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The role of Mobile-Assisted Language Learning in Instructed Second Language Acquisition

A mixed methods approach to the integration of MALL
in language skills training in the Federation Wallonia-Brussels

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ABSTRACT

Digital technologies have transformed several aspects and domains of our society, among which language, language use and literacies, but also foreign language learning and teaching. The use of mobile technologies to support language learning has been studied for a few decades in the Mobile Language Learning (MALL) research field. In parallel, governments have started to support the integration of technologies in school curricula with, for example, in French-speaking Belgium, the introduction of digital literacies in learning outcomes. Yet, we have little knowledge about actual MALL practices in secondary schools in the Federation Wallonia-Brussels (FWB) or about how mobile technologies can be integrated in usual teaching and learning practices.

The present thesis uses a mixed methods approach to investigate the potential role of mobile technologies in Instructed Second Language Acquisition (ISLA) and presents the results of three main studies conducted from 2015 to 2020.

The first part of the dissertation aims to frame the research in its context, at the intersection of different fields of research, and to explore the FWB educational system, i.e. the learning environment in which most studies are conducted. Starting with a look into the ISLA research field and a focus on the integration and use of technologies in ILL, i.e. the world of CALL (Chapter 1), we then investigate the more recent field of MALL (Chapter 2) and several key aspects which are exploited in the studies of the research such as mobile attitudes, affordances, the evaluation of MALL activities, and the use of self-produced videos in oracy practices. We finally take a more institutional perspective and look into the place of (mobile) technologies in L2 learning and teaching in compulsory education in the FWB (Chapter 3).

After the literature review, we detail the methodology (Chapter 4) adopted in each study developed in the multi-phase design, describe the MALL projects and activities co-created with teachers and/or researchers, and present three research paradigms selected to carry out the studies, viz. a mixed methods approach, teacher-researcher collaboration and an ecological perspective.

The practical part of the research first seeks to understand its context by studying teachers' and learners' declared uses of and attitudes towards MALL (Chapter 5). It therefore presents the descriptive results of a cross-sectional survey, whose questionnaire was distributed among upper-secondary FWB language teachers and learners in 2016. Additional qualitative data provides information on the educational context in which MALL could be used. This mixed-methods study is

followed by a thematic comparison of its findings with the results of three complementary surveys on CALL & MALL uses carried out with teams of researchers in 2015, 2018 and 2020.

The second study (Chapter 6) analyses the integration of mobile technologies in language skills training thanks to a cross-case synthesis of the results of four case studies conducted in collaboration with several researchers between 2017 and 2019. The first case study focuses on the design and evaluation of a writing mobile DDL app (*TELL-OP app*) for informal language learning. The second one looks into MALL integration among pre-service teachers with the co-creation of a mobile treasure hunt (*De Avonturen van Hergé*) focusing on the practice of reading strategies in primary education in the FWB. The last two case studies aimed to design and evaluate teacher training modules (*formation 2 temps 3 mouvements*) relating to the integration of (mobile) technologies in the practice of L2 productive skills in the FWB. The second edition of the module allowed to gather additional data from learners on their integration of the tool.

The final case study (Chapter 7) zooms in on the integration and use of a video discussion app to support foreign language oracy practices in secondary education in French-speaking Belgium. The MALL project was implemented by four groups of learners and their three teachers for one school semester. The analyses focus on (1) the activities implemented in the projects, (2) the teachers' perceptions on the project and their integration of technology, and (3) the learners' perceptions and the task implementation process from their perspective.

The main results, presented in the final part of the thesis (Chapter 8), show that, while actual MALL uses in FWB language classrooms are scarce, task-based MALL can promote the use of contemporary pedagogies, support ISLA research principles and foster the development of learners' digital literacies. They suggest that three key factors need to be considered to align the use of MALL with ISLA principles: the mobile tool and its affordances, the task(s) designed for the learning activity, and the teacher and its multiple roles. It is also concluded that mobile tasks can be exploited at various levels of L2 proficiency to develop receptive and/or productive skills in different learning contexts.

