK framework that is briefly explained below, a new framework is proposed considering the salient factors.

TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE FRAMEWORK AND MALL

Addressing potential methodological and pedagogical challenges and obstacles in the integration of technology into language education necessitates a systematic framework so that it could guide researchers and educators during the process. At this point, TPACK seems a good choice, as it provides insights on how to effectively interweave three main areas of teaching (content,

pedagogy, and technology) (Mishra & Koehler, 2006). In other words, it aims to combine technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) and hence equip the professionals with these three domains. The foundation of TPACK is clearly stated by Mishra and Koehler (2006 p. 1029) as follows.

TPCK is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones.

The integration of TPACK into MALL is particularly important considering a lack of knowledge about the effective use of MALL among teachers (Hsu, 2016). Adding a YL factor to MALL within the TPACK framework requires tailored considerations for all three main domains of TPACK. Regarding TK in the context of MALL, it indicates the level of knowledge about various mobile devices and applications. In order to maintain a smooth user experience for YLs, it is crucial for teachers and researchers to have sufficient technical expertise in educational applications. When it comes to PK, it is related to effective ways of teaching language skills and content. In MALL, it incorporates the use of instructional techniques in accordance with YLs' developmental needs. Finally, CK refers to a comprehensive awareness of language content and details of the curriculum. In the context of MALL with YLs, it involves deciding on age-appropriate content, considering phases in language development and customization of teaching. As abovementioned, TPACK could provide a robust basis to understand the intricate relationship between various aspects of MALL studies with YLs and provide guidance for teachers and researchers. The following section presents the most salient features of quasi-experimental MALL studies with YLs, some considerations and recommendations regarding these issues. It will be followed by a proposal of a new framework that is built on TPACK, considering YLs' characteristics.

QUASI-EXPERIMENTAL MALL STUDIES WITH YLS: CONSIDERATIONS AND RECOMMENDATIONS

Lack of Control

Treatment is an important intervention in quasi-experimental research design. It should be the main difference between the experimental and control group. If the study is carried out in formal settings such as classrooms, the variables are mostly observable and under researchers' control. In this case, there are not many issues the researchers need to be concerned about. However, it is highly unlikely for researchers to observe affecting factors in out of school contexts (Kukulska-Hulme et al., 2017). The problems could be general concerning all participants regardless of their age, but it is highly likely to encounter problems with children considering the abovementioned considerable differences between adult and young learners. A useful example illustrating the possible situation in quasi-experimental MALL study is adults' high level of self-control. When they are assigned with the use of a specific application, playing a game, or studying online, they could be expected to be aware of its importance and consequences taking into consideration their previous experience and hence fulfil this assignment timely. They are also regarded as conscious learners due to their developed cognitive and thinking skills (Pinter, 2017). However, circumstances could be different with young learners depending on their age. For example, during playing a mobile game or studying online, children could get extra help from others such as parents or more knowledgeable others. It could also be online help that could affect the results of the study, and children would not be aware of this. Even if the researchers provide them with sufficient information prior to conducting the study, the problem could still persist since children could be over-excited during the activity and hence their primary aim is mostly completing the task, competing with others, or racing against time depending on the nature of the activity or game (Moon, 2005). In this regard, they can be too focused on the aim to remember the ground rules of the study. It is also possible for them to easily get bored with the MALL activity due to their short concentration span (Garton & Tekin, 2022). In this case, although there are numerous ways for them to follow, they are likely to quit dealing with the tool or answer the questions quickly without thinking hard. This could be regarded as an undesirable situation for the healthy outcome of the research.

Although such circumstances might be true for participants from all age groups in a quasi-experimental MALL study, it is more probable for children, since they might lack this awareness and frequently ask for help when they are unable to achieve a goal. When this is the case, results of the study and hence the reliability could adversely be affected. Therefore, it is necessary for researchers to take this possibility into consideration and act proactively prior to actually starting a study. An important precaution could be inclusion of parents or legal guardians in the application of the study. In other words, they could be informed of the ground rules of the quasi-experimental study so that they can help to ensure the smooth conduct of the study with minimum or no deviation from the ideal application process. Moreover, in terms of child participants, researchers should put particular emphasis of working on their own without external help and providing children with sufficient training, which is elaborated below.

