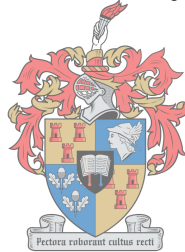


**An Investigation into the Effect of Mobile-Assisted
Language Learning on Rwandan University Students'
Proficiency in English as a Foreign Language**

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*Dissertation presented for the degree of Doctor of Philosophy in the
Faculty of Arts and Social Sciences at Stellenbosch University*

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Declaration

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Valentin Uwizeyimana

December 2018

Abstract

It is almost common knowledge that English is the most spoken language in the world, which is considered a global lingua franca, and which often offers a means of socio-economic mobility for its speakers (Crystal 2003; Samuelson and Freedman 2010). Because of this status, English has been adopted by many countries as their national and/or official language, and to serve as a medium of instruction at different levels of education, even though it is a foreign language in some of those countries, i.e. not spoken or even understood by a large part of the population (Nyika 2015). This implies that attaining a high level of proficiency in English remains an advantage, whereas not knowing the language at all or attaining a low level of proficiency in it, constitutes a disadvantage.

However, in many countries such as Rwanda, attaining a high level of English proficiency is problematic, precisely because it is a foreign language despite being an official language (Kagwesage 2013). This means that learners are not exposed to a sufficient amount of English input, and there are very few to no opportunities for English output (i.e. actually using the language). The limited input which learners receive, comes from the formal language classroom, where learners are, in by far the majority of cases, taught by non-native speakers of English (Abbott, Sapsford and Rwirahira 2015). Furthermore, learners have access to limited conventional teaching-and-learning materials (such as printed books, journals and computers), and they do not get enough opportunities to practise English outside the classroom setting (Andersson and Rusanganwa 2011). In order to address this problem, and in conformity with the constructivist approach to language teaching and learning, this study investigated the contribution that mobile input can make to the attainment of a higher level of English proficiency, given the growing amount of research showing the value of mobile technologies in language learning (MTLL).

60 Kinyarwanda-speaking students studying at the University of Rwanda participated in the study, and were divided into four groups. Group 1 received training in the use of MTLL and then continued using these MTLL; Group 2 used MTLL without having received any training; Group 3 did not use MTLL but were provided with additional conventional material; and Group 4 neither used MTLL

nor received any additional material. Data were collected by means of observation, a survey, an English language proficiency test, a discussion group with the participants and a semi-structured interview with a lecturer at the University of Rwanda. A careful analysis of the data showed that MTLL have a significant effect on the learners' proficiency in English as a foreign language (EFL), and that the learners have positive attitudes towards MTLL and their integration into the language pedagogy. Finally, this study offers some practical suggestions regarding the incorporation of MTLL in formal language classrooms generally, but also more specifically in the case of EFL classrooms in African countries, where English is a foreign language as well as the country's official language and the language of instruction.

Opsomming

Dit is algemeen bekend dat Engels die mees-gesproke taal ter wêreld is, 'n globale lingua franca, wat dikwels aan sy sprekers sosio-ekonomiese mobiliteit bied (Crystal 2003; Samuelson en Freedman 2010). As gevolg van hierdie status, is Engels deur baie lande tot hulle nasionale en/of amptelike taal verkies, sowel as die taal van onderrig, ten spyte daarvan dat die taal in sommige van hierdie lande 'n vreemdetaal is, wat 'n groot deel van die bevolking dus glad nie praat, of selfs verstaan, nie (Nyika 2015). Dit impliseer dat dit voordelig is om 'n hoë vlak van vaardigheid in Engels te verwerf, terwyl dit 'n besliste nadeel is om die taal glad nie te ken nie of om slegs 'n lae vlak van vaardigheid daarin te verwerf.

Dit is egter in baie lande, soos Rwanda, problematies om 'n hoë vaardigheidsvlak in Engels te verwerf, juis omdat die taal 'n vreemdetaal is ten spyte daarvan dat dit ook een van die land se amptelike tale is (Kagwesage 2013). Dit beteken dat leerders nie blootgestel word aan 'n toereikende hoeveelheid insette in die taal nie, en dat daar baie min, tot geen, geleenthede is om Engels te gebruik. Die beperkte insette wat leerders wel ontvang, kom van die formele taalklaskamer, waar leerders, in die meerderheid van gevalle, onderrig ontvang van 'n nie-moedertaalspreker van Engels (Abbott, Sapsford en Rwirahira 2015). Verder het leerders toegang tot beperkte konvensionele onderrig-en-leer materiaal (soos gedrukte boeke, joernale en rekenaars), en kry hulle nie voldoende geleenthede om Engels buite die klaskamer te oefen nie (Andersson en Rusanganwa 2011). Om hierdie probleem aan te spreek, en in ooreenstemming met die konstruktivistiese benadering tot taalonderrig en -leer, het hierdie studie ondersoek ingestel na die bydrae wat mobiele insette kan lewer tot die verwerwing van 'n hoër vaardigheidsvlak in Engels, gegee die toenemende hoeveelheid navorsing wat dui op die waarde van mobiele tegnologieë in taalleer (MTTL).

60 Kinyarwandasprekende studente aan die Universiteit van Rwanda het aan die studie deelgeneem, en is opgedeel in vier groepe. Groep 1 het onderrig ontvang in die gebruik van MTTL en het MTTL aanhou gebruik; Groep 2 het MTTL gebruik sonder om onderrig daarin te ontvang; Groep 3 het nie MTTL gebruik nie, maar is voorsien van addisionele konvensionele leermateriaal; en Groep 4

het nie MTTL gebruik of addisionele materiaal ontvang nie. Data is ingesamel deur middel van waarneming, 'n opname, 'n Engelse taalvaardigheidstoets, 'n groepbespreking met die deelnemers en 'n semi-gestruktureerde onderhoud met 'n dosent aan die Universiteit van Rwanda. 'n Sorgvuldige analise van die data het aangedui dat MTTL 'n beduidende effek het op leerders se vaardigheid in Engels as vreemdetaal (EVT), en dat leerders 'n positiewe houding het teenoor MTTL en die integrasie daarvan by die taalpedagogie. Laastens bied hierdie studie ook praktiese voorstelle vir die integrasie van MTTL by formele taalklaskamers oor die algemeen, maar ook meer spesifiek in die geval van EVT-klaskamers in Afrikalande, waar Engels 'n vreemdetaal is, sowel as die land se amptelike taal en die taal van onderrig.

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For El-Querido Valianne and El-Querido Valora

Iyo mana dusenga tukanizera irakomeye.

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List of Abbreviations

ACTFL	American Council on the Teaching of Foreign Languages
ANOVA	analysis of variance
APP	application software / application
ASR	automatic speech recognition
C-test	cloze test
CALL	computer-assisted language learning
CD	compact disc
CEFR	Common European Framework of Reference for Languages
CG	control group
CPH	critical period hypothesis
EAC	East African Community
e-learning	electronic learning
EFL	English as a foreign language
EG	experimental group
EPT	English proficiency test
ESL	English as a second language
FL	foreign language
GPS	global positioning system
ID	individual difference
IELTS	International English Language Testing System
ILR	Interagency Language Roundtable
L1	first language / mother tongue
L2	second language
LAN	local area network

M	arithmetic mean
m-learning	mobile learning
MALL	mobile-assisted language learning
MoI	medium of instruction
MOOC	massive online open course
MMS	multimedia messaging system
MTLL	mobile technologies in language learning
MVT	matching vocabulary test
NISR	National Institute of Statistics of Rwanda
NNS	non-native speaker
NS	native speaker
<i>p</i>	probability (value)
PDA	personal digital assistant
PLATO	Programmed Logic for Automated Teaching Operations
R	arithmetic range
REC	Research Ethics Committee
REML	restricted maximum likelihood
SLA	second language acquisition
SMS	short message system
SNSLL	social network site for language learning
Std.Dev.	standard deviation
TL	target language
TOEFL	Test of English as a Foreign Language
TOEIC	Test of English for International Communication
UG	universal grammar
UR	University of Rwanda

Chapter 1 : INTRODUCTION

No researcher in the international research field of second language acquisition (SLA) would deny the significant role of input in second language (L2) acquisition (cf. Section 2.4). Most of these researchers would also agree that successful language learning requires sufficient rich input and enough opportunities for output in the target language (TL). However, many learners worldwide, who want to master an L2, face the problem of insufficient input due to the fact that the TL is a foreign language (FL) in their country. This dissertation addresses this problem from a constructivist perspective, and reports on an investigation into the effects of using mobile technologies in language learning (MTLL) on Kinyarwanda-speaking university students' proficiency in English as a foreign language (EFL) in Rwanda. In this chapter, I first provide the background to the research problem in Section 1.1, and specify the research problem statement and focus in Section 1.2. Then I state the research aims, objectives, questions and hypotheses (Section 1.3), as well as the significance and the expected contribution of this study (Section 1.4), and its scope and limitations (Section 1.5). At the end of this chapter, I provide a brief overview of the methodology which was adopted for this study (Section 1.6), and the chapter layout of this dissertation (Section 1.7).

1.1. Background to the Research Problem

English is currently one of the official languages of a number of countries in Africa, and in most of these countries it is also used as a medium of instruction (MoI) in educational systems (Nyika 2015:1). There are a number of advantages to having completed one's education in English, since it is an international language, a global lingua franca and therefore often a means of socio-economic mobility (Crystal 2003; Samuelson and Freedman 2010; Kagwesage 2013). However, these advantages are unavailable to learners if they are unable to speak and/or understand English, and this is precisely the case for a large portion of the population in these countries (Kagwesage 2013). Rwanda is a case in point (Kagwesage 2013:1).

According to Article 8 of Rwanda's constitution, Kinyarwanda is the country's sole national language and one of its three official languages, the other two being English and French (Republic of Rwanda 2015). In 2009, Kinyarwanda was "known and spoken by 99.4% of the population", while only 3.9% of the population knew French and 1.9% knew English¹ (Rosendal 2009:23).

Before 2008, Kinyarwanda was used as MoI for primary education, and French for secondary and tertiary education, while English and Swahili (the latter spoken by roughly 3% of the population) were only taught as subjects (Rosendal 2009:23) from grade 10, i.e. from the fourth year of secondary school in the Rwandan education system, onwards; and this only for students specializing in languages, journalism, and secretarial studies. Because of political changes which took place in Rwanda following "the 1990-1994 civil war, ... the... trend [was]... for the country to become bilingual in Kinyarwanda and English, after dropping French" (Gafaranga 2015: 91-92), in addition to the Rwandan government's perception of "English as the leading language of science, commerce and economic development" (Samuelson and Freedman 2010:192). It is in this regard that in 2008, a new language-in-education policy was put in place, stipulating that English would be the sole MoI at all levels of education (i.e. from grade 1 onwards) in Rwanda (Samuelson and Freedman 2010; Kagwesage 2013). At the same time, English as a Foreign Language (EFL) became a compulsory subject to be taught at all grade levels from primary school throughout secondary school.

However, as Willis (1996:4) states, "you can learn to speak a foreign language quite well without lessons ... [whereas] many ... students who have studied a foreign language leave school unable to communicate in it". This may explain why, although the current cohort at Rwandan universities would have received

¹ These statistics might have become lower for French, and higher for English since 2009 (i.e. the publication of Rosendal's paper) due to a number of changes which took place in Rwanda in matters of language policies, especially in 2008 (cf. Section 1.1).

part of their primary schooling and their entire secondary schooling through the medium of English, overall they still seem to have quite low levels of proficiency in the language. Scholars such as Samuelson and Freedman (2010:205) have found that “given the general lack of qualified [English proficient] teachers [in Rwanda], ...many students entered the university without sufficient skill in one of the official languages”. This is the reason why all university students in Rwanda, regardless of the program that they are registered for, need to continue with EFL as a compulsory subject throughout the first year of their university studies.

An obvious question that follows is why Rwandan learners continue to have low levels of proficiency in English even when it is the MoI at primary, secondary and tertiary level and is also taught as a subject throughout learners’ education, from primary to tertiary level. One challenge that these learners face is that English really is a foreign language (FL) in Rwanda, as it is not spoken outside of the school context at all in the communities in which these learners grow up. In addition, since by far the majority of teachers currently teaching in Rwandan schools grew up in Kinyarwanda homes and received schooling via Kinyarwanda and French, and English is an FL to them as well, they also have a relatively low level of proficiency in English (Samuelson and Freedman 2010; Andersson and Rusanganwa 2011). Abbott, Sapsford and Rwirahira (2015:121) “found that the English of the vast majority of teachers [in Rwanda] was basic at best”. According to Abbott et al. (2015:121), “about forty per cent [of teachers in Rwanda] were considered ‘beginners’, only three per cent had reached an intermediate level and none demonstrated effective operational proficiency or mastery”. This means that the little English input that learners receive is neither native nor near-native like. Furthermore, because teachers struggle with English, Samuelson and Freedman (2010:206) found that they were “forced to fall back on Kinyarwanda” in-between. Andersson and Rusanganwa (2011) also found this code switching during classes, and also note that teachers do not only switch to Kinyarwanda but also to French.

The role of the quantity and quality of input in the second language acquisition (SLA) process continues to receive abundant attention in SLA research – cf.

Chapter 2, especially Sections 2.4 and 2.5 of this dissertation. The study reported in this dissertation fits into this research field by investigating the possibility of using mobile technologies to provide learners with additional input and opportunities for output in the target second language (L2) / foreign language (FL) English.

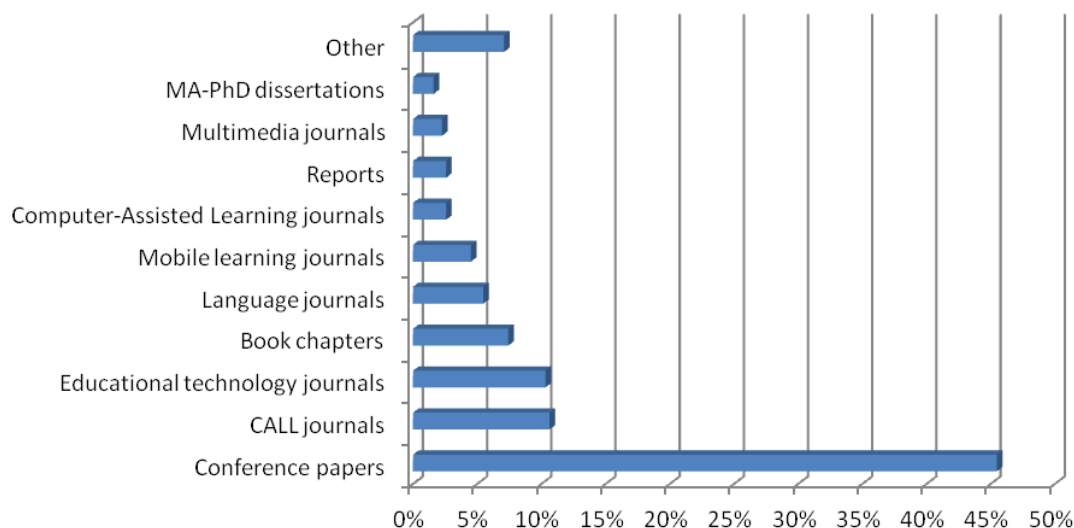
With regard to using mobile technologies in language learning (MTLL), Barton and Lee (2013:65) state that “we are living in an increasingly mobile world, both physically and virtually. Flows of people, knowledge, ideas and objects are all speeding up, leading to new interactions between people and new forms of learning online and offline”. Rwanda, the current study’s geographical location, is ideal for investigating the role that MTLL might play in L2 learning: the National Institute of Statistics of Rwanda (NISR) specifies that 63.6% of the total population of Rwanda owns at least one mobile phone, whereas only 2.5% of the total number of Rwandan households own a computer (NISR 2015:81). Regarding the use of the internet, NISR (2015:67) stipulates that 33.2% of Kigali households have access to the internet at home in addition to a free 4G wi-fi internet connection that covers all public places in Kigali. In rural areas, only 4.4% of households have access to the internet, but this is unsurprising given the fact that only 19.8% of the households in Rwanda have access to electricity (NISR 2015:63), one of the basic infrastructures required for the use of the internet from a home computer, and given the high price of computers and the computer literacy required in order to operate and maintain them.

The majority of the Rwandan population have access to mobile technological devices, and by fully and appropriately exploiting these devices, they can be connected to the world and interact with the world. This also means that Rwandan EFL learners in principle have access to precisely that which is needed to acquire a high level of proficiency in English, namely rich and sufficient English input, and enough opportunities for English output. The question then arises, why the majority of Rwandans still have such a low level of English

proficiency despite the availability of mobile technological devices and, therefore, MTLL. It is assumed that the affordances² of these MTLL are not exploited (at all) or at least not adequately exploited, by the EFL learners or their teachers. Given the potential of MTLL to increase learners' EFL proficiency in this context, there is a need for in-depth studies to address this matter. In fact, a number of researchers have called for precisely such studies.

Amer (2014:297) suggests that “considering the diversity of mobile devices which range from tablets to other small form-factor smartphones, researchers could investigate how they are currently being used in classrooms and how they influence students' performance in class”. The need for studies on the new mobile-assisted learning forms, specifically with their application to English language learning, was expressed by Dang (2013:475), not only for the purpose of helping English language learners to achieve a higher level of proficiency, but also to fill the gap in the literature on mobile-assisted language learning (MALL) which, according to Burston (2013:157), is still “a young field, [in which] some 575 works ... have been published over the past two decades”. In addition, there is a need for students to conduct masters and doctoral studies on MALL. Regarding this, Burston (2014:104) specifies that among the published MALL studies, there are only “a few masters and doctoral dissertations”, which make up less than 2.5% of the total number of publications (cf. Figure 1.1 below).

² “The term “affordance” was defined by Gibson (1986:145) as “the particular ways in which an actor, or [a] set of actors, perceives and uses [a given] object”. In other words, it is the particular ways through which different objects can afford different uses. This means that the more various and/or powerful objects are available, the more different uses can be afforded. As far as the affordances of MTLL are concerned, Hazaea and Alzubi (2016:10) list, among others, “permanency, accessibility, immediacy, interactivity, and situating of instructional activities”. These affordances will be briefly defined under mobile-assisted language learning, in Section 3.2.23.2.2, and their application to this study will be discussed in Section 3.3.



**Figure 1.1: MALL publication types
(Burston 2014:104)**

Mobile technologies are equipped with features that can contribute to SLA. Among other features, different studies have found that the use of the short message service (SMS) and microblogging (Yang 2013), social networking (Abbott 2013), podcasting (Abdous, Camarena and Facer 2009), social networks (Alotaibi, Alamer and Al-Khalifa 2015), and mobile instant messengers (Lai 2016) help learners to construct their knowledge and improve their proficiency in the target L2. This study set out to address the call for additional research in the field of MALL, by investigating the effect that mobile input might have on Rwandan university students' proficiency in English. In addition to the situation of Rwanda in matters of basic infrastructure and access to modern technologies (discussed above), this study exploits the affordance of mobile devices in terms of accessibility (Gromik 2012), portability (Chinnery 2006, Hsu 2013) and mobility (Hsu 2013, Yang 2013) in the context of SLA (cf. Sections 3.2 and 3.3).

1.2. Problem Statement and Focus

According to Kachru and Nelson (2001:9), "English is the most widely taught, read, and spoken language that the world has ever known". In Africa, many non-English-speaking countries have awarded English the status of official language and/or MoI. However, as should be clear from the discussion in Section 1.1 above, employing a foreign language (FL) as MoI is often problematic because

learners struggle to master the language due to a lack of sufficient input (in terms of quality and/or quantity) and opportunity for output.