Besides, the findings reveal that perceptions on MALL have evolved throughout the research period and are generally positive, especially after teachers and learners have experienced MALL projects and had a recurrent use of tools in their practices. Nevertheless, the analyses indicate the need to consider some potential obstacles to effective mobile technology integration in language learning: (1) learners' and teachers' lack of digital literacies, (2) teachers' difficulties in accompanying learners

in the implementation of mobile tasks, and (3) the little attention drawn to the development of digital literacies when performing mobile tasks.

Overall, the results of the three studies speak to the importance of developing specific MALL teacher training and support to ensure the implementation of sound practices in the foreign language classroom.

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ACRONYMS

ACMC	Asynchronous Computer-mediated Communication
ALAO	Apprentissage des Langues Assisté par Ordinateur
ALMT	Apprentissage des Langues Médiatisé par les Technologies
AR	Augmented Reality
ASPID	Adoption Substitution Progression Innovation Détérioration
ASU	Actual System of Use
ASV	Adobe Spark Video
AtL	Awakening to Languages
ATT	Attitudes (TAM)
BloU	Behavioural Intention of Use (TAM)
BYOD	Bring Your Own Device
CALL	Computer-assisted Language Learning
CASLR	Computer-assisted Second Language Research
CEFR	Common European Framework of Reference
CFA	Confirmatory Factor Analysis
CK	Content Knowledge
CLIL	Content and Language Integrated Learning
CLT	Communicative Language Teaching
CMC	Computer-mediated Communication
DDL	Data-driven Learning
DT	Distance Teaching
EFL	English as a Foreign Language
ESL	English as a Second Language
EV	External Variables (TAM)
FC	Facilitating Conditions (TAM)
FWB	Federation Wallonia-Brussels
HE	Higher education
ICALL	Intelligent Computer-assisted Language Learning
ICT	Information and Communication Technologies
ILL	Instructed Language Learning
ISLA	Instructed Second Language Acquisition
IT	Information Technology
L1	First language
L2	Here, any foreign language learnt or used in a formal language learning environment
LM1	First foreign language
LM2	Second foreign language
LM3	Third foreign language
LMOOC	Language Massive Open Online Course
LMS	Learning Management System

M1 – M3	Pre-school education from the first to the third year
MALL	Mobile-assisted language learning or Mobile Language Learning
MR	Mixed Reality
NLP	Natural Language Processing
OECD	Organisation for Economic Co-operation and Development
OER	Open Educational Resource
OR	Odd Ratio
OS	Operating System
OSF	Oracy skills framework
P1-P6	Primary years of education from the first to the sixth year
PCK	Pedagogical Content Knowledge
PDA	Personal Digital Assistant
PE	Perceived Enjoyment (TAM)
PEoU	Perceived Ease of Use (TAM)
PK	Pedagogical Knowledge
PLC	Professional Learning Community
PU	Perceived Usefulness (TAM)
RQ	Research Question
S1-S6	Secondary years of education from the first to the sixth year
SAMR	Substitution, Augmentation, Modification, and Redefinition
SCMC	Synchronous Computer-mediated Communication
SEI	Socio-economic index
SELFIE	Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies
SEM	Structural Equation Modeling
SIG	Special Interest Group
SLA	Second Language Acquisition
SMS	Short Message Service
SN	Subjective Norms
TAM	Technology Acceptance Model
TBLT	Task-Based Language Teaching
TEL	Technology-enhanced learning
TK	Technological Knowledge
TPACK	Technological Pedagogical Content Knowledge
TPK	Techno-pedagogical Knowledge
TSE	Technological Self-Efficacy
UAA	Unité d'Acquis d'Apprentissage (= CEFR language activity)
UTAUT	Unified Theory of Acceptance and Use of Technology
VR	Virtual Reality
XK	Contextual Knowledge

INTRODUCTION

Rationale of the research project

Focusing on the role of technologies in language learning and teaching in instructed settings is acknowledging that they have, at some point, a role to play in the process. More broadly, the advent of technologies has impacted society globally and affected different domains, among which language learning and teaching. Traxler (2016, p.1) claims that “digital technologies transform languages, learning and social practices”. Dudeney et al. (2013, p.2) forecast transformation in similar fields due to the evolution of technologies: “Like all past communications technologies, our new digital tools will be associated with changes in language, literacy, education and society.” The following paragraphs illustrate how technology has already transformed language, language use and literacies, and provide a rationale for the development of a research project on the presence and the role of mobile technologies in language learning.