Training

Training has a crucial role for participants to effectively use the applications and mobile tools in MALL studies (García Botero et al., 2021; Stockwell & Hubbard, 2013). It is particularly important if participants are unfamiliar with the mobile devices or specific language learning applications used in the study. Despite children's higher familiarity with technology and mobile devices, it is still important to inform them of the procedure and how to use the specific application, as they may not necessarily know it specifically.

Considering children's inability to understand long explanations due to a lack of abstract thinking (Pinter, 2017), it would be useful to give a demo of the mobile app or device so that they can better grasp by seeing or experiencing how they will do what is expected from them. Alternatively, a tutorial video would be really beneficial for child participants, since they might easily forget how to do the activity or work with the MALL tool. In fact, it could also be extremely beneficial for parents or legal guardians to get more familiarised with the content and process of the study. With the help of a higher level of knowledge, they can help to keep children on track during the application of the study. By doing so, children's familiarity with the MALL tool could be ensured and hence more reliable results could be obtained.

Training could also be useful to set up the ground rules of the study. Participating children could be informed of the importance of working on their own without getting extra help from their parents or online platforms. In this way, external affecting factors could be eliminated or at least minimised. Considering children's lack of self-regulation skills (Pinter, 2017), their parents could also be informed in the process of getting consent (elaborated below) so that they would be more aware of the details of the study and the importance of children's independent work and hence abstain from helping their children.

Convenience of MALL Activities

Although the convenience of MALL activities could be argued to be important for all age groups, it is crucial for child participants. MALL applications and activities should be appropriate for learners' young age and language level. The possible problems stemming from their young age were previously mentioned. In case of too complicated or simple activities, participating children could easily get bored or distracted and hence quit doing the activity. When this is combined with the characteristics of children in terms of getting bored easily and lacking instrumental motivation, it could be argued that it is inevitable for them to encounter problems in the process of working with MALL activities. Therefore, it is important to adjust the difficulty level of the activities and tasks according to children's age and capability. As for the language level, small children are mostly at the very beginning of learning a new language and hence complete beginners depending on the context in which they grow. In this regard, tasks or activities should be designed in accordance with language level so that children can have opportunities to demonstrate their true potential. Moreover, considering children's lack of instrumental motivation to learn a new language (Garton & Tekin, 2022), it is important to pay particular attention to the contents of the activities/tasks. The researchers need to choose or design enjoyable and appealing activities so that children keep spending time with them. At this point, Stockwell (2008) makes a reasonable recommendation that researchers keep mobile learning tasks and activities short and succinct. In the case of long tasks, they can be divided into smaller and coherent chunks, which would allow participants to take quick breaks and keep their motivation higher. This is a general suggestion given for all MALL studies but particularly important for children due to their distinctive characteristic of short concentration span and getting easily bored.

Ethical Issues

Ethics is paramount in studies recruiting children due to their young age. Different from studies with adults, ethical issues in researching with children are generally regarded as challenging and time-consuming due to official permissions and a high amount of endeavour (Pinter et al., 2013). Obtaining consent is one of the key issues in research with children (Alderson, 2004). Due to children's inability to give consent to participate in a research study because of their young age (up to the age of 18 years), it is legally necessary to obtain consent from those who act in guardianship or responsible others. However, this consent does not necessarily mean that children want to participate in the study. Children's own decisions are also important in this process. Children can explicitly demonstrate their views and feelings on something (Blackburn, 2015; Pinter, 2017); therefore, researchers should also take into consideration children's own decisions. In order to get consent from children and their parents, it is important to give detailed information in both oral and written form prior to starting the study.

Another issue that should be taken into consideration during conducting a MALL study with children is the possibility of child participants' desire to stop playing with the MALL tool. It could be interpreted in two distinct ways. In one sense, it could be a temporary unwillingness due to a spur-of-the-moment decision and hence does not have to be regarded as a valid reason for opting out of the study. Small children could frequently make such instant decisions in daily and educational life and continue doing whatever they deal with. However, if they no longer want to spend time with the MALL tool or activity, researchers need to recognise it on time and let them do so without any negative outcomes. It is important for researchers to distinguish these two situations and act accordingly without insisting on children's participation and violating ethics.