Modern mobile technologies have been found by various studies to be potential tools for addressing this problem. Among others, it was found that mobile technologies create a favourable environment in which FL “learners have a better engagement with learning and... have a better interaction” (Baleghizadeh and Oladrostam 2010:5); and therefore, these technologies can “bridge the gap between formal and informal [FL] learning experiences” (Hsu 2013:198). Furthermore, it was found that, compared to the use of computers and conventional teaching methods, mobile devices provide a more substantial contribution to the acquisition of language features such as vocabulary (Alemi, Sarab and Lari 2012) and grammar (Baleghizadeh and Oladrostam 2010), and that they increase oral proficiency in the target FL by increasing the “learners’ oral confidence” (Gromik 2012:224). However, Kukulska-Hulme and Shield (2008:283) note that “the ways in which different mobile technologies can be employed by different pedagogical approaches and in different more or less formal learning contexts requires further investigation”. In this regard, considering the potential that the use of mobile technologies in language learning (MTLL) has in SLA, from a constructivist approach (cf. Sections 2.5.8 and 3.3), this study integrates training in and the use of MTLL within the existing formal EFL classroom at the University of Rwanda (UR), and investigates the contribution that mobile input can make to the attainment of a higher level of EFL proficiency.

1.3. Aims, Objectives, Questions and Hypotheses

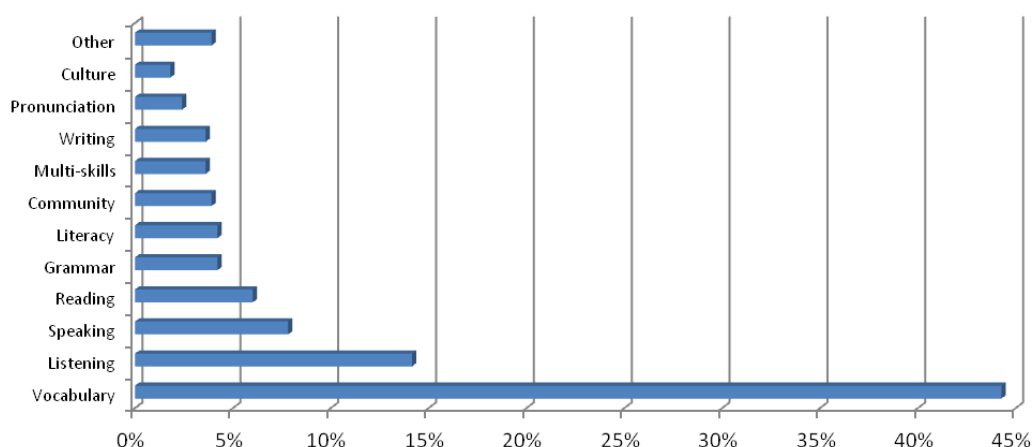
This section highlights the aims and objectives formulated in order to address the research problem referred to above (cf. Subsection 1.3.1), the research questions that the current study attempted to answer (cf. Subsection 1.3.2), and the hypotheses which it set out to test (cf. Subsection 1.3.3).

1.3.1. Research Aims and Objectives

Kachru and Nelson (2001:18) state that “in most cases ...[EFL] is taught to non-native speakers by non-native speakers, neither teachers nor students (who

themselves become the next generation of teachers) ever having any contact with a native user”. Thus, the lack of sufficient native-like input and opportunities for output, for both the teachers and the students, is a common problem in EFL learning.

In the field of MALL research, there is a gap in the language skills which have been investigated by the currently published studies. According to Burston (2014:105), the published studies investigated the use of MTLL to improve reading and writing skills, to learn the target language (TL) vocabulary and grammar, to enable reading and listening practice, and to facilitate discussion activities. Burston (2014:111) notes that no studies have investigated the use of MTLL for improving learners’ overall proficiency in the TL (cf. Figure 1.2 below for details).



**Figure 1.2: Language areas targeted by MALL projects
(Burston 2014:111)**

It is against this background that, in order to investigate whether MTLL can address the common EFL learning problem of insufficient input and opportunities for output, while filling the gap in the published MALL studies, the primary aim of this study was formulated as follows:

- To investigate the effect of (i) the use of MTLL by learners who have been trained in this, (ii) the use of MTLL by learners without any training in this, and (iii) the non-use of MTLL (i.e. classroom instruction and materials alone) on FL learners’ proficiency in the TL.

In order to achieve the primary aim stated above, this study had the following specific objectives:

- to design (and implement) a short course for training learners in the use of MTLL in their acquisition of EFL,
- to investigate the effect of being trained in and/or using MTLL for EFL learning on learners' EFL proficiency, versus using the conventional EFL teaching materials, and
- to investigate learners' attitudes towards and experience with MTLL training and use.

According to Burston (2014:103), "in reality, with few exceptions, published studies of MALL implementations have not progressed much beyond pilot testing". Burston (2014:103) specifies that "what is most striking about published MALL implementation studies is the virtual absence of... curricular integration". As a possible solution to this problem, based on the findings of this investigation, the secondary aim of the current study was to offer suggestions regarding how MTLL can be effectively integrated into conventional teaching in EFL classrooms.

1.3.2. Research Questions

In order to achieve its aims and objectives, the current research attempted to address the following questions:

- Does training in and/or use of MTLL have a significant effect on FL learners' proficiency (i.e. more so than increased conventional input)?
- If yes, what is the extent and the nature of the contribution of MTLL to the FL learners' proficiency?
- What are the language learners' attitudes towards and experience with MTLL training and use?

1.3.3. Research Hypotheses

A research hypothesis is defined by Larson-Hall (2010:394) as "a formal statement of what you expect to find when you conduct your experiment". Based

on the case of EFL in Rwanda, the following statements were tested in the current study:

- The use of MTLL following specific training has a significant (positive) effect on FL learners' proficiency.
- The effect of the use of MTLL following specific training surpasses the effect of the use of MTLL without training, as well as the effect of the (increased) use of conventional language teaching materials.
- Language learners have positive attitudes towards MTLL training and use.

1.4. Significance and Contribution

Given the background provided in the previous sections, I believe that academic research on the question of how one can help EFL learners reach a higher level of proficiency is necessary, especially in the context of Africa where English is often one of the official languages of a country and/or its MoI despite the fact that the majority of the population does not know the language or only has a very low level of proficiency in the language.

Because of the global-lingua-franca status which was attributed to English (cf. Section 1.1), "the use of technology in... [English language] teaching and learning has become one of the biggest research priorities, and exploring the uses that learners are making of mobile-assisted language learning opportunities is one of the first questions being asked" (Park and Slater 2014:94). In addition to falling within this research priority, the current study attempts to fill the gap in the geographical locations investigated by MALL research (cf. Figure 1.3 below) by investigating the case of EFL teaching and learning in a Sub-Saharan African country, specifically in Rwanda – a country which has a uniquely distinct language situation (cf. Section 1.1).

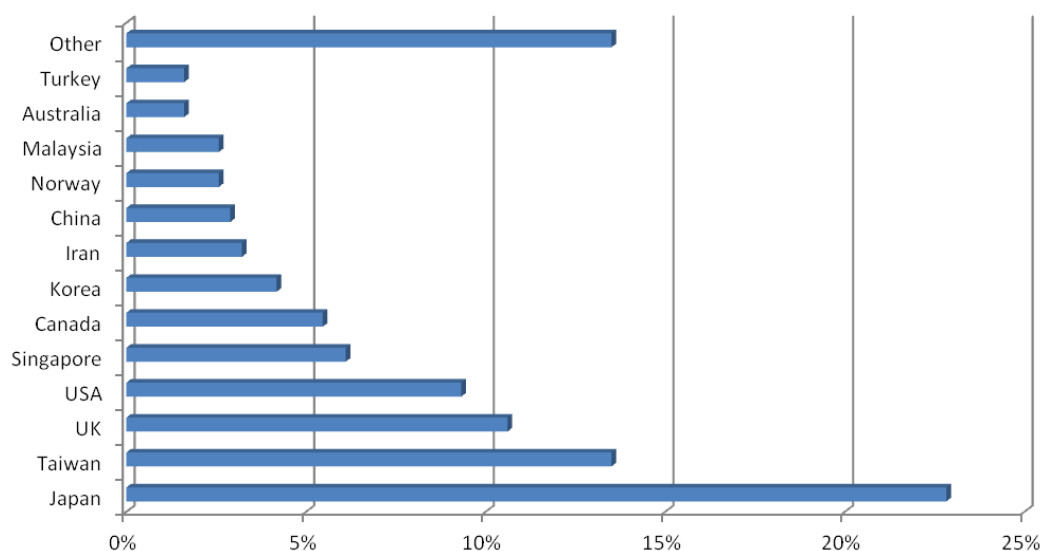


Figure 1.3: Countries in which MALL studies have been undertaken (Burston 2014:110)

Furthermore, as far as I was able to determine, the current study is the first to attempt an investigation into the use of modern mobile technologies in EFL learning within the framework of constructivism (cf. Sections 2.5.8 and 3.3). As far as its contribution to the academic debate is concerned, this research combines the fields of SLA and MALL, the latter being a young field which needs to be given some priority by researchers (Burston 2013). The contribution that the dissertation is predicted to make will thus be three-fold in that it will (i) contribute to our understanding of the role that modern mobile technologies can play in EFL learning in general; (ii) contribute to our understanding of this phenomenon within the African context with its unique challenge that the majority of its population does not have mastery of its country's official language(s); and (iii) offer practical suggestions regarding the incorporation of mobile technologies in L2/FL classrooms.

1.5. Scope and Limitations

This study limited its scope of investigation in terms of both the theoretical and the practical frameworks. On the practical side, the study introduced training in and/or the use of MTLL into the formal EFL classroom, and therefore investigated the effects that the training and/or the use of mobile technological devices can have on the EFL proficiency attained by Rwandan university

students compared to using the conventional language teaching-and-learning methods. On the theoretical side, even though other SLA theories were reviewed (cf. Section 2.5), the current study was guided by the constructivist approach to language acquisition, a specific approach according to which L2/FL knowledge is constructed by learners, as opposed to being transmitted to them by language teachers (cf. Section 2.5.8). In other words, according to this approach, the role of a teacher is not to transmit knowledge to learners, and is instead to show them the objectives and expected outcomes of the teaching-and-learning process, to illustrate to them the tasks involved, to enable the learners to achieve those objectives and expected outcomes, and to execute successfully and efficiently all the tasks on their own. The specific ways in which this was achieved in the current study are discussed in detail and per sample group in Chapter 4, Section 4.6.3.

1.6. Brief Methodology Overview

In order to achieve its primary aim (cf. Section 1.3), this study adopted a case study model. This involves an intensive study in which an investigator starts from background information about the participants and their current status, and monitors their interactions with the environment in order to gain a good understanding of their progress and their status at a later time (Brown and Rodgers 2002:21). In order to do this, a mixture of different methods must be used for data elicitation, collection and analysis (Corbin and Holt 2005; Cohen, Manion and Morrison 2007).

For the purposes of the current study, data collection involved (i) a survey method (to collect data related to the participants' background information), (ii) observation, (iii) a semi-structured interview (to collect data on the English language teaching and learning situation at the University of Rwanda, i.e. the learning environment), (iv) an English proficiency test (EPT) (to measure the participants' proficiency at the beginning and at the end of the study's experimental period, and thus to determine the extent to which the use of MTL could contribute to different types of language proficiencies), and (v) a group discussion with the participants (to collect data related to their attitudes

towards and experience with MTLL and the study in general, since the learners are at the centre of the teach-and-learning process according to constructivism).

1.7. Brief Chapter Overview

The dissertation is structured into the following eight chapters:

Chapter 1 (Introduction): The current chapter started with a discussion of the linguistic situation of Rwanda (which is of course similar to that of other countries in which a specific language has to be acquired as a foreign language) and current developments in terms of access to and use of mobile technologies which form the background to the research problem. In addition, the research questions were posed, the research objectives and hypotheses were stated, and the significance and contribution of the study, as well as its scope and limitations, were discussed.

Chapter 2 and 3 (Literature Review and Theoretical Framework): The second and third chapters provide a thorough literature overview of research conducted on language proficiency, the use of technologies in language learning with a specific focus on MTLL, as well as SLA theories with an emphasis on constructivism and other theories and hypotheses related to the role of input. Moreover, the relation between the use of MTLL and constructivism, which forms the theoretical framework of this study, is extensively discussed.

Chapter 4 (Research Design and Methodology): The focus of the fourth chapter is on describing the research population and sample groups, explaining the selected quantitative and qualitative methods for data collection and analysis, and discussing the ethical matters which were involved in the current study.

Chapter 5, 6 and 7 (Research Findings): With specific reference to the research aims and objectives of the study, these three chapters involve the presentation and discussion of all the quantitative and qualitative data which were collected and analysed for the purposes of the current study. Chapter 5 presents and discuss the language learner factors, the participants' previous access to and use of mobile technologies, the

teaching and learning of English language at the University of Rwanda (UR), and the extent to which all these might have had an effect on the participants' proficiency in English. Chapter 6, which is the heart of this dissertation, presents and discusses the effect of MTLL on learners' proficiency in English, whereas Chapter 7 focuses on the learners' experience with and attitudes towards MTLL use and training.

Chapter 8 (Discussion, Concluding Remarks and Recommendations): In this last chapter of the dissertation, a short general summary of the dissertation is provided with reference to the study's aims, objectives, research questions and hypotheses. Furthermore, the success of the study as an m-learning project which was conducted from a constructivist framework is discussed, and practical suggestions are made regarding the integration of MTLL training and use in L2/FL pedagogy. Finally, the strengths and limitations of the study are discussed, and recommendations are made for future research.

Chapter 2 : LITERATURE REVIEW

2.1. Introduction

As set out in Chapter 1, the current study investigated the effect of mobile technologies for language learning (MTLL) on learners' EFL proficiency. In order to determine this effect, learners' proficiency had to be tested at the beginning and at the end of the experimental period. Section 2.2 of this chapter defines 'language proficiency' and discusses language proficiency testing.

A number of different factors affect the SLA process and, specifically, the level of proficiency that a learner ends up attaining. One factor that has been investigated in numerous studies throughout the years is age at the onset of acquisition; cf., amongst many others, Long (1988), Johnson and Newport (1989, 1991), Birdsong (1999), DeKeyser (2003, 2013), Kulkarni and Hu (2014), and Blom and Bosma (2016). Though there is variation in the findings of these studies – often related to which aspects of proficiency were investigated and by means of which data collection instruments – by far the majority of these studies have found that after puberty, the L2 learner's chances of acquiring the target L2 completely (i.e. to a level of near-native proficiency) decrease significantly (Johnson 2004; Abrahamsson and Hyltenstam 2009).

Similarly, there is a large body of research on the role of different types of input in adult L2 acquisition, and how effective these different types of input are in increasing the learner's proficiency in the target L2 (cf., amongst many others, Krashen 1981; McCandless and Winitz 1986; Schulz 1986; Ellis 1998; Gass 2003; Johnson 2004, Torres-Martínez 2015; Gabarre, Gabarre, Din, Shah and Karim 2016). Section 2.4 provides an overview of studies on the role of input in SLA.

There are different views on the role of naturalistic input versus classroom input, and different views on different types of classrooms. Hulstijn (2003) summarises two of the most prominent, contrasting, views on how L2s should be taught/learned. The first view, which is at the heart of traditional grammar teaching, also referred to as "focus on form", holds that SLA "means months and even years of intentional study, involving the deliberate committing to memory

of thousands of words... and dozens of grammar rules” (Hulstijn 2003:349). And the second view, which is at the heart of so-called communicative approaches to language teaching, also referred to as “focus on meaning”, holds that SLA can take place through the “processes of incidental learning, involving the picking up of words and structures, simply by engaging in a variety of communicative activities... during which the learner’s attention is focused on the meaning rather than on the form of language” (Hulstijn 2003:349).

Researchers’ views on the ideal methods for L2 teaching are related to their views on the nature of L2 learning, which are, in turn, formulated in different theories of SLA. Some of the most prominent of these theories are discussed in Section 2.5. Section 2.5.8 introduces constructivism and explains why it offers an ideal framework for the current study, especially given its focus on the role of input. Simply stated, it makes sense to conduct research on the role of a new type of input within the framework of a theory that focuses on the role of input (cf. Section 2.6).

2.2. Language Proficiency and Testing

Language proficiency can be defined as a degree of competence in a specific language. Speakers are said to have “native speaker proficiency”, the highest level of proficiency that one can have, in their L1. Their competence in or knowledge of the L1 includes knowledge of its vocabulary, phonology, morphology, syntax, semantics and pragmatics, as well as the ability to appropriately employ this knowledge in language use³. Under normal circumstances (excluding, for example, certain physical and cognitive

³ The term “linguistic competence” is used “to refer to speakers’ knowledge of their language, the system of rules which they have mastered so that they are able to produce and understand an indefinite number of sentences, and to recognize grammatical mistakes and ambiguities”, whereas “linguistic performance” is used to refer to actual language use, including language production and language comprehension (Crystal 2008:92).

impairments), if a child is exposed to sufficient and rich input in his L1 before a certain age⁴, he *will* master his L1 completely, i.e. attain native speaker proficiency.

Kukulska-Hulme, Norris and Donohue (2015:7) specify that the L2 learner has to develop very much the same knowledge and skills as the L1 learner, namely “knowledge of the language system (phonology, lexis, grammar and discourse) and language use (the exploitation of the system in order to communicate meaningfully in context)”. However, as Bowden, Sanz and Stafford (2005:105) note, “while incomplete acquisition of ...L1 is rare and related to cases of severe language deprivation and concomitant problems in cognitive development, achieving nativelike proficiency in ...L2 seems to be the exception rather than the norm”. Furthermore, there is a lot of variation between L2 learners in terms of the levels of proficiency that they ultimately attain (the reasons for this variation in ultimate level of L2 attainment will be discussed in Section 2.3 below). The highest level of proficiency in a L2 is sometimes referred to as ‘language fluency’ (being “fluent” in the target L2), which is defined as “the ability to speak or read quickly, accurately, and without undue hesitation, ... [as well as the] automatic execution of certain aspects of L2 performance such as pronunciation, grammatical processing, and word recognition” (Zhang 2009:93).

There are different models of language proficiency classification, such as the Interagency Language Roundtable (ILR) scale and the American Council on the Teaching of Foreign Languages (ACTFL) proficiency guidelines, both of which are used in the United States of America, as well as the Common European Framework of Reference for Languages (CEFR), which was designed by the Council of Europe (2001) and which is the most commonly used model internationally.

⁴ There is a so-called critical period for L1 acquisition, which will be discussed in Section 2.3 with reference to the role of age at the onset of acquisition.

Proficient User	C2	Can understand with ease virtually everything heard or read. Can summarise information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. Can express him/herself spontaneously, very fluently and precisely, differentiating finer shades of meaning even in more complex situations.
	C1	Can understand a wide range of demanding, longer texts, and recognise implicit meaning. Can express him/herself fluently and spontaneously without much obvious searching for expressions. Can use language flexibly and effectively for social, academic and professional purposes. Can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organisational patterns, connectors and cohesive devices.
Independent User	B2	Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.
	B1	Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest. Can describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.
Basic User	A2	Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment). Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Can describe in simple terms aspects of his/her background, immediate environment and matters in areas of immediate need.
	A1	Can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. Can introduce him/herself and others and can ask and answer questions about personal details such as where he/she lives, people he/she knows and things he/she has. Can interact in a simple way provided the other person talks slowly and clearly and is prepared to help.

Table 2.1: The global scale of the common language proficiency levels (Council of Europe 2001:24)

Table 2.1 above illustrates the CEFRL of the Council of Europe (2001), which groups the possible proficiency levels into three categories, each with two levels, ranging from basic users (levels A1 and A2) to independent users (levels B1 and B2) to proficient users (levels C1 and C2). A description is also provided of the typical learner whose proficiency would be classified as at each of the six levels.