Languages are in constant evolution and are creating or adding new words. Some of those words are linked to the creation of new devices, tools, media and practices. This can be seen, for example, in dictionaries with the integration of terms or meanings linked to the domain (for example, in English: to Google, a smartphone). As further detailed in Chapter 3, technologies have also found their way in the lexical fields that must be covered in numerous language learning curricula, including that of French-speaking Belgium. For example, the fourth lexical field, namely *leisure*, includes *ICT and media* as a subcategory next to *sports* and *cultural activities* (Fédération Wallonie-Bruxelles, 2017b).

Beside the inclusion of vocabulary linked to the digital world in languages, the advent of technologies has influenced language use and has led to the development of new types of *literacies* related to the acquisition of reading and writing skills. The use of text messaging (SMS) on smartphones has for instance led to the creation of a new text type consisting in a short written message sent immediately to the recipient using their phone number. This text type can include, among others, the use of specific abbreviations representing sounds of numbers and letters called *textspeak* (e.g.: *B4*, which means *before*), smileys, or pictures (Multimedia Messaging Service).

This new type of literacy, called ‘texting literacy’ (Pegrum et al., 2022), is part of a broader set of skills named digital literacies, a notion that will be further discussed in Section 1.4.1. The SMS can be used in formal or informal contexts depending on the users’ culture and preferences, and can be used for various purposes, but is

meant initially to communicate quickly about a topic. The use of technological features to write an SMS differs from one user to the other and includes various uses of technology to convey a message such as speech-to-text or slide-to-type features. Depending on the user's practices, technology is a mediation tool or is in charge of the form of the message. It sometimes also contributes to the meaning-making process, for example when suggesting chunks of text to the user.

As digital literacies imply the use of technologies, the form of the message can contain language mistakes arising from technological and/or human manipulations. As noted by Pegrum et al. (2022, p.12), digital writing is frequently associated with a notion of 'ephemeral messaging', in which linguistic accuracy can be considered accessory. Nevertheless, the sender can choose to proofread the message before sending it. The ability for the receiver to decipher a message which contains errors from voice recognition, predictive software or autocorrect software can also be considered as a literacy linked to this new language use, and which Pegrum et al. (2022, p.13) call 'reconstructive literacy'. I would argue that reconstructive literacy also consists in reconstructing the meaning of the message by receptively spotting and correcting the error, be it from technology or from the user. It should be added, however, that errors are not necessarily spotted. This may be without consequences (message read and understood despite the errors) but this may also lead to beliefs that the word form is correct ('their are people' for 'there are people', 'its cool' for 'it's cool') or to plain misunderstandings or communication breakdowns (each of us have had experiences of messages that were misunderstood) which may – may not – be followed by clarification requests.

The texting literacy example shows that technology transforms languages with new words, meanings, abbreviations, and text genres. Yet, it also impacts the way humans use language, for which purpose, and how they manage to create a message and communicate with the help of technology. From a language learning perspective, it seems therefore difficult to avoid using or discussing technologies as these are integrated in the language and its everyday uses. Hence, it appears essential to study the new learning opportunities offered by this digital era and to develop the use of mobile technologies to assist language teaching and learning. Dudeney et al. (2013, p.2) argue that learners should be prepared to interact in "digitally networked post-industrial economies and societies" and that we should help them acquire 21st century skills, among others, the command of digital literacies. It should be added that critical thinking skills will need to be taught so that learners can also reflect on and potentially transform this digital society.