A FRAMEWORK FOR MALL STUDIES WITH YOUNG LEARNERS: TPACK-YL

Based on the insights presented so far, it is believed to be useful to propose a new framework that takes into consideration YLs' characteristics in MALL studies utilising the quasi-experimental design. It is basically built upon the TPACK framework with added some additional key points about YLs and hence named the "TPACK-YL" framework (Figure 1). It harmoniously combines the three main domains of TPACK, adding another important component, ethical considerations. This customised framework helps

researchers and teachers create a mobile learning context that integrates technology, engages children in the course of learning a language, and takes into account their distinctive needs and characteristics different from older learners.

As illustrated in Figure 1 below, TK highlights the importance of literacy on mobile devices. More specifically, it ensures that YLs have a sufficient understanding of mobile devices and the application that is intended to be used in the study. These applications should be engaging and appealing for YLs as well as appropriate for YLs' limited cognitive skills. In order to maintain a safe MALL environment, content filtering or parental control might be useful to take into consideration. As for PK, this component focuses on the implementation of child-centred approaches with a specific focus on age-appropriate activities in line with children's interests and motivations. Scaffolding could be viewed as crucial, as it ensures the right balance of support and challenge in the process of YL's progress during the activities. It is also emphasised in a previous study conducted by García Botero et al. (2021) who argued that scaffolding ensures the effective implementation of MALL for users. The following component, CK, necessitates possessing a certain level of knowledge about the language development of children and ensuring the alignment of content with children's developmental stages. Finally, ethical considerations underscore safeguarding children through a variety of ways, including obtaining consent from parents or legal guardians and respecting children's willingness to participate in MALL activities. Children's own decisions to participate or continue the activities also matter as much as their parents.

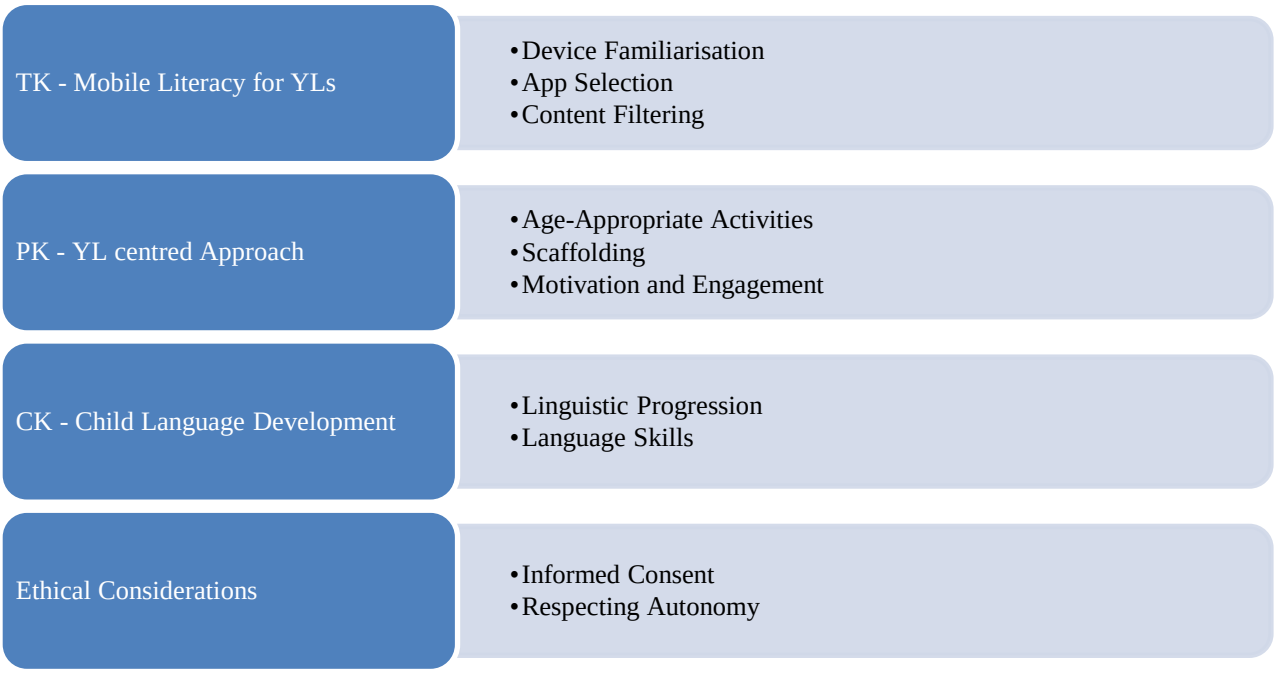

Figure 1. *The TPACK-YLs Framework*

Meticulous implementation of the TPACK-YL framework could help researchers design MALL interventions that can lead children to have effective language learning experiences. It aims to efficiently integrate the main aspects which are technology, pedagogy, content, and ethics, harmonise these and hence ensure the successful application of MALL for YLs by tailoring it according to their age-specific characteristics, needs, and language developmental processes. It prioritises a child-centred approach that enhances the potential outcomes of MALL studies with YLs.