There is usually quite some overlap between other classification models and the CEFRL, as shown in Table 2.2 below, which presents Costa and Albergaria-Almeida's (2015) model. Furthermore, when classification models or proficiency tests make use of other labels for different proficiency levels, they often still mention how their levels are related to those of the CEFRL. This can be seen in

Table 2.2 below, as well as in Table 4.2 presented in Section 4.6.2, which shows the different proficiency levels identified by the Test of English for International Communication (TOEIC), which was, in turn, used to design a proficiency test for the current study (cf. Section 4.6.2).

Proficiency Levels		Council of Europe (2001) Equivalence	Characteristics
Independent user	Advanced independent user	B2	A user who can express him/herself clearly and effectively about any topic without any support
	Independent user	B1	A user who can express him/herself about the straightforward, familiar matters without any support
Basic user	Advanced basic user	A2	A user who can use simple language to communicate on everyday topics
	Basic user	A1	A user who can use very simple language, with support
	Beginner	-	A learner who has not achieved any level of competence

**Table 2.2: Language proficiency levels
(adapted from Costa and Albergaria-Almeida 2015:2370)**

As mentioned in Section 1.3.1, according to Burston (2014:111), there are no studies which have investigated the effect of MTLL on language learners' overall proficiency in the TL. Instead, all previous studies investigated the effect of MTLL on only one aspect of proficiency each, e.g. on communication skills, vocabulary or grammar (Burston 2014:105). In an attempt to fill this research gap, the current study set out to investigate the effect of MTLL on Rwandan university students' overall EFL proficiency. In order to measure the effect of MTLL use on the participants' overall EFL proficiency, their proficiency had to be tested before and after the experimental period.

A number of different tools have been developed to test learners' proficiency in L2 English or EFL. Some of the most popular standardized tests which are used internationally include the Test of English for International Communication (TOEIC), the Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), the matching vocabulary test (MVT),

and cloze tests (C-tests). The first three tests – TOEIC, TOEFL and IELTS – all involve multiple choice questions. In the MVT, participants are given two groups of words, and are requested to match each word from group one with a word in group two that corresponds to it in meaning. Finally, in the case of C-tests, the participant is given a piece of text from which some words or word parts have been removed and is required to fill in the missing words or word parts.

The TOEFL and IELTS were both designed specifically for testing the language abilities of adults who want to immigrate to, respectively, the United States of America and the United Kingdom for reasons such as work and studying. The primary aim of these tests is therefore to measure whether the test taker would be able to work, study and/or simply stay in an English-speaking country. These tests have been adopted for use by many other English-speaking countries such as Australia, New Zealand, and Canada to test the English language abilities of potential immigrants from non-English-speaking countries. In addition, many universities (in English-speaking and non-English-speaking countries) use English as a medium of instruction (MoI) and/or a language of communication, and therefore require the applicants to have a certain minimum score on one of these tests as one of the pre-conditions for being admitted to their academic programmes.

Two other popular English language proficiency tests are the MVT and the C-test. Both of these tests are simply vocabulary-and-spelling based, but scholars such as Daller and Phelan (2006), as well as Khodadady (2007) argue that they also measure learners' general language proficiency, since they correlate significantly with other standardized tests such as the TOEFL. In terms of their administration, "the C-test ...turns out to be much more economical, [and thus] ...the more suitable test for large numbers when measuring students' progress" (Daller and Phelan 2006:101). However, Khodadady (2007:1) states that "although the C-Tests correlated significantly with the MVT and TOEFL, their coefficients were not high enough to establish them as independent measures of vocabulary and language proficiency". He also mentions that "the directions given on the C-Tests might call for the takers' spelling knowledge rather than their vocabulary knowledge and language proficiency" (Khodadady 2007:1). For

these reasons, Khodadady (2007:21) recommends that “C-Tests ...should not ...be used alone to measure test takers’ language proficiency because they fail to correlate with standardized tests highly enough to replace them”. In addition, Daller and Phelan (2006:105) state that the C-test is not ideal in cases where proficiency testing involves a pre-test and a post-test, since “taking a C-test twice will lead to increased scores” that might not be due to an increase in the participants’ proficiency levels but rather to the fact that they still remember the test, its format and/or some of its items. Given the above-mentioned criticisms and because the current study does indeed involve a pre-test and a post-test (as will be explained in Chapter 4), the C-test and the MVT were thus disregarded, even though they might have been convenient options.

As mentioned above, both the TOEFL and the IELTS were primarily designed to test the proficiency of people who wanted to immigrate to an English-speaking country. For the purposes of this study, a different test was needed – a test that was primarily designed for people learning English as a foreign language (EFL) in their own country. After a thorough review of the relevant literature, the TOEIC was found to be the most relevant tool for testing the proficiency level of learners of EFL.

Daller and Phelan (2006:101) state that the TOEIC is one of the leading English proficiency testing tools which “is used by government agencies, language schools, academic institutions and more than 4,000 corporations” worldwide. As far as its history is concerned, Daller and Phelan (2006:101) say that “the TOEIC® ...was first administered in Japan to 2,710 candidates on December 2nd, 1979, [and that] it is now available in 39 countries, ...with 2 million tests being taken annually”.

One advantage of this test, according to the Educational Testing Service (2015:5), is that it “is not based on the content of any particular English course” and instead measures learners’ general English language proficiency. Importantly, also, in contrast to C-tests, in which a test taker can show an improvement as a result of being familiar with the test, for the TOEIC, the test taker’s “[i]mprovement in proficiency may take some time and is generally achieved through a combination of practice and study” (Educational Testing Service

2015:5). This is a very important property of the test in the case of a study which involves administering the test twice and where the time between the tests is relatively short (i.e. six weeks)⁵.

There are two types of TOEIC, namely the 'TOEIC Listening and Reading', as well as the 'TOEIC Speaking and Writing'. According to the Educational Testing Service (2015:4), "many leading companies, academic institutions, and language programs worldwide rely on the TOEIC Listening and Reading test as a fair, objective measure of English-language proficiency for students and business professionals". In addition to being fair and objective, "a number of studies... also claim that the [TOEIC Listening and Reading] test measures speaking and writing indirectly and that it is a test of general English language proficiency" (Daller and Phelan 2006:102). In this regard, Daller and Phelan (2006:102) state that many studies have found a "high correlation [of the TOEIC Listening and Reading test] with other direct measures of reading, writing, listening and speaking, [and thus recommend its use for testing] ...general language proficiency".

Furthermore, "the TOEIC Listening and Reading test does not test business knowledge, and you are not required to know specialized business and technical vocabulary beyond what is used in everyday work activities" (Educational Testing Service 2015:5). The TOEIC Listening and Speaking test was thus selected as the most relevant EFL proficiency testing tool for the purposes of the current study. Section 4.6.2 in Chapter 4 of this dissertation explains how the TOEIC was used as a basis for designing an English proficiency test (EPT) which was even better suited for the specific aims and objectives of the current study⁶.

⁵ The pre-test was administered on Friday, 19 May 2017, and the post-test on Friday, 30 June 2017.

⁶ As Section 4.6.2 will explain, there are a number of reasons why the TOEIC itself was not used in the current study.

2.3. Factors Affecting Second Language Proficiency

2.3.1. Age effects

Having defined language proficiency and provided an overview of tests available for proficiency testing, we now turn to the most prominent factors which are said to affect SLA. As noted in Section 2.1, one of the factors which has received considerable attention throughout the years, is age at the onset of acquisition. The Critical Period Hypothesis (CPH) for L1 acquisition states that a child has to receive sufficient exposure to a language before the end of the critical period, which is assumed to be around five years (though researchers differ about the exact cut-off age) (Crystal 2008; DeKeyser 2013; Herschensohn 2013). If the child does not receive sufficient exposure to a language before the end of this period, he/she will never be able to acquire any language completely. Evidence for this is found in studies on “language-deprived children (reared in the wild or by animals – ‘feral children’ – or kept isolated from society – ‘attic children’)” (Crystal 2008:123), and in studies on deaf children of hearing parents, who only receive exposure to TL input (i.e. a signed language) after (early) childhood, and are then never able to master the language completely (Curtiss 1988). This critical period is claimed to be neurological in nature: There is a certain language-specific module of the brain, which is responsible for language acquisition, and which is sometimes referred to as Universal Grammar or UG⁷. The claim is that if UG is not activated by sufficient exposure to a language before the end of the critical period, then it can never be activated (cf. White 2003). What children do manage to acquire of a language when they only receive input after the critical period (e.g. deaf children of hearing parents), they learn with

⁷ There are a number of different so-called “UG hypotheses” for both L1 and L2 acquisition, and these have led to fruitful research since the 1960s. However, it is important to note that these UG-based SLA theories do not place any emphasis on the role of input in SLA, and are thus not suitable for this study, and will not be discussed in this dissertation.

other, general cognitive skills, and because these general cognitive skills are, unlike UG, not designed specifically for language acquisition, the child can never master the language.

One of the proposals for accounting for the fact that L2 acquisition is very rarely complete, is that there is also such a critical (or maybe, more accurately, sensitive) period for L2 acquisition: if an L2 learner does not receive sufficient exposure to the target L2 before the end of this period (assumed to be around puberty), he/she will never be able to acquire the language completely – cf., amongst many others, Long (1988), Johnson and Newport (1989, 1991), Birdsong (1999), DeKeyser (2003, 2013), Johnson (2004), Abrahamsson and Hyltenstam (2009), Kulkarni and Hu (2014), and Blom and Bosma (2016). Some proponents of UG (see previous paragraph) argue that the critical / sensitive period is related to UG becoming inaccessible after puberty (even if it was activated by sufficient exposure during L1 acquisition). Learners who receive sufficient exposure to a target L2 before puberty (“child L2 learners”) are thus argued to have access to UG for L2 acquisition, and will therefore most probably acquire the L2 completely. Learners who only receive sufficient exposure after puberty (“adult L2 learners”) have to make use of their general cognitive skills and therefore never acquire the L2 completely – cf., for example, Schwartz and Sprouse (1994, 1996), as well as the studies referred to directly above.

However, not all SLA researchers agree that there is a critical / sensitive period for L2 acquisition. These researchers argue that it is not necessary to refer to such a period in order to account for the differences between L1 and L2 acquisition. Bowden, Sanz and Stafford (2005:106) agree that only learners who start learning an L2 as children will be able to fully master the L2. However, they argue that this is not necessarily evidence for the CPH in L2 acquisition. They specify that “there are a number of age-influenced factors that may have an impact on the success of SLA but that are not caused by the closing of neurological critical period for language acquisition” (Bowden, Sanz and Stafford 2005:111). Proponents of the CPH do not deny the role of other factors; they simply believe that the critical period (with its neurological nature) is an additional, and very important, factor that affects L2 acquisition.

The other factors that affect L2 acquisition can be divided into two categories: factors related to the learner (which are sometimes referred to as “individual differences” or “IDs”) and factors related to the learning environment. Individual differences (IDs) include factors such as the learner’s age, gender, language aptitude, attitude, motivation, personality, preferred language learning strategies and efficiency (Sanz 2005; Zhang 2009). Factors related to learning environment include whether the L2 is being learned naturalistically or in a classroom setting, and, if in a classroom setting, then also which teaching approach and teaching methods are made use of.

2.3.2. Individual differences

Sanz (2005:3) states that “it is the interaction between internal processing mechanisms and IDs... that explain[s] why some adult language learners learn faster than others and get further ahead in the acquisition process”. Regarding the difference in L2 learners’ efficiency and the contribution of other factors, “researchers agree that L2 learners follow a predictable path in their acquisition process irrespective of their L1, aptitude, and context of acquisition and that language learners vary in the efficiency with which they go through the stages” (Sanz 2005:3). There is also a lot of research on the role that learners’ knowledge of their L1 and any other languages that they know plays in the SLA process and in the ultimate level of proficiency attained. Specifically, some researchers claim that L2 learners start out with their L1 grammar as a template for L2 acquisition (Schwartz and Sprouse 1994, 1996), while others claim that L2 learners start out with a clean slate, in much the same way as L1 learners (Tayyebi 2012; Clahsen and Felser 2006; Clahsen and Muysken 1986).

Regarding the effect of gender on language learners’ proficiency, scholars such as Bowden, Sanz and Stafford (2005) explain that the learners’ gender affects their TL processing abilities, and thus their proficiency in the TL. Bowden, Sanz and Stafford (2005:114) state that “current research indicates that there is indeed a processing difference between males and females and that this processing difference exists in both L1 and at least in highly practiced L2”. If this is true, it means that gender differences do not really have an effect on L2 acquisition or

proficiency, as such, but rather on language processing (regardless of whether the language is the learner's L1 or L2).

'Language aptitude' is defined by Bowden, Sanz and Stafford (2005:115) as the "talent for foreign language learning that varies from individual to individual", as well as the learners' prior experience with L2 learning. According to Bowden, Sanz and Stafford (2005:115), "language aptitude is considered to be a largely stable trait and has been identified as the individual difference most predictive of L2 learning outcomes". Regarding the learners' prior experience with language learning, Bowden, Sanz and Stafford (2005:122) explain that multilinguals are believed to be better language learners than monolinguals because "that previous practice (being experienced as a language learner) gives you an edge when it comes to learning other languages".

Another important ID is 'motivation', which involves "a combination of the learner's attitudes, desires, and willingness to expend effort in order to learn the second language" (Richards and Schmidt 2010: 377). The most important distinction in this regard is that between intrinsic/integrative motivation and extrinsic/instrumental motivation. Integrative motivation is present when learners *decide* to learn a TL because, for example, they want to be part of the L2 community or because they like the language and/or its speakers and/or the culture to which it is linked. Instrumental motivation is present when learners *need* to learn a particular TL for the sake of, for example, passing an exam or increasing their job opportunities (Gardner 2013).

Although the only variable affecting L2 proficiency that is formally investigated in the current study is input, a questionnaire was used to collect data regarding the participants' IDs as well, so that these could be kept in mind when analysing the data from the proficiency test (cf. Sections 4.6.1 and 5.2). Furthermore, as it will become clear from the remainder of this dissertation, the learners' IDs could not be ignored because this study was guided by constructivism which places the learners at the centre of the teaching-and-learning process (cf. Section 2.5.8 and Chapter 3). Since L2 input (in terms of its quantity, quality and type) is the main variable in the current study, it will be discussed in more detail below in Section 2.4.

2.3.3. Learning environment

In terms of the role of the learning environment, Zhang (2009:91) argues that certain learning environments are not conducive to increasing learners' L2 proficiency because of "lacking effective input and output, having no real need for interaction, [and] attaching too much importance to language forms and written tests". Hazaea and Alzubi (2016:8) argue that in most cases, especially EFL learning "has been characterized as a traditional... setting in which teachers direct the... process, and students are then assumed to be passive or marginalized". According to Hazaea and Alzubi (2016:8), such EFL learning settings result in "students' lack of motivation toward learning, coming to class unprepared, total dependence on the teacher, and weak competition", and thus hinder the improvement of L2 proficiency. Sanz (2005:3) also notes that L2 learners "from immersion programs learn faster and attain higher proficiency levels than L2 learners in foreign language programs". A number of researchers have noted that it is precisely because English is learned as a foreign language in Rwanda, that Rwandan EFL learners do not attain a very high proficiency level (Samuelson and Freedman 2010; Andersson and Rusanganwa 2011; Abbott, Sapsford and Rwirahira 2015). The reason why learning a foreign language (FL) is so hard has to do with the quantity and quality of the TL *input* that a learner receives, of course. For example, it is much harder to improve one's proficiency in a TL if that TL is not spoken in one's home or in one's community, if it is only spoken in one's classroom for a limited time each day, and if it only involves input from non-native speakers with relatively low levels of proficiency.

2.4. Input

Long (1996:415) states that "research on input for L2 acquisition began in the 1970s", and it has remained a fruitful sub-field of research in SLA – cf., for example, Mackey, Gass and McDonough (2000), Zhang (2009), Mackey and Abbuhl (2005), as well as Gass and Torres (2005). Input is defined as the "language which a learner hears or receives and from which he or she can learn" (Richards and Schmidt 2010:286). In other words, input includes all "the linguistic forms [of the target language (TL)] to which learners are exposed" (Mackey and Abbuhl 2005:207), and it is considered the most important factor

for successful SLA (Ellis and Shintani 2014:173). All SLA theories agree that input is a necessary condition for successful language acquisition. However, as Mackey and Abbuhl (2005:207) explain, “while exposure to input has been claimed to be sufficient for first language learners, ...simple exposure to the target language rarely has the same outcome for ...L2 learners”.

Regarding the source of input, Ellis and Shintani (2014:163) state that “teaching, however defined, involves ‘input’. [And] no matter which approach or method is adopted, learners are exposed to the input provided by the teacher, other students and in the instructional materials”. But according to Ellis and Shintani (2014), in some settings, this kind of input is neither sufficient nor rich enough to allow the learner to acquire the TL to an advanced level of proficiency. They note that this situation is not limited to FL learning, since it is sometimes the case even in settings where the learner receives TL input in *and* outside of the formal classroom. Furthermore, according to Gass and Torres (2005:1), “[i]n addition to input, it is also accepted that interaction plays a crucial role in the process of learning a second language”. The suggestion here is that learners should not just be passive receivers of input but should actually participate in the L2 classroom by interacting with the teacher and with fellow students, and that this interaction should take place with native speakers outside the classroom too, if this is possible.

In general, in the context of L2 acquisition, the TL input received from the language classroom is indeed enhanced by the learners’ opportunities to interact with the TL speakers within their communities, whereas in the context of FL acquisition, the learners have to rely only on the TL input which they receive in the language classroom, without any exposure to the TL in their communities, nor the opportunity to practise the TL outside the classroom setting. There is thus a discrepancy in FL acquisition, between the need for input and for output opportunities outside the classroom, and the lack of such input and output opportunities. It is exactly this discrepancy that is addressed by studies on MTL – cf. the research referred to in Chapter 3, specifically in Sections 3.2 and 3.3, as well as the current study. Before providing an overview of such research, it is

necessary to provide an overview of the different theories of SLA in which these studies are often couched.

2.5. Theories of Second Language Acquisition

Second language acquisition (SLA) “refers to beginning the learning of another language after a first language (L1) has been acquired” (Hummel 2014:1). It is “the acquisition of a language after the native language has already become established in the individual” (Ritchie and Bhatia 1996:1). It can also be defined as “learning another language after the early years of childhood” (Hummel 2014:1), but the latter definition is problematic in that, according to Hummel (2014), there is not agreement about the so-called ‘early years of childhood’ yet, and this causes confusion between ‘child SLA’ (where an L2 is acquired after an L1 has been acquired completely) and ‘bilingual first language acquisition’ (where two languages are acquired almost simultaneously, and are both mastered as L1s). SLA is an activity which “millions of individuals worldwide are engaged in, and... a distinct field of study” (Hummel 2014:2).

As a field of study, SLA originated in the early 1970s due specifically to the need to investigate and to “teach English as a second language (ESL) to a growing number of ESL learners around the world” (Kramsch 2003:66). Since then, it “has been found useful not only for the teaching and learning of other second languages, but also for the study of foreign languages in educational settings” (Kramsch 2003:66). As an activity, it “encompasses the acquisition of a third or additional languages” (Hummel 2014:3), and it “includes both L2 and FL acquisition” (Kramsch 2003:67), which take place “inside and outside the classroom” (Kramsch 2003:67).

Like in any other field of knowledge, “the goal of SLA research is not primarily to improve teaching practice but to build a theory of how second linguistic systems develop within individual learners” (Kramsch 2003:67). Larsen-Freeman and Long (1991:227) note that between the early 1970s and the beginning of the 1990s, “at least forty theories of SLA [had] been proposed”, and the field has just been growing ever since. Shakouri and Shokouhi (2015:73) warn, though, that “most of the theories born in the last three decades are revitalization[s] of old

vocabulary; they are more or less assumption-based". This implies that researchers should be careful when selecting so-called "new" SLA theories as their research framework. It is in this regard that constructivism (see Sections 2.5.8 and 3.3.1), which is "the leading metaphor of human learning since the 1970s" (Liu and Mathews 2005:386), and one of the traditional "metatheories", which are still relevant even in the current technological world (Talja, Tuominen and Savolainen 2014), was selected as the framework for the current study.