Since language learning and social change can be considered as interdependent on several aspects, we observe that more and more private but also public initiatives now support new teaching and learning methodologies with the learner at the

centre of their learning and the teacher who acts as a facilitator in the process (Pérez-Paredes & Sánchez Tornel, 2009). If this learner-centered way of learning was first developed in the private sector, it is nowadays also fostered by public institutions with, for example, the CEFRL (Council of Europe, 2001) but also by international institutions like the European Council and Commission. Indeed, a report from 2015 regarding *new priorities for European cooperation in education and training* issued the following statement:

Europe's low levels of basic knowledge and skills hamper economic progress and severely limit individuals in their professional, social and personal fulfilment. To enhance employability, innovation and active citizenship, and building on the 2006 Recommendation of the European Parliament and the Council on key competences for lifelong learning, basic skills must go hand in hand with other key competences and attitudes: creativity, entrepreneurship and a sense of initiative, digital competences¹, competence in foreign languages, critical thinking including through e-literacy and media literacy, and skills which reflect growing needs, such as those in the green economy and in the digital and health sectors. (p.27)

The change in methodology and approaches corresponds to an evolution of our today collaborative society where critical thinking and autonomy override knowledge (Depover et al., 2013) and where digital literacies and foreign language competences are considered as key competences that need to be addressed in the agenda for our society.

The development of technologies has already received considerable attention in research fields linked to language, as is for instance the case in Natural Language Processing (NLP). Research in linguistics and Second Language Acquisition (SLA) have also embraced technologies for a few decades now. They have been used as research tools (e.g.: using digital corpora and annotation tools to study language features) but have also been studied as research topic in itself (e.g.: studying the impact of computerized feedback in language learning).

Computer-assisted Language Learning (CALL) research investigates the language learning phenomenon associated with the use of technologies and Mobile-assisted Language Learning (MALL) research focuses particularly on the use of mobile

¹ The report includes a footnote on the term 'digital competences': "Learning and acquiring digital competences go beyond pure ICT skills and involve the safe, collaborative and creative use of ICT, including coding".

technologies, trying therefore to analyse the role of these technologies in language learning and teaching. MALL can still be considered as a young research field (Palalas & Hoven, 2016) in second language acquisition. Linked to the advent and the development of mobile technologies, the field is composed of various research strands from the study of the latest technical developments such as augmented reality (Nobrega & Rozenfeld, 2019), the new learning and teaching opportunities brought with MALL such as the production of digital material (Persson & Nouri, 2018) to the design of theoretical frameworks and research agendas for this maturing field of research (see for example Reinders & Pegrum, 2015; Pegrum, 2016). Other MALL experts start to offer meta-analyses and meta-syntheses (see for example Burston, 2015; Chwo et al., 2018; Peng et al., 2021) to set the frame and guide the MALL community towards more efficient teaching and research practices.

With the use of technologies in the classroom, schools follow the trends and try to adapt to this rapid shift in society. But if research in language learning fully embraces the integration of technologies in its agenda, its implementation in school curricula has not reached its peak yet in French-speaking Belgium. In the last decades, government projects like 'les plans Cyberécole et Cyberclasse' since 1999 and 2005, 'l'Ecole Numérique' since 2011 and the more recent 'plan du Numérique' (see www.ecolenumerique.be for more details) have been set up to equip schools and educational environments with, among others, computers, tablets and WiFi connection. The emergency remote teaching period has obviously had an impact on the development of strategies and tools such as the open-source platform Happi (www.happi.cfwb.be). However, little is known about the actual use and integration of these technologies in schools in general and in our foreign language learning classrooms in particular. In addition, despite available information about the access to computers in schools (see Digital Wallonia, 2018 for more details), the use of mobile tools has been underinvestigated.

Our research intends to address this gap and build bridges between the society needs and expectations and the application of MALL research findings in education. Our work will look into the roles that are played, can be played and should be played by mobile technologies in language learning and teaching in the Federation Wallonia-Brussels (FWB). Our main research question is the following: *To what extent do mobile technologies have a role to play in foreign language learning and teaching in upper secondary education in the Federation Wallonia-Brussels?*

Objectives and context of the research

The objectives of this thesis are (1) to examine the potential of MALL in the context of Instructed Second Language Acquisition (ISLA), (2) to explore the MALL landscape in local and global contexts from different perspectives so as to understand the variables at stake in MALL research, and (3) to suggest a possible MALL training framework for educators that exploits the potential of MALL in ISLA while taking the local context into account.