CONCLUSION

This paper has focused on the salient points that have been identified as important in the course of designing a quasi-experimental study in MALL with children. While some issues stem from the distinctive feature of MALL which is language learning in informal settings (e.g., lack of control), others could occur due to participating children's young age (e.g., ethics), characteristics, and language level. Based on these, the TPACK framework was customised so that researchers can navigate potential methodological and ethical constraints in a quasi-experimental MALL study in extramural settings. It is important to take into consideration these factors to ensure the seamless implementation of a MALL study, as they specifically address the issues stemming from YL participants. It is acknowledged that the paper has some limitations. Since it does not present any empirical data that are collected in a MALL study through TPACK-YL, it does not validate the effectiveness of this newly proposed framework. More investigation and testing are needed to determine its practical benefits. Moreover, the proposed TPACK-YL framework and its components are primarily focused on YL age groups. Considering the wide age range of YLs (up to the age of 18) and their changing characteristics and needs depending on the age group they belong to (e.g., post-puberty), this framework may need to be customised depending on these factors. Future methodological and empirical papers are invited to revise, challenge, and build on the issues addressed in this paper. In this way, it could be possible to find the best way for the successful implementation of a quasi-experimental MALL study with young language learners in extramural settings.

Ethics and Consent: Ethics committee approval for this study was received from the Ethics Committee of Nevşehir Hacı Bektaş Veli University (Date: 26.05.2023; Approval Number: 2023.05.190).

REFERENCES

Alderson, P. (2004). Ethics. In S. Fraser, V. Lewis, S. Ding, M. Kellett, & C. Robinson, (Eds.), *Doing research with children and young people* (pp. 97–112). London: Sage.

Blackburn, C. (2015, June 22). *Researching with young and developmentally young children: Ethical considerations, dilemmas and compromises*. BERA. https://www.bera.ac.uk/blog/researching-with-young-and-developmentally-young-children-ethical-considerations-dilemmas-and-compromises

Burston, J. (2015). Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL, 1*(27), 4–20. https://doi.org/10.1017/S0958344014000159

Dörnyei, Z. (2007). *Research Methods in Applied Linguistics*. Oxford: Oxford University Press.

Duman, G., Orhon, G., & Gedik, N. (2014). Research trends in mobile assisted language learning from 2000 to 2012. *ReCALL*, *27*(2), 197–216. https://doi.org/10.1017/S0958344014000287

Chinnery, G. M. (2006). Going to the MALL: Mobile assisted language learning. *Language Learning & Technology, 11*(1), 9-16.

Esit, Ö. (2011). Your verbal zone: An intelligent computer-assisted language learning program in support of Turkish learners' vocabulary learning. *Computer Assisted Language Learning*, *24*(3), 211–232. https://doi.org/10.1080/09588221.2010.538702

García Botero, G., Botero Restrepo, M. A., Zhu, C., & Questier, F. (2021). Complementing in-class language learning with voluntary out-of-class MALL. Does training in self-regulation and scaffolding make a difference? *Computer Assisted Language Learning*, *34*(8), 1013–1039. https://doi.org/10.1080/09588221.2019.1650780

Garton, S., & Tekin, S. (2022). Teaching English to young learners. In E. Hinkel (Ed.) *Handbook of Practical Second Language Teaching and Learning* (pp. 83–96). London: Routledge. https://doi.org/10.4324/9781003106609-7

Hsu, L. (2016). Examining EFL teachers' technological pedagogical content knowledge and the adoption of mobile-assisted language learning: A partial least square approach. *Computer Assisted Language Learning*, *29*(8), 1287-1297. https://doi.org/10.1080/09588221.2016.1278024

Jalilifar, A., & Mashhadi, A. (2013). Current trends in research on mobile phones in language learning. *Journal of Research in Applied Linguistics, 4*(2), 110-127.