Gass and Torres (2005:2) say that "since the early 1980s, the roles of input and interaction have been recognized as important in our understanding of how L2s are learned. In its simplest form, input is the *sine qua non* of acquisition". As explained in the previous section, "there is no theory or approach to SLA that does not recognize the importance of input, although theories differ as to its significance" (Gass and Torres 2005:2). Since the study reported in this dissertation investigated the role of a specific type of input in SLA, the remainder of this section focuses on theories which pay specific attention to input. These include the Incidental Learning Hypothesis (cf. Section 2.5.1), the Frequency Hypothesis (cf. Section 2.5.2), the Input Hypothesis (cf. Section 2.5.4), and the Noticing Hypothesis (cf. Section 2.5.3), which all directly consider the role of input in SLA from different angles (Ellis and Shintani 2014:174).

Finally, as should be clear from the discussion above, as well as in the previous sections, one cannot focus on the role of input alone as if it is deposited into a passive receiver; instead, one also has to take the learner into account as an active participant in the SLA process. For this reason, four additional theories are regarded as relevant to the current study and discussed below, namely Constructivism (cf. Section 2.5.8), the Input Processing Theory (cf. Section 2.5.5), the Interaction Hypothesis (cf. Section 2.5.6), and the Comprehensible Output Hypothesis (cf. Section 2.5.7). All of these theories go beyond the role of input alone, to the role of individual learners' learning abilities and learning environments in the SLA process. In the following sections, each hypothesis / theory is briefly defined and its (non-)usefulness to the current study considered.

2.5.1. Incidental Learning Hypothesis

According to Ellis and Shintani (2014:174), “the Incidental Learning Hypothesis claims that learners can learn new linguistic features without any intention of doing so”. According to this hypothesis, learners “can ‘pick up’ L2 forms simply through exposure to input” (Ellis and Shintani 2014:174). In other words, the learners acquire the language feature from the available input without explicitly focusing their attention on it. This kind of learning is called ‘incidental’ or ‘implicit’ learning, and specifically in SLA, it “refers to the learning of formal features when learners are primarily engaged in the effort to comprehend input” (Ellis and Shintani 2014:174).

This hypothesis is most relevant to settings in which learners are exposed to TL input, and acquire the L2/FL linguistic features without necessarily consciously deciding to acquire them (Schmidt 1994:17). Therefore, this hypothesis cannot be used to guide an inquiry into the situation of countries such as Rwanda, where the language in question is a foreign language (EFL) and learners are not exposed to TL input anywhere other than in the formal classroom setting, where they are obligated to learn it at least for academic purposes (cf. Section 1.1).

2.5.2. Frequency Hypothesis

The Frequency Hypothesis was introduced by Hatch and Wagner-Gough (1976) to account for the order in which the L2/FL features are acquired. Ellis and Shintani (2014:175) note that “a key claim of the Frequency Hypothesis is that learning is primarily exemplar-based rather than rule-based. That is, learners learn associatively by identifying and then storing sequences of sounds, syllables and words that occur in the input”. With respect to TL morphology, for example, this hypothesis receives support from studies in which “the order in which learners acquired different grammatical morphemes reflected the frequency with which these items occurred in the input” (Ellis and Shintani 2014:175). According to Ellis and Shintani (2014:175), this hypothesis “applies to the acquisition of vocabulary in the same way: learners learn words that occur frequently in the input before those that occur less frequently”.

The Frequency Hypothesis aims to account for how SLA occurs, and claims that the developmental path of SLA is governed by the frequency with which certain linguistic forms appear in the data: the linguistic forms which the learner will acquire early on, and the ones which he/she will acquire later on, can thus be predicted. Since the study being reported in this dissertation did not focus on the acquisition of specific linguistic features but instead on learners' overall L2 proficiency, this hypothesis was not found useful for it.

2.5.3. Noticing Hypothesis

In contrast to the Incidental Learning Hypothesis, which is linked to 'implicit' learning, the Noticing Hypothesis is linked to 'explicit' learning, which involves the process of converting the 'received input' into 'intake'. Schmidt (1990:149) who is the pioneer of the Noticing Hypothesis, defines the term "intake" which, according to this hypothesis, is the primary condition for successful language acquisition, as "what learners consciously notice". The Noticing Hypothesis claims that language learning involves "the conscious registration of formal features in the input" (Ellis and Shintani 2014:178). For the acquisition of plural formation in ESL, for example, the learner will have to consciously notice that the morpheme 's' is added to a noun to change its meaning from "one" to "more than one" (Ellis and Shintani 2014:178).

In keeping with this hypothesis, researchers have investigated the effect of emphasising certain linguistic features in learners' input – cf., for example, White (1998), Izumi (2002), as well as Jensen and Vinther (2003). These are known as enhanced input studies, and may involve the researcher purposively exposing learners to material in which a specific linguistic feature (e.g. past tense) appears very frequently, or even printing certain morphemes or words in bold in written L2 input. Scholars such as Philp (2013:466) criticised this hypothesis in that its "claim that it is only what the learner consciously notices about the input that holds potential for learning ... underlies much of the research and theory of form-focused instruction, task-based language learning, and interaction-driven second language acquisition". In addition to this criticism, for the same reason as that given for the Frequency Hypothesis (cf. Section 2.5.2 above), this hypothesis was not found particularly useful for the current study either: this hypothesis

deals with cases in which one wants to investigate the acquisition of one or more specific features, rather than overall L2 proficiency.

2.5.4. Input Hypothesis

The Input Hypothesis was introduced by Krashen (1981). It “was extremely stimulating and ...[it] provided the first attempt at [a] wider explanation of second language acquisition” (Cook 1993:68). This hypothesis claims that “we acquire [an L2] by understanding language that is ‘a little beyond’ our current level of competence” (Krashen 1981: 102-103), and that “the more comprehensible [the] input [,] the greater the L2 proficiency” (Cook 1993:57). Input which is ‘a little beyond’ the learner’s current level is defined as input which is “neither too difficult to understand nor too easy” (Cook 1993:53). Hypothetically stated, “if an acquirer is at stage *i* in acquisition..., he can progress to stage *i*+1 by understanding input at that level of complexity” (Krashen 1981:103).

In the context of the Input Hypothesis, “language acquisition depends upon trying to comprehend what other people are saying. Provided that the learner hears meaningful speech and endeavours to understand it, acquisition will occur” (Cook 1993:51). This implies that “humans acquire language in only one way – by understanding messages or by receiving comprehensible input” (Cook 1993:51). Importantly, Krashen distinguished between ‘acquisition’ and ‘learning’, claiming that acquisition could only take place subconsciously and that “learners automatically and naturally acquired new L2 features as a result of comprehending the input they were exposed to” (Ellis and Shintani 2014:10)⁸. This is, of course, what is claimed to happen in a natural setting (and what is imitated in communicative classrooms where the focus is on meaning rather than form). Learning, in contrast to acquisition, is defined as a conscious process

⁸ The study reported here was not interested in the acquisition-learning distinction, and the terms are thus used interchangeably in the dissertation, each as referring to both natural and classroom settings.

that takes place when learners are focusing on form rather than on meaning. On Krashen's view, acquisition is clearly superior to learning if one wants to increase a learner's proficiency, since only the former leads to permanent changes in the learner's L2 knowledge and L2 use. With respect to the current study's focus on the potential value of MTL, this hypothesis would actually predict that additional exposure to the TL outside the formal language classroom might lead to *learning* in cases where the focus is on form (e.g. when the learner uses an online dictionary) and to *acquisition* in cases where the focus is on meaning (e.g. when the learner communicates with native speakers in an online chatroom). This is an interesting prediction, but not one that the current study set out to investigate.

Krashen's Input Hypothesis has received criticism from various scholars. Among others, Ellis and Shintani (2014:176) say that the Input Hypothesis ignores the "direct role for output [in SLA by claiming that] ...the ability to speak in an L2 develops only as a result of the acquisition that takes place through comprehensible input". According to Cook (1993:58), "Krashen is concerned with the properties of the input, rather than the processes of the mind; he leaves the process of acquisition as mysterious as ever". In the context of the Input Hypothesis, "L2 acquisition is driven by the language environment rather than by the mind" (Cook 1993:58), whereas in the context of theories such as constructivism, it is driven by both the learning environment and the learner's mind (Ertmer and Newby 2013:55).

According to Cook (1993:60), the Input Hypothesis posits the concept of 'comprehensible input' without providing "an explicit independent specification of the linguistic forms used in comprehensible input and of the type of situational help that make them comprehensible". Furthermore, Cook (1993:61) argues that "it is never certain that it is the comprehensibility of the input that counts rather than its simplicity". To sum up the criticisms against Krashen's Input Hypothesis, Cook (1993:66) states that "the overall problem [with the Input Hypothesis] is the failure to recognise that the L2 user has two languages in one mind. [It] ...treat[s] L2 acquisition as an impoverished version of L1 acquisition rather than having the complexity and richness of multi-

competence". In this way, the hypothesis completely ignores the role of the learner's L1 in the acquisition of an L2.

As will become clear in Sections 2.5.8 and 3.3.1, constructivism was selected as the framework for the current study because it takes the TL input, the learning environment, the learner's learning abilities and mind into account to explain the learning process.

2.5.5. Input Processing Theory

Like Schmidt (1990) (cf. Section 2.5.3 above), Krashen (1981:102) also proposed a distinction between the concepts of 'input' and 'intake', but, unlike Schmidt, he did not relate it to what the learner consciously notices, but rather said that "intake is ...[the] input that is understood". Whereas 'input' can be defined as "the language data which the learner is exposed to" (Zhang 2009:91), "intake refers to what is actually internalized by the learner" (Zhang 2009:92). Given these definitions, Gass and Torres (2005:5) note that "what is far from being uncontroversial is how input is transformed into intake". As a response to Gass and Torres (2005), Zhang (2009:91) notes that there are two prerequisites for successful SLA, namely TL input and "a set of internal mechanisms to account for how L2 data are processed".

Input Processing Theory was introduced by VanPatten (1996). This hypothesis "is concerned with how learners derive intake from input regardless of the language being learned and regardless of the context (i.e., instructed or non-instructed)" (VanPatten 2005:267). Regarding the possible procedures through which the TL input can be successfully processed, Mackey, Gass and McDonough (2000:474) propose that learners should focus their attention "on a limited, and hence controlled, amount of data at a given point in time". Once this is done, "learners can [then] focus on ... [that] reduced, and hence manageable, amount of language that allows them to take initial steps in moving from input to knowledge (as represented by their output)" (Mackey, Gass and McDonough 2000:474).

It is important to note that Input Processing Theory can account for the fact that most learners do not attain near-native speaker proficiency in an L2. In this

regard, Ellis and Shintani (2014:124) state that “Input Processing Theory claims that L2 acquisition is primarily input-driven but that simply exposing learners to input does not guarantee successful learning”. This implies that there must be a certain kind of instruction or support that is provided to the learners since “the learners’ internal processors act on the input in such a way that only part of the input makes its way into the developing system of the second language” (Ellis and Shintani 2014:124). This kind of instruction and support that need to be provided to the language learners will be discussed under constructivism (cf. Sections 2.5.8 and 3.3) and in Chapter 4.

It follows that a good ESL/EFL classroom might be one in which measures are put in place to increase the amount of input that becomes intake. How one might be able to accomplish this, is not made clear by the theory. Regardless, a challenge that precedes the challenge of converting input to intake, is simply ensuring that learners receive a sufficient amount of input in the first place. This is the challenge that is addressed by the current study. The study thus takes one step back from the Input Processing Theory’s focus, and asks how one can increase the amount of input that is at the learner’s disposal.

2.5.6. Interaction Hypothesis

The Interaction Hypothesis was introduced by Long (1983) to account for the specific ways in which negotiations play an important role in making input comprehensible. In the context this hypothesis, the term “interaction” is defined as “exchanges in which there is some indication that an utterance has not been entirely understood” (Gass and Torres 2005:2), and therefore, the interlocutors “need to interrupt the flow of the conversation in order for both parties to understand what the conversation is about” (Zhang 2009:92), i.e. to negotiate the meaning. In other words, “negotiated interaction occurs when [at least] two speakers work together to arrive at mutual understanding of each other’s utterances” (Mackey, Gass and McDonough 2000:472). The Interaction Hypothesis claims that such interaction which is “modified through different types of conversational adjustments, enhances the learners’ needs to access L2 comprehensible input” (García-Mayo 2013:332). Studies on the role of interaction in SLA originate from a research tradition introduced in the early

1980s, which “investigates the role that negotiated interaction (between native (NS) and non-native (NNS) speakers or between two non-native speakers) plays in the development of an L2” (Mackey, Gass and McDonough 2000:472). According to Gass and Torres (2005:2), “in recent years, there has been growing interest in the role of interaction in SLA”.

According to Satar (2015:485), “learning occurs ‘not through interaction but in interaction’; ...which means that interaction is not only social necessity, but it is a requirement for language learning”. The Interaction Hypothesis claims that “negotiation of meaning, and especially negotiation work that triggers interactional adjustments by the NS or more competent interlocutor, facilitates acquisition because it connects input, internal learner capacities... and output in productive ways” (Long 1996:451-452). According to Mackey, Gass and McDonough (2000:471), “the Interaction Hypothesis suggests that negotiated interaction can facilitate SLA and that one reason for this could be that, during interaction, learners may receive feedback on their utterances”. In addition, interaction in the TL provides learners “with opportunities to use language, and... to reflect on their own language use” (Mackey, Gass and McDonough 2000:471).

Mackey and Abbuhl (2005:207) explain that interaction is made up of three components, namely input, feedback, and output. From the Interaction Hypothesis perspective, “input must be comprehensible for acquisition to occur, and there is some evidence that global linguistic and conversational adjustments to NNSs improve comprehensibility” (Long 1996:423). Unlike Krashen’s Input Hypothesis (discussed in Section 2.5.4), the Interaction Hypothesis does not only acknowledge the role of comprehensible input in SLA, but also provides details on the ways in which the TL input can be made comprehensible. Among other ways, Swain (2000:98) discusses the interactional modification, which is a discourse in which the “learners’ input [is modified] as a consequence of their having signalled a lack of comprehension”. In such discourse, input “comprehensibility is achieved as interlocutors repeat and rephrase for their conversational partners” (Swain 2000:98). Apart from interactional modification, Mackey and Abbuhl (2005:220) add other ways through which

input can be made comprehensible, and these include “explicit corrections and metalinguistic explanations, as well as more implicit clarification requests, confirmation checks, repetitions, and recasts”.

In the context of the conventional, formal L2 language classroom, Alotaibi, Alamer and Al-Khalifa (2015:1308) note that “interaction... provides students with appropriate, comprehensible input while giving them opportunities to negotiate meaning, which, in turn, facilitates L2 learning”. In the context of a more communicative classroom, “recasts and negotiation of meaning both function to direct the learners’ attention toward linguistic form in the context of meaning-based communication” (Mackey, Gass and McDonough 2000:491). Zhang (2009:92) states that “when input is negotiated and learners produce output in interaction, they selectively ‘take in’ portions of comprehensible input and choose correct linguistic forms to express themselves, ... [and thus] internalize what they have learnt and experienced”. On this view, “knowledge is ‘constructed not discovered’, is ‘multiple not single’ and cannot ‘ever be simply discovered’” (Satar 2015:484).

Kukulska-Hulme and Shield (2008:272) explain that “since language learning is, essentially, a social activity, ... lack of such interaction may be seen as disadvantaging learners... Increasingly, however, interaction... can be provided via ...[mobile] applications”. It is this possibility that the current study explored by creating a mobile-supported interactional setting in which the participants were able to interact with English NSs and among themselves (cf. Chapter 4, more specifically Sections 4.6.3.1 and 4.6.3.2).

2.5.7. Comprehensible Output Hypothesis

People (usually) acquire an L2 not only for the purpose of understanding L2 utterances but also for the purpose of being able to produce L2 utterances, articulate messages in the TL, and interact with other (L1 and L2) speakers of the language. Focusing on the latter, Talja, Tuominen and Savolainen (2014:89) state that “conversation is the condition *sine qua non* for the constitution of ... knowledge” because it creates an opportunity not only for output, but also for input.

The Comprehensible Output Hypothesis was introduced by Swain (1985) in reaction to Krashen's (Input Hypothesis) claim that "input alone was responsible for acquisition [- a claim that] contradicted the pedagogic assumption... that learners need plenty of production practice" (Ellis and Shintani 2014:9) in order to achieve their SLA goals.

Regarding TL knowledge construction in the learners' mind from the perspective of the Comprehensible Output Hypothesis, Swain (2000:100) articulates it as follows:

The importance of output to learning could be that output pushes learners to process language more deeply – with more mental effort – than does input. With output, the learner is in control. In speaking or writing, learners can 'stretch' their interlanguage to meet communicative goals. To produce, learners need to do something. They need to create linguistic form and meaning, and in so doing, discover what they can and cannot do.

According to Long (1996:447), "the failure of... students to reach nativelike levels might partly be due to the lack of much genuine opportunity for them to participate in classroom conversation in more than a response mode". This is a common challenge that conventional L2 classrooms face, and it is the case in Rwanda as well (as will become clear from the discussion in Section 5.3: learners do not have an opportunity for TL output in any form other than response mode, and this is undesirable). Swain (2000:13) notes that learners should be involved in "collaborative dialogue[s]", since this involves "problem-solving and, hence, knowledge building" (Swain 2000:13). Long (1996) explains the role of production in this knowledge building or knowledge construction process. The first role is to "push learners to analyze input grammatically, with accuracy" (Long 1996:447). The second role of production is played by its features such as "[c]onfirmation checks, comprehension checks, clarification requests, and other triggers of negotiation... [which push] sensitive learners to a need for greater comprehensibility on their part" (Long 1996:447). In other words, production contributes to the process of building and constructing the L2 knowledge "by pushing learners to increase control over forms they have already internalized" (Long 1996:447).

Long (1996:447) admits that “a claim that production is necessary for acquisition is problematic in light of the exceptional cases of individuals who have supposedly learned languages with minimal or no opportunity to speak”. Although such cases do exist, a language teacher cannot expect that all or most of his/her L2 learners will be exceptional, and thus successfully learn the TL without or with minimal opportunity for output.

As noted in the previous section, Kukulska-Hulme and Shield (2008:272) point out that in cases where it might not be possible to provide learners with opportunities for face-to-face interaction, especially with NSs, one could make use of mobile applications. MTLs are thus potentially valuable sources of input, output and interaction, especially in the case of foreign language acquisition.

As mentioned at the beginning of this section (i.e. Section 2.5), all the hypotheses discussed here place some degree of emphasis on the role of input in L2/FL acquisition. In addition, some of the hypotheses also recognize the role of the language learners’ learning abilities, as well as the contribution of the learning environment to the L2/FL process. Section 2.5.8 below discusses constructivism, a theory which takes all of these factors into account.

2.5.8. Constructivism

The concepts ‘learning’ and ‘knowledge’ and their specific definitions within the framework of constructivism, form the foundation of this model. Cobern (1993:109) defines these concepts as follows: “learning is the active process of constructing a conceptual framework” and “[k]nowledge is a meaningful interpretation of our experiences of reality”. One of the central claims of constructivism is thus that “no one learns by transmission” but instead “by making sense of what is experienced” (Cobern 1993:109). As mentioned by Cobern (1993:109, 110), “the definition of constructivism is carried in its name” – knowledge is not transmitted to or passively received by learners; instead, it is formed by the learner’s interpretation of his/her experience of learning, and therefore actively constructed by the learner. In this way, knowledge becomes “a function of how the individual creates meaning from his or her own experience” (Ertmer and Newby 2013:55). According to Cobern (1993:105), constructivism

is the “most promising model of learning”, applicable not only in the field of SLA, but also in other fields of knowledge (discussed further below in this section).