This PhD work does not seek to address the effectiveness of MALL for the acquisition of a particular linguistic feature nor consists of a single study that tackles one specific aspect of second language acquisition. It rather explores the MALL phenomenon from various perspectives, thanks to multiple studies and different methodologies, with the aim, first, of getting an overview of MALL in ISLA contexts, and then, of investigating the implementation of MALL as innovative practice with its challenges and opportunities.

Although some results of our work will be generalized to different learning environments, this research addresses particularly an integrated use of MALL in the formal foreign language classroom with specific attention drawn to the practice of oracy skills. The target context of the research is upper secondary education in the FWB and the studies will look into the phenomenon mainly from the perspectives of language instructors and language learners. Some complementary studies are carried out at other levels of education and in other contexts. Their results will document our main findings and contribute to providing a broader perspective on MALL.

In Belgium, compulsory education concerns children from 5 to 18 years old. However, most young children attend pre-school education from 2,5 to 6 (European Commission, Eurydice, 2020) and then start 6 years of primary education before 6 other years of secondary education. In our plurilingual country, where French, Dutch and German are 3 national languages, *Communities* are in charge of the educational system, which explains why studies or surveys related to this topic usually target one community instead of the whole country. This research focuses on the French-speaking community called the Federation Wallonia-Brussels (FWB). The community includes all French-speaking schools in Wallonia and Brussels.

Using a mixed methods approach, four main research questions are addressed throughout this doctoral journey to reach our three global objectives:

RQ1: How can MALL activities support ISLA? (Objective 1)

RQ2: How are (mobile) technologies perceived by language teachers and learners? (Objective 2)

RQ3: How are (mobile) technologies used by language teachers and learners? (Objective 2)

RQ4: How can language teachers best be trained to integrate MALL tools in their practices? (Objective 3)

Three main studies are carried out in this work and follow a multi-phase research design (see Figure 4.1). The first one is a quantitative survey on CALL and MALL uses and attitudes distributed among language teachers and learners (Chapter 5). Its objective is to collect data from the field on actual MALL practices before starting more qualitative research on the topic. The second study is a qualitative cross-case synthesis that analyses four CALL/MALL case studies conducted by the researcher in collaboration with several colleagues (Chapter 6). By looking into MALL integration and MALL teacher training projects, the objectives of the study are to partly answer the four main research questions and to guide the preparation of the last study of the research. The final case study focuses on the practice of L2² oracy skills and investigates MALL integration in secondary education by teachers and learners in the FWB (Chapter 7). This study seeks to observe the integration of a video tool in L2 oracy practices by teachers and learners from different perspectives (activities, teachers and learners' perceptions). It tackles the integration of the tool both in teaching and learning practices, and focuses on the mobile task implementation process rather than on the learning outcome.

Structure of the research project

Here is the presentation of our doctoral journey and of the articulation between the chapters, the different studies and the research questions addressed. The first three chapters introduce the theoretical foundations of our topic. A variety of studies have been conducted in this research and the ecological approach imposes to consider different elements of a system. Moreover, the evolution of technologies

² L2 is used in this work to refer to any foreign languages learnt and used mainly in a formal language learning environment.

and the associated research this last decade also requires to introduce several topics in the literature review. Therefore, the theoretical section of this dissertation can look patchy and disorganized at moments. Yet, the aspects tackled in the first three chapters are interconnected and will contribute to analysing the integration of MALL in the light of previous research findings.

Chapter 1 looks into the relationship between the fields of CALL and ISLA. This work is situated in the ISLA domain as the studies were mainly conducted in instructed settings, more particularly in foreign or second language classrooms. Addressing CALL theories in line with SLA principles seems here essential as first step towards the more specific field of MALL. This first chapter introduces the context of this research by examining the key aspects that are addressed in CALL and MALL research such as CALL practices, the notion of technological affordances, of digital literacies and technology integration. Finally, it constitutes a first part of the answer to RQ1 as it summarizes the potential of CALL in its relation to ISLA.