Jarvis, H., & Achilleos, M. (2013). From Computer Assisted Language Learning (CALL) to Mobile Assisted Language Use (MALU). *Tesl-ej*, *16*(4), 1–18.

Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, *20*(3), 271–289. https://doi.org/10.1017/S0958344008000335

Kukulska-Hulme, A. (2013). Mobile-assisted language learning. In C. A. Chapelle (Ed.), *The encyclopedia of applied linguistics* (pp. 3701–3709). London: Wiley-Blackwell.

Kukulska-Hulme, A., Lee, H., & Norris, L. (2017). Mobile Learning Revolution: Implications for Language Pedagogy. *The Handbook of Technology and Second Language Teaching and Learning*, 217–233.

Li, R. (2022). Effects of Mobile-Assisted Language Learning on EFL/ESL Reading Comprehension. *Educational Technology & Society*, *25*(3), 15–29.

Lin, J. J., & Lin, H. (2019). Mobile-assisted ESL/EFL vocabulary learning: a systematic review and meta-analysis. *Computer Assisted Language Learning*, *32*(8), 878–919. https://doi.org/10.1080/09588221.2018.1541359

Little, D. (2007). Language Learner Autonomy: Some Fundamental Considerations Revisited. *Innovation in Language Learning and Teaching*, *1*(1), 14–29. https://doi.org/10.2167/illt040.0

Loewen, S., & Plonsky, L. (2016). *An A-Z of applied linguistics research methods.* New York: Palgrave.

Mays, B. R., Yeh, H. C., & Chen, N. S. (2020). The Effects of Using Audience Response Systems Incorporating Student-Generated Questions on EFL Students' Reading Comprehension. *Asia-Pacific Education Researcher*, *29*(6), 553–566. https://doi.org/10.1007/s40299-020-00506-0

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record 108*(6), 1017–1054. https://doi.org/10.1177/016146810610800610

Moon, J. (2005). *Children Learning English*. Oxford: MacMillan.

Pinter, A. (2017). *Teaching young language learners*. Oxford: Oxford University Press.

Pinter, A., Kuchah, K., & Smith, R. (2013). Researching with children. *ELT Journal*, *67*(4), 484–487. https://doi.org/10.1093/elt/cct033

Rogers, J., & Revesz, A. (2019). Experimental and quasi-experimental designs. In J. McKinley & H. Rose (Eds.) *The Routledge handbook of research methods in Applied Linguistics* (pp. 133-143). London: Routledge.

Stockwell, G. (2022). *Mobile assisted language learning: Concepts, contexts and challenges*. Oxford: Oxford University Press. https://doi.org/10.1017/9781108652087

Stockwell, G., & Hubbard, P. (2013). Some emerging principles for mobile-assisted language learning. *The International Research Foundation for English Language Education*, 1-15.

Tekin, S. (2023b). CALL teacher education for young learner classrooms. In D. Tafazoli, & M. Picard (Eds.), *Handbook of CALL teacher education and professional development: Voices from under-represented contexts* (117-133). Singapore: Springer. https://doi.org/10.1007/978-981-99-0514-0_8

Thongsri, N., Shen, L., & Yukun, B. (2019). Does academic major matter in mobile assisted language learning? A quasi-experimental study. In *International Journal of Information and Learning Technology 36*(1), pp. 21–37). https://doi.org/10.1108/IJILT-05-2018-0043

Wong, T. L., Xie, H., Zou, D., Wang, F. L., Tang, J. K. T., Kong, A., & Kwan, R. (2020). How to facilitate self-regulated learning? A case study on open educational resources. *Journal of Computers in Education, 7*(1), 51–77. https://doi.org/10.1007/s40692-019-00138-4

Wu, T. T., Sung, T. W., Huang, Y. M., Yang, C. S., & Yang, J. T. (2011). Ubiquitous English learning system with dynamic personalized guidance of learning portfolio. *Journal of Educational Technology & Society, 14*(4), 164-180.

Yang, Y., & Song, Y. (2022). Understanding primary students' self-regulated vocabulary learning behaviours on a mobile app via learning analytics and their associated outcomes: A case study. *Journal of Computers in Education, 1-30.* https://doi.org/10.1007/s40692-022-00251-x