The constructivist model of learning was admired by scholars specifically “for its emphasis on learners’ active participation and the heightened recognition given to the social nature of learning” (Liu and Mathews 2005:386). It is currently recognized by many researchers as the sole model of learning which pays sufficient attention to the role of the learner (Cobern 1993:110).

Before moving on to the central claims of this model within the specific field of SLA, some historical background is provided. According to Ertmer and Newby (2013:55), “constructivism is not a totally new approach to learning” as it is originally based on the work of Piaget and his proponents. With its purpose “to overcome the Cartesian mind-body dualism and the ...debates between empiricism and rationalism, the constructivist metaphor ...emerged in the 1970s” (Liu and Mathews 2005:386). In this regard, Ertmer and Newby (2013:55) explain:

As with the rationalists of Plato’s time, the mind is believed to be the source of all meaning, yet like empiricists, individual, direct experiences with the environment are considered critical. Constructivism crosses both categories by emphasizing the interaction between these two variables.

According to Talja, Tuominen and Savolainen (2014:83), constructivism was born from “Piaget’s theory of cognitive development proposing that humans cannot be ‘given’ information which they immediately understand and use. Instead, humans must ‘construct’ their own knowledge”. In addition to acknowledging the role of human beings’ ability to construct knowledge, constructivism acknowledges the role of input in the learning process. According to Ertmer and Newby (2013:55), “constructivism... equates learning with creating meaning from experience, ... [in that] constructivists believe that the mind filters input from the world to produce its own unique reality”.

Constructivism claims that “knowledge is not mechanically acquired, but actively constructed within the constraints and offerings of the learning environment” (Liu and Mathews 2005:387). There are two prominent variants of constructivism, which share this claim, but which involve different methods in

matters of pedagogy. The first variant is called ‘radical or cognitive constructivism’, and it originates from Piaget’s (above-mentioned) theory of cognitive development (Liu and Mathews 2005). In matters of pedagogy, this variant supports a “learner-centred and discovery-oriented learning process” (Liu and Mathews 2005:387, 388):

Theorists affiliated with this line of thinking focus on the intrapersonal process of individual knowledge construction. They argue that knowledge is not a self-sufficient entity; that knowledge is not directly transmittable from person to person, but rather is individually and idiosyncratically constructed.

The other variant of constructivism is called ‘realist or social constructivism’, and originates from Vygotsky’s work (Liu and Mathews 2005). This variant of constructivism supports “situation-specific and context-bound” pedagogy (Liu and Mathews 2005:388): “learners are believed to be enculturated into their learning community and appropriate knowledge, based on their existent understanding, through their interaction with the immediate learning environment”. According to Pear and Crone-Todd (2002:221), social constructivist theory claims that “human learning occurs primarily through a socially interactive process”. In the context of the formal conventional classroom setting, a teacher can thus create a favourable environment in which “all the students receive feedback on their performance from more advanced students ... [who, in return] learn from the answers of the less advanced students” (Pear and Crone-Todd 2002:221).

According to Cobern (1993:105), constructivism is the sole theory of learning, which is “applicable in any learning situation, including educational and psychological consultation”. Ertmer and Newby (2013:55) emphasise that “both learner and environment factors are critical to the constructivist, as it is the specific interaction between these two variables that creates knowledge” (Ertmer and Newby 2013:55). It follows that teaching should be learner-and-situation-centred and should acknowledge the contribution of learners’ autonomy to the success of the learning process.

In the context of SLA, constructivism can be interpreted as a theory which claims that an L2 is successfully acquired when learners are integrated within a rich TL

environment and provided with enough time for input processing and knowledge construction. There are examples of how a constructivist approach can be used in the teaching-and-learning process of different TL features. Concerning the acquisition of vocabulary, for example, Ertmer and Newby (2013: 55-56) state that “as the learning of new ...words is enhanced by exposure and subsequent interaction with those words in context, ...it is essential that content knowledge be embedded in the situation in which it is used”. For acquiring TL pronunciation, for example, Pear and Crone-Todd (2002:222) state that an L2 learner “constructs new verbal behavior on the basis of linguistic practices that have been reinforced by his or her verbal community”.

Regarding the pedagogical implementation of constructivist approaches, Pear and Crone-Todd (2002:223) caution that “[c]onstructivist teaching should help students construct their own solutions to problems rather than simply accept the solutions of others”. The challenge which arises in this regard is that “attempting problem solution when faced with an opportunity to do so, does not come naturally for all learners” (Pear and Crone-Todd 2002:223). In order to address this challenge for the purposes of the current study, the researcher prepared the participants for solving the problems which they might face in EFL learning. Specifically, the participants were purposively selected (cf. Chapter 4, Section 4.5), and then, respectively, trained and/or guided in using MTLL or additional conventional teaching-and-learning materials for EFL knowledge construction (cf. Section 4.6.3). The researcher also monitored this process throughout the entire experimental period, and provided assistance to the participants in any case that it was needed (cf. Section 4.6.3).

2.6. Conclusion

For successful SLA, “input is absolutely necessary and there is no theory or approach to SLA that does not recognize the importance of input” (Zhang 2009:92). Section 2.5 discussed those theories of SLA that explicitly address the role of TL input rather than just acknowledging it.

However, input can also not be emphasised to the exclusion of other factors. Zhang (2009:98) notes that “comprehensible input alone is not enough and

when input is negotiated [(cf. Subsection 2.5.6 above)], the learners will possibly internalize what they have learned and experienced". In support of this claim, Gass and Torres (2005:1) found that "learners exposed to input and interaction in combination showed greater improvement than those in conditions with only input or only interaction". Pear and Crone-Todd (2002:224) add that "learning about the constructed knowledge of others is a necessary element in the construction of one's knowledge". Regarding the sequence of different factors, Gass and Torres (2005:1) found that "learners who received interaction followed by input showed [the] greatest improvement".

Overall, the "SLA literature shows that comprehensible input, interaction and output play an essential role in L2 acquisition" (Zhang 2009:98). This means that most of the theories discussed above are relevant to investigations into input to a greater or lesser degree, but constructivism (cf. Section 2.5.8 above) was chosen as the framework for this study because it is a theory of learning which takes both the learner factors (individual differences) and the factors related to the learning environment into consideration. In the next chapter, I focus on the integration of technologies into the constructivist approach to SLA, since it is such integration which forms the theoretical framework of this study.

Chapter 3 : THEORETICAL FRAMEWORK

3.1. Introduction

In recent years, with the developments in mobile technology, one specific type of input has started featuring more and more prevalently in L2 acquisition contexts: input from modern mobile devices with connectivity and portability features, “which offer ... an opportunity where language can be learnt anywhere and anytime” (Taj, Sulan, Sipra and Ahmad 2016:76). It is with these new developments in mind, that the current study’s aims and objectives (cf. Section 1.3.1) were formulated. In addition to this short introductory section, this chapter is divided into three sections. Section 3.2 provides an overview of technology for language learning, specifically, computer-assisted language learning (CALL) and mobile-assisted language learning (MALL). Section 3.3 explicates the relation between MTLL and the constructivist theory of SLA, and finally, Section 3.4 provides a conclusion to the chapter.

3.2. Technology for Language Learning

Technology for language learning can be defined as the field which investigates the use of technological equipment with the purpose of facilitating the language teaching-and-learning process. Regarding its history, technology for language learning started in the 1950s with the rise of language laboratories that contained sophisticated audio-visual equipment, which was used to mediate the communication between the language teacher, who had to set the learning tasks, and the language learners, who had to complete the tasks (Abbott 2013; Alotaibi, Alamer and Al-Khalifa 2015). According to Abbott (2013:30), “such technology was didactic in nature... Any suggestion of technology as a tool for learners was still some way in the future, with these technologies privileging vocabulary over meaning, and promoting repetition and the regurgitation of set phrases”.

Language laboratories “became unpopular due [to] unreliable technology and a lack of appropriate training ... [of] both teachers and students” (Alotaibi, Alamer and Al-Khalifa 2015:1307), and started phasing out in the early 1990s due to the rise of the internet and modern digital technology affordances provided by

modern computers. Currently, handheld and pocket digital devices are also integrated into language teaching-and-learning activities.

Different studies have found a positive effect of digital technologies on the language teaching-and-learning process. Nikou and Economides (2016:1246) state that the use of digital tools, especially mobile devices, increases language learners' motivation, confidence and self-efficacy, and it has "significant positive effects on students' attitudes and achievement". In other words, Nikou and Economides (2016) claim that MTLL (recall: "mobile technologies in language learning") have an indirect effect on learners' proficiency, more specifically in that MTLL lead to increased motivation, confidence and self-efficacy, and this, in turn, leads to increased proficiency.

Depending on the types of technological tools and the learning settings which are focused on, research on technology for language learning is divided into two subfields. The first subfield is referred to as "computer-assisted language learning" (CALL). This subfield focuses on the use of computers for language learning, i.e. technology which is mostly available in and accessible from a specific language learning location, at a specific time (cf. Subsection 3.2.1). The second subfield is referred to as "mobile-assisted language learning" (MALL). This subfield investigates the use of handheld portable devices in language learning, i.e. MTLL, tools which are personalized, portable and available for use anywhere and at any time (cf. Subsection 3.2.2). The following two subsections discuss each of these two research fields in turn.

3.2.1. Computer-Assisted Language Learning

The idea of using computers for language learning, which became known as "computer-assisted language learning" (CALL), can be traced back to the 1960s, to the "Programmed Logic for Automated Teaching Operations" or "PLATO" project (Park and Slater 2014:95). The University of Illinois, in the USA, started this project with a multi-user computer system. This system was similar to an audio-visual language laboratory, with the exception that it integrated visual graphics, on a desktop screen, into the teaching-and-learning process.

According to Hummel (2014:128), “CALL... has become a flourishing source of innovation for second language learning and teaching over the past several decades”. Alotaibi, Alamer and Al-Khalifa (2015:1308) summarise CALL’s evolution over these decades as follows:

By the late 1970s, ... Computer labs began to gradually replace audio language labs... During the 1980s, the term CALL... [was introduced], and there was a flurry of language learning software and CALL publications. A decade later, with the emergence of the Internet, most traditional computer labs were replaced by network- and multimedia-enabled systems with extended functionality, thereby allowing students to record, view, upload, and download multimedia.

The PLATO project and other CALL projects which followed it, had the objective of creating a collaborative and interactional environment in which teaching-and-learning activities could take place with the use of chatrooms, message boards, screen sharing and user forums. However, the main focus was still on the teacher as the source of knowledge, and as the person in control of the teaching-and-learning process. Furthermore, the quality and use of the materials that were involved were limited by the graphics and computer technology available at the time, and in the majority of cases listening and speaking were the only language skills targeted with the use of these technologies. For these reasons, CALL projects could not be completely differentiated from the 1950s’ language laboratories (discussed in Section 3.2 above) until the early 1990s, when modern computers with internet and connectivity affordances were introduced into the language teaching-and-learning context. According to Alotaibi, Alamer and Al-Khalifa (2015:1308), “unlike the previous generation of language labs, which were devoted solely to listening and speaking skills, the new digital... [technological devices] are able to facilitate the teaching of reading and writing [as well]”.

Since the 1960s, CALL projects have been implemented in three phases, namely structural, communicative and integrative. Whereas the first phase, i.e. the structural phase involved the use of computers “for drill and practice activities to achieve [language] accuracy”, the second phase, i.e. the communicative phase, involved the use of computers from “a ... communicative language teaching approach ... [which] involved more communicative exercise, with a fluency

objective” (Park and Slater 2014:95). In contrast to these first two phases in which CALL projects were implemented in the past, phases which were content-based and communication-based, the third phase which is the current one, i.e. the integrative phase, is learner-based. This phase involves “using computers for authentic discourse and adds learner agency into the objectives” (Park and Slater 2014:95).

Currently, according to Smith and Craig (2013: 253), “CALL is considered to include any visual, audio, text, or graphic format associated with the transmission of information through technology where learning support... occurs, either synchronously or asynchronously”. And therefore, CALL studies focus on different topics that range from the use of synchronous and asynchronous communication software, such as e-mail and Skype, Web 2.0 applications and internet sources, to the use of social networking applications, blogs and games on computers, for language learning purposes.

3.2.2. Mobile-Assisted Language Learning

According to Chen (2013:21), “mobile assisted language learning [(MALL)] is the formal or informal learning of a foreign language with the assistance of mobile devices”. More specifically, MALL is the new field of study, which investigates the use of mobile devices such as tablets, mobile phones, personal digital assistants (PDAs), and portable multimedia players such as iPods, for language learning purposes. MALL research “tackles the issues of mobile implementation in the field of language acquisition” (Hazaea and Alzubi 2016:9) and can also be defined as “a subset of [mobile learning] (m-learning), [which] refers to the integration of mobile tools and applications to assist and enhance language learning inside or outside [the] classroom” (Hazaea and Alzubi 2016:9).

In this dissertation, the term “mobile technologies in language learning” or “MTLL” is used to refer to both mobile technological devices as hardware and its features, and mobile device applications as software. The term “MTLL” is thus defined as any type of mobile technological device, mobile device tool, or application which has the potential to be used for language learning purposes, and therefore to become a focus of m-learning and MALL. In other words,

“MTLL” refers to mobile technological *devices and tools* which have the potential to be used for language learning; “MALL” refers to the field of study which involves *theories about and approaches to* using these tools for the purpose of language learning; and “m-learning” refers to the *actual application* of these theories and approaches in the teaching-and-learning process.

Focusing on m-learning, Cacchione, Procter-Legg, Petersen and Winter (2015:1248) explain that it “has emerged as an area of research, where the focus has evolved from a technology-centred view... to learning anytime, anywhere and anyhow..., to fostering a new culture of thinking and learning”. By adopting learner-centred teaching methods and approaches, both MALL and m-learning try to address the problems faced by conventional classroom methods, including (but not limited to) the overloaded teaching-learning timetable, and the lack of flexibility in the organization of teacher-learner contact sessions. By combining the concepts of ‘mobility of devices used’ and ‘mobility of learners’, m-learning can thus be defined as “learning mediated via handheld devices and potentially available anytime, anywhere, [and which] ...may be formal or informal” (Kukulska-Hulme and Shield 2008:273).

As can be concluded from the definitions of MALL, m-learning and MTLL discussed above, MALL is a field of study which investigates the integration of m-learning with the affordances of MTLL into the language learning process. MALL “is a relatively new research area” (Chen 2013:21), which was first introduced as a field of study in 1994, and its main objective was “to realize the potential of mobile [devices]” in SLA (Burston 2014:103).

According to Park and Slater (2014:94), “the ownership of mobile devices... has become widespread; ...[and] mobile technologies have... made their way into ...[language] classrooms, offering advantages through flexibility of time, space, and mode of communication”. It is in this regard that both MALL and m-learning, recently started including the concept of ‘mobility of learners’ in MALL discourse (Kukulska-Hulme and Shield 2008:273). MALL has thus become synonymous with the use of MTLL, i.e. the devices which are “mainly characterized by [the affordances of] permanency, accessibility, immediacy, interactivity, and situating of instructional activities” (Hazaea and Alzubi 2016:10). The meanings of these

main affordances of MTLL, and the ways in which they contribute to the language teaching-and-learning process, are evident in their names.

Starting with permanency, it is said that MTLL are permanent in the sense that they are always available at their users' disposal at any time and place. In addition to their permanency, mobile technological devices are easy to own, to maintain, and to operate or use (i.e. accessibility). Because of their portable sizes and their mobility affordance, which is linked with the mobility of their users, MTLL can be used instantly, the moment that the user requires them (i.e. immediacy). Furthermore, because of their connectivity features, mobile devices enable their users to interact with one another at any time and place (i.e. interactivity). It is important to note that most of the modern mobile technological devices are equipped with global positioning system (GPS) which allows the users to navigate to any destination, and to locate themselves, their peers and any other object. This feature also helps the language teachers and learners (i) to get more information about their geographical locations, (ii) to find the teaching-and-learning materials which are relevant to their geographical locations, (iii) to find, meet and connect with other teachers, learners and speakers of the TL with whom they are in the same geographical location, and thus (iv) to have the teaching-and-learning methods, content and activities which are relevant to the teachers and learners' environment (i.e. situating of instructional activities). The specific ways in which these affordances were exploited during the execution of the current study, are discussed in Chapter 4, and in Section 3.3 below.

Park and Slater (2014:97) divide MALL studies into two categories. The first category is referred to as "MALL implementation studies", and the second category is referred to as "MALL review studies". Starting with MALL implementation studies, these studies focus their SLA inquiry "on specific context, mobile device use, and language skills" (Park and Slater 2014:97) and their main objective is to identify the contribution of mobile devices, and specifically MTLL, to successful SLA. In MALL implementation projects, mobile devices have, for example, been "acknowledged as a delivery channel with

immense potential for sustainable learning and that offers better accessibility and practicability” (Alotaibi, Alamer and Al-Khalifa 2015:1309).

A large number of these implementation studies have found a positive contribution for MLL to the SLA process. Among others, Hazaea and Alzubi (2016: 9-10) found that MLL help learners to acquire new vocabulary, as well as to improve their reading skills in EFL. Cacchione, Procter-Legg, Petersen and Winter (2015:1248) found that “mobile devices such as smartphones and tablets have played a central role in [SLA by] supporting the learning process both in and outside school”. Kukulska-Hulme, Norris and Donohue (2015:7) make the same observation:

Students now carry with them powerful devices with which they can create and share multimodal texts, communicate spontaneously with people anywhere in the world, capture language use outside the classroom, analyse their own language production and learning needs, construct artefacts and share them with others, provide evidence of progress gathered across a range of settings, in a variety of media.

Even though a large number of MALL implementation studies have been conducted, there is a disparity in terms of the language teaching methods that were employed, in that “85% of all MALL implementations have been *teacher-centered* and based on various kinds of content delivery in the form of SMS, multimedia messaging system (MMS), podcasts, tutorials, quizzes, flashcards, text readings, games, etc.” (Burston 2014:111-112, own emphasis). On the other hand, “*learner-centered* activities such as discussion forums, blogs, wikis, chats, journal writing and data collection (photos, audio, texts, etc.) account for only about 15% of all MALL applications” (Burston 2014:112, own emphasis).

The second category is referred to as “MALL review studies”. In MALL review studies, researchers investigate “the approaches taken for MALL implementation, and ...[recommend] directions for future MALL research and applications” (Park and Slater 2014:98). Liakin, Cardoso and Liakina (2015:16), for example, based on their MALL review study, recommend the following regarding the role of automatic speech recognition (ASR) apps in SLA:

ASR can and should be used in the language learning environment because: (1) it has the potential to improve L2 learners' pronunciation; ...(2) it can relocate resources so that classroom time can be used exclusively (or mostly) for communicative activities; (3) it accommodates a wide variety of learners (e.g., those who benefit from the visual interactions afforded by ASR...); and, finally, (4) the technology was evaluated very positively by the participants [of different studies].

Given that the primary objective of the current study is to determine the extent to which MTLL can contribute to university students' proficiency in EFL (see Section 1.3.1), the study falls mainly into the category of MALL implementation studies. Considering the secondary objective of this study (cf. Section 1.3.1), which was to provide recommendations as to how MTLL can be practically integrated into the conventional L2/FL classroom, and given the fact that previous MALL studies were reviewed in order to select the theoretical framework as well as the design and methodology of the study, it can also be categorized as a review study (though at a secondary level).