Chapter 2 narrows the scope by investigating the field of MALL and its specificities. It includes the relation between ISLA and MALL and some background information on MALL effectiveness. More importantly, it presents a few research interests developed in this research such as the study and evaluation of MALL practices, MALL attitudes and the use of self-produced videos to develop L2 oracy skills. The chapter also provides theoretical background/framing that will be referred to/used in various studies on the field.

Chapter 3 presents the context in which most studies of the research are carried out: the FWB. It addresses its language learning and teaching landscape, as well as the place given to the digital dimension in this environment. Finally, it tackles the state of L2 oracy practices in compulsory education in the FWB. The final section of the chapter highlights some main findings from the theoretical part and identifies a few gaps to address in this research.

Chapter 4 is a methodological chapter. It details the choices and options taken to design the studies presented and to carry out the analyses of the various data types collected. The first part discusses three research paradigms used to guide and structure the research (ecological research, teacher-researcher collaboration, and mixed-methods approach). It then presents the research questions and details each study design, from the project design, to the data collection and analysis.

The last three chapters present the results of the different studies. **Chapter 5** first presents the results of a survey relating to CALL and MALL attitudes and practices that was distributed to language teachers and learners in 2016. The survey targets upper secondary education teachers (N=118) and learners (N=1054) in the FWB and

focuses on general uses and attitudes towards technologies in language teaching. The main result from this survey is the infrequent use of mobile technologies in the FWB context. The chapter then summarizes three complementary surveys carried out in 2015, 2018 and 2020, and which respectively address teacher uses of mobile devices and OER resources in language teaching (Van de Vyver & Meunier, 2015), HE learner and instructor attitudes toward and use of MALL (Gimeno-Sanz et al., 2020), and teacher uses of digital tools for language teaching during the lockdown period (Delforge et al., 2022). Their results nuance the picture given in the first survey and look into generalizable features. This section addresses RQ2 and RQ3 in detail, mainly from a quantitative perspective, but it also provides the reader with an overview of the context in which training can be carried out (RQ4).

Chapter 6 examines innovative uses of technology in language teaching (CALL and MALL) in multiple case studies. Given that MALL usual practices are scarce in the target context, the researcher chooses to further investigate innovative uses and the integration of MALL in teaching practices. The variety of the studies and their analysis allows the researcher to add qualitative results to RQ2 and RQ3, as well as to come up with preliminary findings regarding RQ1 and RQ4. The results focus mainly on the way teachers get familiar with a specific technology, on how they implement it in their classroom and on how the techno-pedagogical support of a research team impacts the integration of a digital tool in their teaching practices. These case studies provide a methodological basis that will help design the *Flipgrid* study developed in the following chapter.

Chapter 7 develops the final case study of this doctoral path. It consists of a close-up on the innovative and recurrent use of one mobile tool called *Flipgrid* by three secondary education teachers in their foreign language classroom with the aim of practising oracy skills. This study takes the form of a teacher-researcher collaboration since the researcher trains and follows the teacher in the implementation of MALL activities in the classroom while the teacher informs, comments and gives feedback on the training design chosen by the researcher. Interviews and digital productions of learners also provide valuable feedback on the project. The chapter seeks to build upon the theoretical knowledge gathered in the theoretical chapters and the expertise gained in the following practical ones to address all the research questions. The variety of data collected in this study enables the researcher to look into MALL from an ecological perspective, considering therefore the actors, the context, and the MALL activity separately and, at the same time, as a complex phenomenon.

Chapter 8 discusses the four research questions in the light of the previous findings, and aims to offer a global picture of the MALL phenomenon. It then exposes the

limits of the research before suggesting some avenues for the future which concern MALL researchers and/or language teachers.

Practical considerations

This manuscript compiles a series of studies, some of which have led to peer-reviewed publications in conference proceedings and in international journals. Some sections of the dissertation are therefore largely based on published text, which is always clearly mentioned in footnotes. All co-authored publications are also listed at the end of the manuscript, before the bibliography.

Besides, the data collected in the research includes several languages (mainly French, Dutch, and English) and I decided to opt for a plurilingual manuscript. Although this choice was first made for practical reasons, I also believe it is in line with modern pedagogical approaches we tend to develop in L2 learning. Finally, it highlights how (mobile) technologies can support language use and plurilingual communication.