3.2.3. Conclusion

According to Kukulska-Hulme and Shield (2008:273), "MALL differs from computer-assisted language learning in its use of personal, portable devices that enable new ways of learning, emphasizing continuity or spontaneity of access and interaction across different contexts of use". Park and Slater (2014:98) note that various MALL studies have found that the use of MTLL has a positive effect on SLA, despite a number of issues which are specifically related to the devices' "small screen sizes, limited audiovisual quality, limited text message length, virtual keyboarding, limited power, and high costs". Nowadays, with the introduction of modern mobile technological devices which have all the affordances discussed in the section above, these issues might have been solved (I return to this below). In addition to the availability of modern and powerful devices, their "portability and high rate of ownership ... have provided an impetus for language learners to study or practice with manageable chunks of information in any place on their own time, thereby taking advantage of the convenience of these devices" (Park and Slater 2014:98).

Stockwell and Liu (2015) conducted a MALL implementation study with 160 learners, made of 39 Japanese-speaking learners in Japan, and 121 Taiwanese-speaking learners in Taiwan, who were learning English as a precondition for being admitted to different academic programmes at their universities. Stockwell and Liu (2015:316) found that “learners seemed to be quite enthusiastic about using their mobile phones when they talked with the teacher, but mobile phone usage remained relatively low [compared to computer usage], despite the enthusiasm they exhibited”. Modern MALL have overcome some of the challenges that Park and Slater mention and that Stockwell and Liu experienced, more specifically with the introduction of smartphones and tablets which have wide high-definition screens, and which support various accessories including external keyboards, storage devices, wireless chargers, monitors and projectors. Naismith and Corlett (2006:6-12) compared MALL and CALL, and found that MALL increase the language learners’ motivation and engagement with the learning process, and that they create a sense of community, as well as a personalized (learner-centred), interactive and collaborative language learning environment. Alotaibi, Alamer and Al-Khalifa (2015:1308) found that MALL affordances of self-recording and self-listening “reduce shy students’ anxiety by offering them some degree of privacy and assuring their anonymity”, and therefore increase the students’ motivation and language learning comfort.

Even though many studies have been conducted in the field of MALL, there are still gaps, especially in terms of the geographical locations of the published studies (cf. Figure 1.3), the language areas that have been investigated by MALL researchers (cf. Figure 1.2), and the formats which MALL studies have been published in (cf. Figure 1.1). In addition, MALL studies have not yet exploited all the affordances of MALL. In this regard Kukulska-Hulme and Shield (2008:275) specify that “although mobile phones were developed to allow oral interaction, MALL rarely seems to make use of this affordance, at least in published research”; i.e. most of the published MALL studies involved written input and/or interaction. In addition, according to Kukulska-Hulme and Shield (2008:280), “mobility and portability too often seem not to be fully exploited in the design of MALL activities... Many of the studies ignored the ‘anytime, anywhere’ affordances supposedly offered by mobile devices”. This gap might be due to the

theoretical frameworks within which published MALL research has been conducted, frameworks which probably do not take into account all the affordances related to learner factors and environmental factors. The study reported in this dissertation was an attempt to fill the above-mentioned gaps, by investigating the potential of MTLL to increase Rwandan university students' proficiency in EFL, within the framework of constructivism, a theory that takes into account the learning environment, learner factors, *and* the learning tools available to learners (see Section 2.6).

3.3. Integration of Technologies into Constructivist Theory

According to Stockwell and Liu (2015:300), “the potential of mobile devices to carry out activities for learning both inside and outside of the classroom has been widely cited as a way of making learning more accessible and to allow for more consistent learning opportunities”. From a constructivist approach, the study reported in this dissertation integrates the use of technologies, specifically MTLL, into the conventional EFL classroom in order to overcome one of the main challenges (if not the most important one) that Rwandan EFL learners face, namely the lack of sufficient input and of enough opportunities for output and interaction. The purpose of this study was to create what would be a favourable EFL learning environment from a constructivist approach, i.e. an environment in which learning involves not only interaction with the language teacher in the conventional classroom setting, but also the availability and potential use of MTLL in any place, at any time and potentially with any interlocutor.

Since the use of MTLL involves human-machine interaction, it also gives learners the opportunity for risk-taking, which is defined as the “learners' ability to practice language without fear of losing face or embarrassment of saying the wrong thing” (Amer 2014:293). Amer (2014) explains that all the interactions which involve risk-taking are very important in L2/FL learning in that, compared to the traditional formal classroom, “language learners ... produce more language through the activities made available by the computer [or MTLL], and in turn produce more comprehensible input and comprehensible output [for themselves at the beginning, and for other learners as they progress]” (Amer 2014:293).

According to Hubbard (2013:163), “as technology has come to play a more central role in language teaching, research, development, and practice have focused on three main areas: the technology itself, ...interactional and learning tasks, and teacher education”. But Hubbard (2013:163) adds that “there is a fourth area that... seems to have received much less attention: the learner”. In response to Hubbard (2013), this study adopted constructivism as theoretical framework, since it treats the learner as the main focus of the learning process, and the use of MTLL as tools which have the potential to sustain learner-centred teaching-and-learning methods. The following subsections discuss constructivism as a rich theory for addressing any MALL inquiry (cf. Section 3.3.1), and the use of MTLL from a constructivist approach as a promising way to successful SLA (cf. Section 3.3.2).

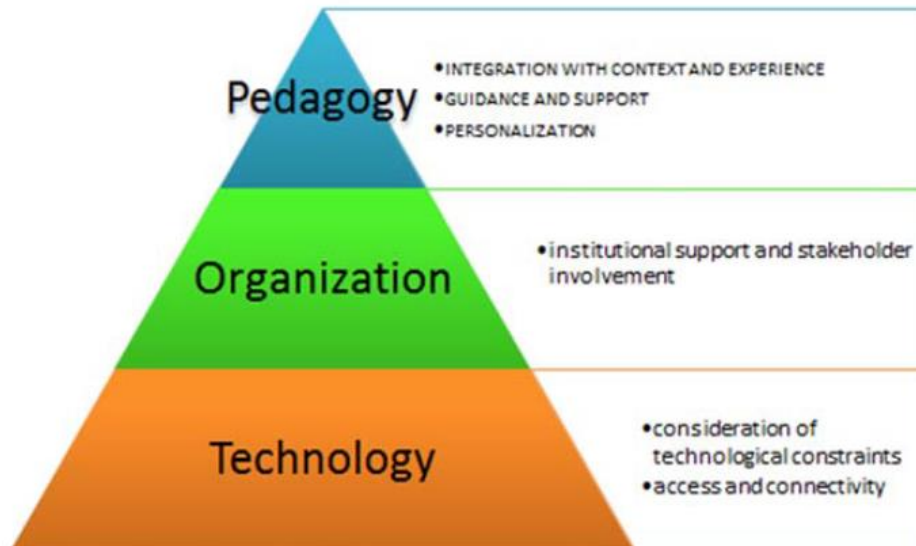
3.3.1. Constructivism and MALL

According to Smith and Craig (2013: 254), “learners need to take responsibility for their own learning... by taking a substantial hand in directing it... through a process that would build knowledge and be part of doing things with others”; and this is exactly what MTLL allow learners to do. In the same framework, specifically from a constructivist approach, Derry (1996:165) discusses the students versus teachers’ activities as follows:

Students employ their knowledge structures in efforts to construct working understandings of situations they observe and experiment with in the world... [And] teachers ...view themselves as midwives who facilitate the birth of understanding, not as engineers of knowledge transfer.

According to Liu, Abe, Cao, Liu, Ok, Park, Parrish and Sardegna (2015:114), proponents of constructivism “view learning not just as an individual process, but an ongoing process of knowledge construction and reflective thinking within a social environment”. From a constructivist approach, Liu et al. (2015:114) argue that any type of knowledge, regardless of its field, is social. As far as language learning is concerned, Liu et al. (2015:114) specify that “language develops via shared and meaningful activities, through performance within a community of practice, ...and when learners connect with appropriate knowledge from a sociocultural context in which they are immersed”.

Cacchione, Procter-Legg, Petersen and Winter (2015:1259) illustrate three factors for the successful implementation of a MALL project on the following pyramid (cf. Figure 3.1 below):



**Figure 3.1: Pyramid of a successful MALL project
(Cacchione, Procter-Legg, Petersen and Winter 2015:1259)**

The first of the three factors involved in the successful implementation of a MALL project, is technology, which requires not only connectivity and access to technology, but also the availability and capabilities of the language learners (MTLL users) and teachers to use this technology adequately. Here the role of a teacher is to train and guide the learners in the appropriate use of technological devices, and to create and modulate the interactional learning environment. In other words, for a successful MALL project, there must be a link between technology (the first factor) and pedagogy (the third factor); and this link is the support from learning institutions and stakeholders (the second factor). For an even more positive outcome of such a MALL project, the learners have to be integrated into this whole system, which goes beyond the technology and pedagogy sub-systems to involve not only the institutions and stakeholders, but also the learners' physical and social environments. As was explained in Section 2.6, constructivism is a metatheory of learning that literally takes this whole system into consideration.

According to Liu et al. (2015: 114-115), “constructivist approaches to language learning and teaching encourage the integration of different language skills (reading, writing, listening and speaking) as well as the negotiation of cognitive ...processes *through social interaction*” (own emphasis). In other words, the language teaching-and-learning process has a much larger possibility for success if the language learners are integrated into an environment (made of learning institutions, social communities, etc.), which allows them to interact and therefore to develop TL skills. The environment should thus be an interactive one, in which learners get “the opportunity to offer personal insights, obtain alternative perspectives, and test hypotheses and ideas” (Liu et al. 2015:115). In this kind of learning environment, “the teacher performs a facilitative role through expert guidance and provision of opportunities for learners to practice and learn knowledge and skills in a supportive and encouraging environment” (Liu et al. 2015:115). It is for this reason that the study reported in this dissertation designed and implemented formal MTLT training in the form of a short course which was taught to one group of participants (cf. Section 4.6.3.1). This is also the reason why the other three sample groups, including the control groups, were each provided with some kind of guidance and support from the researcher (cf. Sections 4.6.3.2 to 4.6.3.4).

Considering the three factors for successful MALL project implementation (cf. Figure 3.1 above), with reference to a constructivist interpretation of language learning (as discussed above), it should be clear that constructivism is the most relevant theory to guide any MALL investigation. Furthermore, it is important to note that selecting constructivism as a theoretical framework for an investigation into the use of MTLT in SLA falls within the recommendations of Burston (2014; 2015) regarding the integration of MALL within the formal language classroom (cf. Section 3.3.3).

3.3.2. Constructivism and MTLT

Abbott (2013:40) states that “technology can do more than enable learners to practise or even to provide essential tools to assist learning”. According to Abbott (2013:40), “in certain circumstances and with the enthusiastic and expert support of technology-aware teachers, [technology] ...can enable learning [in

different non-classroom settings] where it would otherwise not take place". Long (1996:438) is referring to the potential of MTLL in the non-classroom setting of SLA, such as providing learners with opportunities for "spontaneous conversation with no metalinguistic focus". However, there are also classroom settings in which MTLL could potentially be invaluable and promote learning (in the constructivist sense) "where it would otherwise not take place", for example a formal language classroom which offers minimal input, no NS input, and very few opportunities for output or interaction. The study reported in this dissertation was designed with the assumption that MTLL training and use can address this challenge if they are integrated within such a formal language classroom.

Constructivist approaches to language teaching and learning prioritize the learners' active participation in the teaching-and-learning process (cf. Section 2.5.8). According to Kukulska-Hulme, Norris and Donohue (2015:7), "active participation in language teaching and learning implies that learners take responsibility for their own learning and that teachers play their part in enabling this". The learners' active participation in the teaching-and-learning process has been found to be the best philosophy of an adequate language classroom, and as was discussed in Section 3.3.1 above, "mobile technologies enable the implementation of this philosophy in ways that were previously impossible" (Kukulska-Hulme, Norris and Donohue 2015:7).

In addition to encouraging learners' active participation in the teaching-and-learning process, MTLL can contribute to the implementation of the constructivist approach to language teaching and learning, in that they are equipped with features which have the potential to "enable ubiquitous learning in both formal and informal settings by reducing students' reliance on particular work and study settings" (Alotaibi, Alamer and Al-Khalifa 2015:1310). In the classroom setting for example, as discussed by Hazaea and Alzubi (2016:18), the language learners "no longer ask about word meanings, parts of speech or pronunciation", "teachers save more time and effort", "the atmosphere ... become[s] natural and healthy". Some studies on the use of MTLL in SLA are discussed in the following paragraphs.

Hazaea and Alzubi (2016) investigated how the use of MTLT enables SLA activities outside the classroom, and thus contributes to the implementation of constructivist (learner-centred) approaches to language teaching and learning. This study which focused on EFL reading skills was conducted with 30 male preparatory-year students at Najran University in Saudi Arabia. It found that “students are no longer confined to the traditional classroom, rather they advantageously extend their learning outside [the] classroom thanks to mobile features; mobile online and offline dictionaries, ...WhatsApp, ...camera, ...online resources, ...memos, ...etc.” (Hazaea and Alzubi 2016:18). Among other MTLT that have been found to contribute to SLA, various scholars investigated the use of SMS, and according to Alotaibi, Alamer and Al-Khalifa (2015:1310), it was found that the use of SMS “allows students to receive numerous new English words daily, which, in turn, helps to enhance their vocabulary and grammar”, beyond what would have been possible with the conventional teaching-and-learning materials and methods.

In addition to SMS, which is one of the basic features of any mobile phone, the use of other mobile applications (henceforth, “apps”) for SLA have also been investigated, but most of these require the availability of advanced-technology devices, specifically smartphones, convertible computers, and tablets. Among others, Automatic Speech Recognition (ASR) apps “identify the words that a person speaks into a microphone, and automatically convert them into readable text” (Liakin, Cardoso and Liakina 2015:2). Language learners can use the ASR apps which are available free of charge on their mobile devices such as Google Docs Voice Typing and Google Text-to-Speech (on Android), Apple Dictation or Siri (on Apple iOS), and Google Translate (on both Android and Apple iOS), to practise their L2 listening and speaking skills through interaction with their devices. These apps are potential tools “(1) to teach pronunciation of a foreign language; and (2) to assess students’ oral production” (Liakin, Cardoso and Liakina 2015:2). Learners can use ASR apps on mobile devices to help them improve their L2 pronunciation skills on their own. These apps are thus potential tools for the application of the constructivist approach to SLA.

Some of the uses of mobile ASR apps in language learning are not related to any specific teaching-and-learning approach (cf. Section 2.6.2 and the previous paragraph). However, these apps also provide some advantages that are particularly relevant from a constructivist view. These are listed below and have been taken directly from Liakin, Cardoso and Liakina (2015:14):

- i. “learner fit ([they] ... emphasize ... a feature that the participants needed to improve)”
- ii. “potential for explicit teaching and learning”
- iii. “opportunities for interactions with [one’s mobile technological device]”
- iv. “comprehensible and visual (orthographic) feedback”
- v. “strategy development to guide students to start learning new L2 features on their own outside of the language learning environment”.

By exploiting the connectivity affordance of their mobile devices, learners can improve their language skills by using podcasts as well. Kukulska-Hulme and Shield (2008:276) explain that “podcasting may be used as a delivery mechanism, either for targeted language learning materials or for providing a source for real materials in the target language”, and thus providing learners with the possibility to develop their listening skills in any place and at any time. And as far as speaking skills are concerned, “learners can be encouraged to make their own podcasts which they then upload and share with their peers” (Kukulska-Hulme and Shield 2008:276).

In addition to providing language learners with the possibility to interact with their devices in the TL, there are also a large number of apps which allow learners to interact with native speakers of the TL. Currently, one cannot talk about these mobile opportunities without mentioning social networks, tools which have been designed with the main purpose of creating online communities and facilitating communication among their members. Some of the most popular social network platforms are Twitter, Facebook and WhatsApp, which have been the focus of a number of SLA studies.

Alotaibi, Alamer and Al-Khalifa (2015:1312, 1313) state that Twitter is “one the most efficient and motivational tools for English reading, writing, and communication”, and that Facebook helps learners “to exchange video and audio

English materials, as well as to communicate and have discussions". In addition, the feature "Facebook Groups' could be useful for providing access to authentic language input" (Liu, Abe, Cao, Liu, Ok, Park, Parrish and Sardegna 2015:116). Regarding language learners' attitudes towards Facebook for SLA, Alotaibi, Alamer and Al-Khalifa (2015:1313) found that "most students appreciated Facebook and found it a useful and meaningful learning environment". Another mobile social networking app which has the potential to contribute to SLA is WhatsApp. According to Hazaea and Alzubi (2016:18), the use of WhatsApp can help L2 learners to "extend their reading activities". In addition, WhatsApp can be used as a platform for L2 learners "to reflect on ... self-study parts with their classmates and teacher" (Hazaea and Alzubi 2016:18).

In addition to these generic social networks, there is another group of social networking apps that are referred to as "social network sites for language learning" (SNSLLs), and which include tools which have been specifically designed for language learning purposes. The most commonly used SNSLLs include Lang-8, English Café, iTalki, English Club, and Polyglotclub. According to Liu, Abe, Cao, Liu, Ok, Park, Parrish and Sardegna (2015:116), such SNSLLs provide "language learners [with] ... unique opportunities ...to practice their oral skills with native speakers and to receive almost immediate peer-feedback".

According to Cacchione, Procter-Legg, Petersen and Winter (2015:1249), "as the devices evolved, their capabilities were leveraged to enhance the learning support". Currently, there are a large number of SLA tools which include "web-based activities and electronic dictionaries [which] help students to be exposed to authentic texts and to practice reading extensively" on their mobile devices (Hazaea and Alzubi 2016:10). According to Cacchione, Procter-Legg, Petersen and Winter (2015:1249), the use of MTL evolved from "using the camera to support vocabulary learning, ...using the location and positioning capabilities for situated and contextualized support, [to facilitating] ...collaboration, knowledge sharing and user generated learning content through cloud-based technologies". Taking cloud technologies as an example, nowadays, it does not require advanced technology skills anymore to create and work on a file, and to host or

save it online so that other people can access it and work on it remotely at any time, from their respective locations.

Currently, there are a number of free apps which bring this cloud technology affordance of modern devices to mobile device users. Among these are OneDrive, Dropbox and Google Drive (available for all mobile device operating systems) and iCloud (available for Apple iOS), as well as online storage space which is provided by popular e-mail service providers such as Yahoo. In language learning, these technologies give learners the possibility to collaborate with native speakers of the TL and with other learners, to work on one's L2 tasks remotely, and to share language learning materials quickly and easily, by simply clicking on or pressing a "share" button. In addition, these apps synchronise the users' files and progress between all his/her technological devices, including computers and mobile devices, so that he/she can pause his/her work on one device, and then resume the same work at any time and in any place on another device.

One final note is in order regarding social networking tools. Alotaibi, Alamer and Al-Khalifa (2015:1314) state that all the studies which investigated the contribution of social networks in SLA, considered social networks "as a supplementary tool for language learning and not as separate system, as social networks focus solely on interactivity without managing learning materials". However, scholars such as Abbott (2013) view social networks not only as tools for interactional activities, but also as tools for publication, and thus as sources of information. In this regard, Abbott (2013:36) states the following:

Just as the Web offered the means of worldwide publication to all in the 1990s, so the tools that have followed, like Twitter and Facebook, have made this publication easier, faster and even more pervasive. Although the use of these tools for social interaction among young people has been well documented, ...their use within formal education has been the subject of much less research, ...although digitally supported collaboration in the classroom space has long been a subject for scholarly writing.

In order to address these comments by Alotaibi, Alamer and Al-Khalifa (2015) and Abbott (2013), in the process of designing an MTLL-enhanced constructivist-

learning environment, the current study attempted to integrate the use of social networks within the formal EFL classroom, not only for facilitating interaction among the learners, but also for finding information, which can facilitate learners' L2 knowledge construction.

The current study assumed that the combinational use of social networks, SNSLL, SMS and ASR, and other applications which have been found to potentially facilitate SLA could lead to the creation of a favourable learning environment in which learners could construct L2 knowledge. By providing the learners "with more opportunities to take responsibility for their informal learning outside of the classroom with the network-enabled [devices]" (Chen 2013:29), and by providing a suitable mobile language learning environment for the learners, this study was designed to investigate the potential of MTLL to address the common foreign language learning problem of a lack of sufficient TL input (cf. Section 1.2).

3.3.3. Conclusion

As discussed in Section 3.2.2, MALL studies are divided into two categories, namely implementation studies, alternatively referred to as 'content-related' studies, as well as review studies, alternatively referred to as 'theory-based' studies. In this regard, Burston (2014: 115) confirms that "as revealed by a close examination of implementation studies over the past two decades, MALL has been and remains on the fringes of foreign language instruction". As far as the nature of limitations that MALL studies have been experiencing is concerned, Burston (2014: 115) lists among others, "the number of students and courses involved, the duration of implementations, the language skills targeted, the kinds of learning activities undertaken and the methodological approach used". Similarly, Kukulska-Hulme and Shield (2008:279) found that most of the studies, which have been conducted on the use of MTLL, "concentrate on the delivery of activity types such as quizzes and vocabulary items that the provider believes to be relevant to their students' needs". According to Kukulska-Hulme and Shield (2008:279), there is a need for MALL studies that "empower learners to take control of their own learning", a call that the study being reported in this

dissertation attempted to respond to. Burston (2015:17) motivates the call for such studies as follows:

As more recent and innovative MALL implementations attest, ...it is possible to effectively exploit mobile devices in conformity with learner-centered, constructivist, collaborative methodologies. There is every reason to expect that MALL can make significant contributions to improving language learning, most particularly by increasing time spent on language acquisition out of class, by exploiting mobile multimedia facilities to complete task-based activities, and by using the communication affordances of mobile devices to promote collaborative interaction in the L2.

In order to overcome the limitations and challenges that MALL studies have had in the past, and thus to achieve the successful curricular integration of MTLL within the L2 classroom, Burston (2014: 115-116) calls for studies to exploit MTLL from another perspective, specifically “as part of a learner-centered, constructivist, approach that provides ubiquitous access to learning resources”. It is in this regard that in this section, it has been argued (i) that MTLL can be used to create an adequate language learning environment and to facilitate learner-centred teaching and learning and (ii) that constructivism is a suitable theory to guide enquiries in MALL studies. The current study was designed to implement the use of MTLL in an EFL classroom in conformity with constructivism (cf. Sections 3.3.1 and 3.3.2)⁹. The study set out to contribute to the available literature in the fields of MALL and SLA, but also to formulate some practical recommendations for L2/FL pedagogy (cf. Section 8.5). MTLL use cannot be implemented in a classroom in conformity with constructivism by using a single specific mobile app, since there is no single app that would be convenient for all learners and meet all learners’ SLA needs. For this reason, for the purposes of the current study, a mobile-enhanced constructivist language learning environment, i.e. an environment which specifically allows for the

⁹ The specific ways in which constructivism guided the implementation of this study are discussed in Chapter 4, more specifically in Section 4.6.3.

combinational use of different applications that have been found to be relevant for language learning, was created – these apps are elaborated on in Section 4.6.3.

3.4. Conclusion

Zhang (2009:98) argues that “it is possible for a non-native speaker to possess near native-like proficiency in a foreign language setting if he or she has adequate and effective input, interaction and output”. Bialystok (1981) adds another condition, claiming that native-like L2 proficiency will be attained if learning takes place “in a natural setting, where conveying the message is the only essential goal of the language occasion”. This is, of course, much easier in the case of L2 acquisition, than in the case of FL acquisition, where the TL is not really spoken outside of the classroom. The reason Bialystok (1981:25) emphasises the significance of learning outside the formal L2 classroom, is because this type of classroom setting does not provide learners with independence and full autonomy in the process of knowledge construction. In natural settings outside the formal language classroom, the learner is in control of his/her own language learning and knowledge construction, and thus does have independence and autonomy.

Attaining a high level of proficiency in an L2 or FL – English in this case – becomes possible if the learner “has plenty of time for learning English, adequate exposure... to a wide variety of English [,] both spoken and written, a real need to use English on a daily basis and interaction with more knowledgeable ones” (Zhang 2009: 98-99). In other words, there must be sufficient and rich input, and enough opportunities for output and interaction in EFL. In addition to these, the learner must “not treat ... English as a subject to be learned, but as a means of communication” (Zhang 2009: 99).

The study reported in this dissertation did not set out to improve participants’ EFL proficiency from quite low to near-native speaker level within six weeks, as this would be an unrealistic aim. Instead, the study attempted to create a learning environment in which all four of the requirements set out above are met, so that learners have an optimal chance at increasing their EFL proficiency.

It is in this regard that in addition to discussing language proficiency (cf. Section 2.2), the purpose of Chapter 2 was to elaborate on the requirements which should be met in order for the learners to attain a higher level of EFL proficiency (cf. Section 2.3). For this reason, different SLA theories which focus on the role of input, interaction, output and the learning environment were discussed (cf. Section 2.5). Constructivism was selected as a theoretical framework to guide the current study, specifically because it was found to be the sole meta-theory which takes all four of the above-mentioned requirements into consideration (cf. Sections 2.5.8 and 2.6).

In the current study, before intervention, the formal EFL classroom that the Rwandan participants were attending, did not meet the four requirements for successful SLA (cf. Chapter 5, Section 5.3). As mentioned earlier, Rwanda (cf. Chapter 1) is a de facto monolingual Kinyarwanda-speaking country, i.e. the TL English is not used outside the classroom setting at all, which means that learners rely solely on the formal language classroom for input. The EFL learners are thus not exposed to sufficient and rich EFL input, and they do not get enough opportunities for EFL interaction and output outside the formal classroom setting. In order for the teaching-and-learning process to be successful in a case such as this, Zhang (2009:98) notes another condition - "the learning process should involve native English speakers or at least... English teachers with near native-like fluency, who are competent enough to provide 'scaffolding'". By providing 'scaffolding', such a teacher should exercise different roles such as "recruiting the learner's interest, simplifying the task, highlighting its relevant features, maintaining motivation, controlling the learner's frustration, and modelling" (Zhang 2009:98).

As discussed in Chapter 1 (specifically in Sections 1.1 to 1.3), this requirement for teachers' TL proficiency is almost certainly not met in by far the majority of EFL classrooms in Rwanda, since the majority of Rwandan EFL teachers are native speakers of Kinyarwanda and are not highly proficient in English. In order to address these challenges (which are common in FL acquisition and not limited to the case of Rwanda), this study attempted the integration of MTLL into the formal FL classroom, in a manner that creates a language learning environment

which is optimal according to the constructivist theory. In the next chapter, I discuss the design and methodology of the study.

Chapter 4 : DESIGN AND METHODOLOGY

4.1. Introduction

As discussed in the previous chapters, especially in Sections 1.2 and 1.3, this study was an attempt to introduce the training in and the use of mobile technologies in language learning (MTLL) in conformity with constructivism into the conventional teaching-and-learning process of English as a foreign language (EFL) in Rwanda (cf. Section 3.3). The first two sections of the current chapter discuss, respectively, the research design which was adopted (Section 4.2) and the methodology which was followed (Section 4.3) in the collection and analysis of the current study's data. The other sections focus on the research population and the selected sample groups (Section 4.5), ethical matters (Section 4.4), and the data collection instruments which were used (Section 4.6).

4.2. Research Design

As was explained in Section 3.2.2, the use of MTLL is one of the components of m-learning, which “differs from learning in the classroom or on a desktop computer in its support for education across contexts and life transitions” (Sharples 2009:17). Investigating any such learning is always complex and problematic; it requires the researcher to consider many factors before adopting a given design for their studies. Sharples (2009:17) specifies some common problems with researching m-learning as follows:

The [m-learning] context is not fixed and the activity can span formal and informal settings. There may be no fixed point to locate an observer, the learning may spread across locations and times, there may be no prescribed curriculum or lesson plan, ...and there may be ethical issues concerned with monitoring activity outside the classroom.

In order to avoid these problems, investigating any m-learning component requires the adoption of a research design which expands its scope of inquiry from the formal classroom to the individual learners and learning environment, both in matters of location and time. In terms of theoretical frameworks, as was discussed in Chapter 2, especially in Section 3.3, constructivism is one of the

most relevant theories to guide such m-learning investigations, as it takes into consideration all the factors related to the formal teaching-and-learning process, the individual learners, and the learning environment. In other words, a constructivist approach to teaching-and-learning expands an investigation's scope of inquiry from the formal classroom to the individual learners and learning environment, and thus it meets the requirements for addressing the common m-learning investigation problems mentioned by Sharples (2009).

One research design which is assumed to be relevant to m-learning investigations is the 'case study' model, which is "an intensive study of the background, current status, and environmental interactions of a given social unit: an individual, a group, an institution, or a community" (Brown and Rodgers 2002:21). This model not only meets the requirements for addressing common m-learning investigation problems, but also has the potential to guide an investigation into m-learning topics within a constructivist framework specifically, as it takes into consideration all the factors identified by the constructivist approach to the teaching-and-learning process.

More specifically, where the m-learning involves *language* learning, Brown and Rodgers (2002:21) emphasise that "case studies often involve following the development of the language competence of an individual or small group of individuals". And as was discussed in Section 1.3, the main objective of this study was to investigate the contribution of using MTLL to the development of FL learners' proficiency. Therefore, a case study design was adopted because investigating the process of attaining a certain language proficiency level involves following learners' progress on a regular basis, and analysing the role played by (i) the language learning activities which take place in both the formal and informal learning settings, (ii) the individual language learners' abilities and (iii) the learning environment, during a certain period of time. For the purposes of the current study, different components playing a role in EFL learning, as well as various activities related to using MTLL and other materials for EFL learning purposes, were intensively followed during a five-month period, specifically from 31 January to 30 June 2017, for a group of 60 undergraduate students at the University of Rwanda (UR) who were divided into four sample groups (cf.

Section 4.5). As the case study model suggests, and in conformity with the constructivist approach to SLA, different tools were used to collect data on (i) the EFL learners' background and (ii) the EFL teaching-and-learning process in the formal language classroom and in informal settings, as well as (iii) the learners' EFL proficiency development within the different groups which received different types of training and language input (cf. Section 4.6).

4.3. Research Methodology

Different research methods are used depending on the type of research one needs to conduct, its aims and objectives, and the questions to be answered, as well as the hypotheses that need to be tested. According to Brown and Rodgers (2002:243), "in surveying and navigation [for example], one determines the position of an object by measuring the angles of observation to this object from two points of already known positions". As far as the study being reported in this dissertation is concerned, as discussed in Section 1.3.1, the purpose was to measure the extent to which MTLL training and use can contribute to the EFL learners' proficiency (i.e. an object of which position had to be determined), (i) firstly versus the use of the conventional EFL teaching-and-learning materials and methods (i.e. the first point), and (ii) secondly versus the use of MTLL use without training (i.e. the second point). However, these two positions were not known, and had to be also measured.

According to Corbin and Holt (2005:50), as well as Cohen, Manion and Morrison (2007:142), determining the position of an object in such a context requires the use of the mixed-methods approach, alternatively referred to as 'triangulation'. In linguistics and the social sciences in general, Brown and Rodgers (2002:243) specify that "triangulation refers to the attempt to understand some aspect of human behavior by studying it from more than one standpoint, ...making use of both quantitative and qualitative data in doing so". This is why, for the purposes of the current study, a mixture of qualitative and quantitative methods was adopted for data collection and analysis. On the one hand, quantitative methods were used to collect and analyse data related to the learners' background (cf. Chapter 5), as well as data related to the extent to which MTLL can contribute to the level of UR students' EFL proficiency (cf. Chapter 6). On the other hand,

qualitative methods were used to elicit and analyse data related to the EFL teaching-and-learning process at UR (cf. Chapter 5), as well as data related to the mobile technology users' attitudes towards, and experience with, MTLT (cf. Chapter 7).

Starting with quantitative methods, Lowie and Seton (2013:13) state that these methods involve a scientific inquiry "in which variables are manipulated to test hypotheses and in which there is quantification of data and numerical analyses". Larson-Hall (2010:399) specifies that the "quantitative approach [is] an approach to collecting and analysing data that focuses on collecting measurements that can be represented by numbers". And regarding the importance of adopting quantitative methods in scientific research, Larson-Hall (2010:399) states that the quantitative approach assumes that "there is one objective [and] verifiable truth", an assumption which leads to a research finding that is "often ... reliable because it can be replicated". Quantitative methods were therefore adopted for the collection and analysis of some of the current study's data, in order to obtain data and findings which are verifiable, reliable and replicable.

Regarding qualitative methods, Lowie and Seton (2013:13) explain that these are used for studies "in which the focus is on naturally occurring phenomena and data are primarily recorded in non-numerical form". As mentioned above, qualitative methods had indeed to be used to collect the data on variables such as the learners' attitudes towards and experience with MTLT training and use, a phenomenon which is natural and non-numerical.

Given that quantitative data were used to address the primary aim of this study, it could be argued that the study is quantitative and that the qualitative data simply served to contextualise the study and its results. In this sense, the study could thus be regarded as quantitative, rather than as a proper mixed methods study. However, the collection of qualitative data was not a nice-to-have afterthought in this study, but instead a necessity for the following two reasons. Firstly, the study was couched within a constructivist view of SLA, which considers the learner as the primary and main component of the teaching-and-learning process, and the learners' attitudes towards and experience with the

MTLL training and use was thus not something that could be ignored. In addition to this, there are different approaches – including the most commonly used one, proposed by Sharples (2009) – which guide the implementation of MALL projects, and what they have in common is the emphasis on evaluating any technology-related project by considering the technology users' experiences and attitudes. Consequently, I would argue that the study was indeed a proper mixed-methods study, even though constraints on time and other resources did not allow as in-depth an analysis of the qualitative as the quantitative data.

In terms of the specific instruments, the quantitative data were collected by means of an EFL proficiency test which was administered twice to all the participants, specifically at the beginning and at the end of the experimental period (cf. Section 4.6.2), and by means of a survey which was conducted at the beginning of the experimental period (cf. Section 4.6.1). It is important to note that the same survey was also used to collect some qualitative data, such as the data related to the participants' attitudes towards and motivation to learn EFL, the phenomena which are natural, and which cannot be expressed in a numerical form. Furthermore, observation, a semi-structured interview and a discussion group were used to collect the qualitative data (see Section 4.6.4).

4.4. Ethical Considerations

Considering its aims, objectives and hypotheses (cf. Section 1.3), its design (cf. Section 4.2) and methodology (cf. Section 4.3), as well as the kind of geographical location, population and sample groups (cf. Section 4.5), the execution of the current study did not require conducting any laboratory experiment, or physical or psychological test, nor did it directly or indirectly involve any child or minor. Even though the participants' confidentiality was respected at all times, this research did not need, elicit or use any personal, social or classified information of any kind. However, academic research ethics had to be considered by securing the relevant research affiliation (cf. Appendix B), permit (cf. Appendix C) and ethical clearance (cf. Appendix A) from the responsible institutions before starting the data collection activities, and by signing the informed consent between the researcher and the participants (cf. Appendix D).

Starting with ethical clearance, the current study had to be approved by Stellenbosch University as the institution hosting the researcher, UR as the institution where the data would be collected, and the Ministry of Education in Rwanda as the institution which controls all research activities which take place in the Republic of Rwanda. The first step was to submit the approved research proposal and the data collection instruments to the Research Ethics Committee (REC) at Stellenbosch University, in order to obtain ethical clearance. After receiving the REC's approval (see Appendix A), the application for research affiliation was addressed to UR's College of Education in Rwanda. UR reviewed the application, and forwarded their application review report to the Ministry of Education. After the review at ministerial level, the researcher's affiliation and his contact person at UR were confirmed (see Appendix B), and the permit to collect research data was granted (cf. Appendix C). Both the research affiliation and permit were granted by the Ministry of Education in Rwanda on 31 January 2017. During the first week of February 2017, all the potential participants received detailed information on the study and all volunteers were required to sign an informed consent form (see Appendix D).

4.5. Research Population and Sample Groups

After securing the ethical approval, research affiliation and permit (discussed in Section 4.4 above), the research population and sample size were decided on, based on previous (published) MALL studies, as reviewed by Burston (2014). Starting with the research population, as discussed in Section 1.4, the current study targeted the population located in Sub-Saharan Africa, and more specifically in Rwanda, a population who had not yet been investigated by MALL scholars (cf. Figure 1.3, Burston 2014:110). The current study was geographically located in Rwanda, a country which is essentially monolingual with Kinyarwanda as the sole national and the first official language, spoken by the entire population in everyday communication (cf. Section 1.1). As explained in Section 1.1, English is a FL in Rwanda, which has the status of the second official language of the Republic of Rwanda according to the constitution (Republic of Rwanda 2015), and which is used as a medium of instruction (MoI).

From his review of MALL publications, Burston (2014:103) found that “MALL remains marginal in terms of the number of students” who are recruited to participate in MALL studies. Burston (2014:112) explains that among all published MALL studies, “only 8% of the cohorts consisted of more than 100 participants. Over half involved no more than 25, with well over a third of these groups consisting of no more than ten learners and some as few as four”. In order to fill this gap, for the purposes of this study, a moderate sample size, specifically of 60 participants, was selected from the undergraduate students at UR who were studying at the College of Education in Kigali, and voluntarily participated in this study during a 22-week experimental period, which started on 31 January 2017 and ended on 30 June 2017.

In order to achieve the primary aim of this study (cf. Section 1.3.1), different control and experimental groups (cf. Table 4.1 below), each made of 15 students, were selected purposively from the undergraduate students who were majoring in any subject other than English language, more specifically from the 60 first-year students who were majoring in mathematics and physics. As mentioned above and discussed in Section 1.1, English is used as the MoI in Rwanda, and therefore, all students at UR’s College of Education had to take two compulsory modules of English, namely English communication skills (in their first year) and English for academic purposes (from their second year onward). The following table describes the selected four sample groups, and in each case, it indicates which research objective they were related to.

Objectives	Groups	Subgroups
1. To investigate the effect of using MTLL after having received training in it versus using MTLL without training	A: Students who use mobile devices for language learning	Experimental Group (EG)A1: Students who were trained in using MTLL
		Control Group (CG)A2: Students who were not trained in MTLL, but who made use of mobile devices in language learning
2. To investigate the effect of being trained in and using MTLL versus using the EFL conventional teaching materials and methods	B: Students who do not use mobile devices for language learning	EGB1: Students who were exposed to additional conventional learning materials such as printed books and newspapers, tapes and compact discs (CDs), in addition to the input that they were receiving in the formal language classroom
		CGB2: Students who did not receive any additional input, i.e. students who were exposed only to the language input and learning materials provided in the formal language classroom

Table 4.1: Research sample groups

In matters of purposive selection of sample groups, which is the sampling technique that was used for the purposes of the current study, Cohen, Manion and Morrison (2011:156) state that:

Researchers hand-pick the cases to be included in the sample on the basis of their judgment of their typicality or possession of the particular characteristics being sought. In this way, they build up a sample that is satisfactory to their specific needs.

As was discussed in Section 1.3, the main objective of the current study was to investigate the effect of the use and the non-use of mobile technologies on EFL proficiency. And regarding the use of mobile technologies, the objective extended to their use by L2 learners who were trained in MTLL versus L2 learners who were making use of technologies without MTLL training.

In order to achieve this objective, the factor of use and/or access to mobile technologies was considered in the participants' recruitment process, and was the main factor for assigning each participant to a particular sample group. Further in matters of sampling, the specific purpose for this study was to recruit 30 students who were using and/or had access to mobile technological devices, to be divided into experimental group (EG)A1 and control group (CG)A2, as well as another 30 students who were not using mobile technologies for language learning purposes, to be divided into EGB1 and CGB2 (see Table 4.1 above).

After a seven-week period of being integrated within the UR community and becoming acquainted with the potential participants by attending some of their classes and lecturing them in some courses on behalf of the responsible lecturers, detailed information about the current study was provided to the potential participants (i.e. the total of 119 first year students who were majoring in mathematics and physics), and a call was made for their voluntary participation in the study. The participants' recruitment involved two stages. In the first stage, 30 students who had their own mobile technological devices were recruited, and in the second stage, the recruitment expanded to everyone.

All 60 recruited participants signed the informed consent form (cf. Section 4.4), and were requested to complete a survey (cf. Section 4.6.1). Information that participants provided in the background information section of the survey was used to assign each of them to a particular sample group. More specifically, the EGA1 and the CGA2 were recruited from the participants who confirmed that they owned and used mobile technologies for EFL learning purposes; and the EGB1 and the CGB2 from the then remaining participants including the those who responded either that they did not use mobile technologies for language learning purposes, or that they did not own mobile technological devices (cf. Sections 5.4 and 5.5). The detailed background data collected from the participants are discussed in Chapter 5.

4.6. Data Collection

In addition to the gap in the available MALL literature in terms of sample sizes and geographical locations (discussed in Section 4.5), Burston (2014:103) found

that there is also a gap in terms of “the duration of implementations, the language skills targeted, the kinds of learning activities undertaken and the methodological approach used” in MALL studies. In this regard, Burston (2015:7) specifies the following:

Of the 291 application studies in the MALL database under analysis, only 35 involve projects that report learning outcomes from implementations that lasted at least a month and involved ten or more experimental subjects, the minimal requirements set for the statistical generalizability of the results.

In order to fill these gaps, starting with the gap observed in terms of the language skills investigated by previous MALL studies, the current study investigated the learners’ overall language proficiency whereas the published MALL studies focused on only one language skill or component (cf. Figure 1.2). And as stated in Section 4.5, this study was implemented during a 22-week period, which corresponds to five calendar months. It used methodological triangulation, i.e. “multiple data-gathering procedures” (Brown and Rodgers 2002:244) for data collection, and it took into consideration both conventional and technology-related methods of teaching and learning a foreign language for the purpose of improving the learners’ proficiency.

Data collection was preceded by the preliminary observation of and acquaintance with the participants. The purpose of these preliminary activities was to ensure the researcher’s integration into the research population, and a friendly relationship with the research participants during the entire experimental period. These activities were complemented with a discussion group with the participants (at the end of the experimental period), as well as a semi-structured interview with a university academic, who was also an administrative council member.

In conformity with constructivism, as discussed in Section 3.3.1, the teacher’s task in the teaching-and-learning process is to play “a facilitative role through expert guidance and provision of opportunities for learners to practice and learn knowledge and skills in a supportive and encouraging environment” (Liu et al. 2015:115). It is in this regard that, in addition to elaborating on how this facilitative role was played for all four sample groups, the following sections

discuss the survey methods which were used to collect both qualitative and quantitative data (cf. Section 4.6.1), the proficiency test which was used to collect quantitative data (cf. Section 4.6.2), the MTLT training which was provided to the EGA1 and other materials which were provided to the other sample groups (cf. Section 4.6.3), as well as the observation, discussion group and semi-structured interview methods which were used to collect qualitative data (cf. Section 4.6.4).

4.6.1. Survey

According to Brown and Rodgers (2002:117), surveys can be used by researchers who need “to understand better how things are really operating in ... [any] learning setting, or to describe the abilities, performances, and other characteristics of the learners, teachers, and administrators involved” in the teaching-and-learning process. In the current study, the survey was used to collect data on the participants’ demographics, language background, language learning and use (cf. Section 5.2), and their perception of the availability of conventional EFL learning materials at UR (cf. Section 5.3), as well as their access to and use of mobile technologies (cf. Sections 5.4 and 5.5). As discussed in Section 4.5 above, some of the survey data were used for forming different sample groups (cf. Table 4.1).

Regarding the administration of the surveys, Sue and Ritter (2007:149) recommend the use of online survey methods especially “when dealing with closed populations... and when the target respondents have access to the necessary... technology [tools]”; and this was the case for the current study. The participants in this study were a group of university students, and they had access to computers and mobile devices with internet connection, accessible from either the university campus or outside the university, or both. Therefore, the online survey method was adopted.

The survey (see Appendix F) was made up of 24 questions which were designed to collect qualitative and quantitative data (cf. Section 4.3) on three primary variables which were assumed to have a direct relationship with EFL learning. These variables were (i) the participants’ language background and individual differences (IDs) including English language learning and use, (ii) the

participants' access to mobile technologies, and (iii) the participants' use of MTL.

In the process of complying with research ethics (cf. Section 4.4), the first page of the survey included an introduction to the survey, and an invitation to voluntarily participate in the study. The first page also addressed confidentiality issues which might arise when the collected data are presented. Even though the participants had already signed the informed consent to participate in the study (cf. Appendix D), they could of course again decide whether they still wanted to participate in the study, upon which they could go to the next page (cf. Appendix F).

As discussed in Section 1.2, the objective of the current study was to help the learners to improve their EFL proficiency through the use of modern mobile technologies. However, as discussed in Chapter 2, especially in Section 2.3, there are various factors other than input which can affect learners' L2 proficiency and which need to be taken into account. For this reason, the second page of the survey included 15 questions which were related to the participants' language background and their IDs, as well as to their mobile technological devices. The IDs referred to in the survey included age, gender, prior experience with the English language, attitude towards English language learning, and motivation (cf. Appendix F).

All 60 participants provided answers to these 15 questions of the first section of the survey, which were compulsory and relevant to all the participants (cf. Section 4.5). Some restrictions were placed within the survey so that each participant could see and answer only the questions which were relevant to him/her. More specifically, the answer provided to the last question in each section of the survey was the key to opening either the following section or the survey's final page, on which the participant was thanked for taking the time to complete the survey.

In the first section of the survey, the participants were requested to provide information on their EFL background and IDs, and at the end of the section, the participants had to answer whether or not they had their own mobile technological devices. Participants who had no mobile devices were directed to

the survey's final page, whereas the ones who had their own mobile devices were directed to the second section of the survey. As explained in Section 4.5, the participants who had no mobile technological devices were qualified to participate in this study as members of EGB1 or CGB2 (cf. Table 4.1 in Section 4.5).

The second section of the survey was designed to collect data on the 'access to mobile technologies' variable, and it contained three compulsory questions, which were relevant to participants who mentioned that they had their own mobile technological devices. In this section, the participants were asked to indicate the number of devices which they had and which types of devices they were, as well as some technical details about them, specifically their brands, models and operating systems. In addition to these, the participants were asked about their general use of the devices, and whether or not they used their devices for EFL learning purposes. At the end of this section, the participants who said that they did not use their devices for EFL learning purposes were directed to the survey's final page, whereas those who said that they did use their devices for EFL learning were directed to the third section of the survey. It is important to note again that the members of EGB1 and CGB2 were to be recruited primarily from the participants who did not use their mobile devices for language learning prior to this study's experimental period (cf. Table 4.1).

The third section of the survey was made up of three questions which were designed to collect data related to the participants' use of MTLL, specifically which language learning materials which they used, and how often they used them. At the end of the section, the participants were asked whether they used MTLL outside the classroom, and the participants who said that they did not use MTLL outside the classroom were directed to the survey's final page. The participants who responded that they did use MTLL outside the classroom were directed to the fourth section, where they were asked to provide details about their MTLL use outside the formal language classroom. As discussed in Section 4.5, and illustrated in Table 4.1, only the members of EGA1 and CGA2 were the primary target of these last two sections of the survey.

Concerning the online administration of the survey, Sue and Ritter (2007:149) argue that online surveys “are faster, cheaper, and sometimes more effective than other methods”. The current study used a paid online survey tool called ‘eSurvey Creator’ (accessible online from <https://www.esurveycreator.com/>) because it provides a 100% discount on a business account for students registered at one of the universities which subscribe to the tool (see Appendix E). In order to qualify for this discount, the researcher’s student e-mail was submitted to and verified by eSurvey Creator; thereafter a free business account was immediately activated for conducting online surveys by using this tool.

After activating the researcher’s account, the online survey was built by entering the questionnaire items which had been prepared in text format, into the online tool. Appendix F shows the participants’ view of the complete, active survey with all its response options, and Figure 4.1 below shows the survey administrator’s view of one of the online questionnaire pages with the features which were available for use in the process of questionnaire building.

The screenshot displays the 'Edit survey' interface for a survey titled 'An Investigation into the Effect of MALL on Rwandan University Students' Proficiency in EFL'. The survey is currently 'active'. The survey link is <https://www.esurveycreator.com/s/MTLLinRWA>. The progress bar shows 0% completion. The page is labeled 'Page 1' and contains an invitation text: 'You are kindly invited to take part in my PhD research project, of which the title is provided above, by voluntarily responding to the following questions aiming at collecting the background information about participants, English as a foreign language and the access to mobile technologies. Please note that any information that is obtained in connection with this study and that can be identified with you will remain confidential in all documents that make reference to the information you have supplied.'

Figure 4.1: Survey link and online administration page

After building and verifying the online survey, as well as creating and activating the survey link, all the participants received an invitation to participate with the link to the questionnaire via SMS and WhatsApp messages. The study's survey (<https://www.esurveycreator.com/s/MTLLinRWA/>) was active from 19 April to 25 May 2017, the date on which the 60th participant had fully completed it. Some of the participants completed the survey by using their mobile devices, laptops and computers, and others, who had a problem with access to internet, completed it by using the researcher's laptop and a desktop computer which were always available in the researcher's temporary office at UR during the experimental period. After the completion of the survey by all the participants, the data were downloaded for analysis. The results are presented and discussed in Chapter 5.

4.6.2. English Proficiency Test (EPT)

As discussed in Chapter 2, Section 2.2, there are a number of different standardized English proficiency tests which differ in terms of their purpose, structure, length, cost and the type of language proficiency tested. For the purposes of the current study, the requirements for the English proficiency test were that it should: (i) measure overall EFL proficiency; (ii) be relevant for the participants of this study; (iii) allow for re-testing; (iv) be free of charge to the researcher and the participants (as funding was not available for purchasing a proficiency test); and (v) have an appropriate length. Given these requirements, as was explained in Section 2.2, a thorough review of the available literature about proficiency testing led to the conclusion that the ‘Test of English for International Communication (TOEIC) Listening and Reading’ was the test best suited for the current study.

The reasons for selecting the TOEIC were the following. Firstly, the primary objective of this study was to investigate the effect of MTL training and/or use on the learners’ *overall* L2 proficiency (rather than one specific language skill, such as reading only or listening only). And, as noted in Section 2.2, the TOEIC’s Listening and Reading test is taken as a reliable indication of overall proficiency. Secondly, according to Daller and Phelan (2006:102), the test was specifically designed to measure English learners’ and users’ proficiency level as something “that enables them to adequately perform their jobs”. This view of proficiency is particularly relevant in the case of the current study, since its focus was on the type of proficiency that would allow EFL learners to function effectively in their academic careers at an English-medium university and later in their professional careers. Thirdly, the TOEIC allows for re-testing. As discussed in Section 4.3, the current study used triangulation methods, not only through the use of qualitative and quantitative methods for data collection and analysis, but also through re-testing, which involves the triangulation of time (cf. Brown and Rodgers 2002:244). Recall from Section 2.2 that the TOEIC is indeed suited for such time triangulation, since any improvement at re-testing is highly unlikely to result from memory effects and can instead be regarded as an improvement in proficiency.

Regarding its structure, according to Daller and Phelan (2006:102), “the TOEIC® has two equally weighted parts, listening and reading. ...There is a total of two hundred multiple-choice questions”. In terms of test administration, “the listening lasts forty-five minutes and the reading one hour fifteen minutes” (Daller and Phelan 2006:102), i.e. the whole TOEIC test lasts two hours. In matters of scoring, Daller and Phelan (2006:102) specify that the TOEIC marking report shows the “three scores, one for reading, one for listening and a combined total which ranges from 10 to 990”. In order to address the research questions of this study (cf. Section 1.3.2), these scores were indeed needed in order to determine the contribution of MTLT not only on the overall English language proficiency, but also on different types of proficiency. Recall that the research question in this regard was formulated as follows: What is the extent and the nature of the contribution of MTLT to the FL learners’ proficiency?

However, there are mainly two reasons why the TOEIC test itself was not used for the current study, and why its structure and other information available on the website (<https://www.ets.org/toeic>) were instead used to develop an alternative test. Firstly, regarding requirement (iv) above, the Educational Testing Service is the organization which holds the copyright for the TOEIC. The organization’s website does not provide access to all the test items because they “are used in multiple test administrations” (Educational Testing Service 2015:5). When someone wants to take the TOEIC, they have to register on the website and the ETS will then arrange for them to take the test. The cost for one person to take the test differs from one test center to the next, but is advertised at around \$85 (USD) for the USA and around €113 (Euros) for Europe (cf. for example the Exam English and Global Exam websites, which are respectively <https://www.examenglish.com/TOEIC> and <https://www.global-exam.com/en/blog/toeic>)¹⁰. It would not have been possible for the researcher

¹⁰ These amounts are not exorbitant – they are, in fact, in line with what it costs to take other similar tests. According to the Global Exam website, the advertised tariff is €183 for taking the TOEFL and €200 for taking the IELTS.

to pay this amount for 60 participants, each taking the test twice, and the participants could also not be requested to pay for themselves.

Secondly, regarding requirement (v) above, about the length of the test, it is important to note again that “the TOEIC test is a two-hour multiple-choice test that consists of 200 questions divided into two sections, [namely a] listening section... [and a] reading section” (Educational Testing Service 2015:2). The listening section, which tests the examinee’s ability to understand the spoken language, lasts 45 minutes, and the reading section, which tests the examinee’s ability to understand the written language, lasts 75 minutes. Both sections of the test carry the same weight in terms of the number of questions and the total score. The Educational Testing Service (2015:2) specifies that the TOEIC test format includes 100 items, which range from photographs to talks in the listening section, and 100 items, which involve incomplete sentences, text completion and reading texts, in the reading section. Having to complete a test that has 200 items and that takes two hours to complete could create discomfort and/or inconvenience for the participants who had to complete the test twice (as a pre-test and as a post-test), and also who had to complete the survey (cf. Section 4.6.1). In addition, the participants had to participate in a discussion group, and some of them had to attend the MTL training as well (cf. Sections 4.6.3 and 4.6.4). It was, therefore, decided not to use the TOEIC itself, but to use its structure and format, instructions and example items to guide the researcher in preparing a shorter English proficiency test (EPT) for the current study. The items and guidelines which were used (details are provided below), are publicly available on the Educational Testing Service’s website (<https://www.ets.org/toeic>)¹¹.

The EPT has 50 test items and has to be completed in a maximum of one hour (see Appendix G). The structure and format of the EPT are (almost) identical to

¹¹ It should be made clear though, that the EPT designed for this study, is not endorsed by the Educational Testing Service.

those of the standard TOEIC Listening and Reading test. The EPT has two sections, namely a listening section and a reading section. The listening section was made up of two subsections, the first one involved the description of photographs, and the second one involved an audio-recorded piece (i.e. the talk in the terms of TOEIC Listening and reading). Regarding the photograph subsection, nine of the ten photographs were original images captured by the researcher at different locations. Only one photograph was downloaded from Wikimedia Commons (an open source website accessible on the link: <https://www.commons.wikimedia.org/>). The downloaded material is specifically the photograph (provided below) of the Stellenbosch University landscape viewed from one of its faculty buildings (photograph N° 5 in Appendix G). The audio statements on all the 10 photographs involved short sentences (cf. Appendix J), and were prepared and recorded by the researcher himself. In administering the EPT, the participants heard one statement for each photograph, and had to circle either “True” or “False”, to indicate whether the statement was true or false in the context of the photograph. It is important to note that all the photographs were printed on the test paper without any caption. An example photograph is provided in Figure 4.2 below. The statement which participants heard for this photograph was “most of the cars are packed on the street” (cf. Appendix J).



Figure 4.2: Stellenbosch University landscape

In contrast to the photograph subsection which involves listening to a short sentence about each of the photographs, the second subsection of the EPT involves a moderately long piece of talk which the test takers have to listen to, and complete the related task afterwards. It is in this regard that the audio piece which was used in the administered EPT, was selected from another source, even though the researcher (an English NNS) was able to prepare and record his own. An audio-recording entitled ‘Future of English’ (cf. Appendix J for its transcript) was downloaded from an open source website which provides reliable English language proficiency (self-)testing instruments. More specifically, it was downloaded from <https://www.learnenglish.britishcouncil.org/>, the website of one of the British Council’s English language teaching-and-learning divisions known as ‘LearnEnglish Professionals’. In this section, participants listened to the audio-recording and then had to respond to 15 statements, circling either “True” or “False” in each case to indicate whether the statement was true or false in the context of the audio-recording (cf. Appendix J). Similarly to the TOEIC Listening and Reading procedures, it is important to note that the statements were printed on the EPT paper, and that the audio-recorded piece was played only once to the test takers.

The reading section of the EPT was composed of three subsections which respectively involved sentence completion, text completion, and reading comprehension. All of the sentences, texts and tasks which were used in this section were downloaded from reliable online sources of English proficiency testing tools. The sentences in the sentence completion subsection, and the text in the text completion subsection were downloaded from <https://www.examenglish.com/>, a website which provides samples of different standard language proficiency tests. These samples are available to examiners and examinees for the purpose of preparation. The sentence completion subsection contains 10 sentences, each with one blank space and four response options to choose from. An example is provided in the textbox below.

- | |
|--|
| <p>1. The manager of the group was a brilliant man _____ only weakness was that he hated to accept defeat.</p> <p>A. <i>whose</i>
B. <i>who</i>
C. <i>whom</i>
D. <i>who's</i></p> |
|--|

The text completion subsection contains one short text with five blank spaces, each with four options to choose from. One of the sentences is provided as an example in the textbox below.

- | |
|--|
| <p>I am happy to announce that the planning _____ (1) have been granted by the council...</p> <p>A. <i>times</i>
B. <i>acceptance</i>
C. <i>access</i>
D. <i>permissions</i></p> |
|--|

The text in the reading comprehension subsection, together with the related comprehension questions, were downloaded from <https://www.ets.org/>, the official website of the Educational Testing Service, which provides sample test items which can be used by anyone, since the actual TOEIC test items are copyright-protected as discussed above. The text consists of four paragraphs and is followed by 10 comprehension questions (cf. Appendix G). An example of such a comprehension question is given in textbox below.

1. The passage primarily discusses the pipeline's _____
- A. *operating costs*
 - B. *employees*
 - C. *consumers*
 - D. *construction*

In terms of test marking, all examinees' scores on the TOEIC are determined by the number of correct responses, but these raw scores are then converted to scaled scores, ranging from 10 to 990. The procedure for converting raw scores to scaled scores involves a statistical procedure referred to as "equating" and requires "a unique raw-score-scaled-score conversion table" (Educational Testing Service 2015:4). Table 4.2 below illustrates the TOEIC proficiency level classification and its equivalence on the Council of Europe (2001) language proficiency classification, which is the most commonly used model for categorising proficiency levels, as discussed in Section 2.2.

TOEIC Scaled Score	Percentage Equivalence	Proficiency Level	Council of Europe (2001)
10 – 250	0 – 25%	Basic proficiency	A1
255 – 400	26 – 40%	Elementary proficiency	A2
405 – 600	41 – 60%	Elementary proficiency plus	B1
605 – 780	61 – 78%	Limited working proficiency	B2
785 – 900	79 – 90%	Working proficiency plus	C1
905 – 990	91 – 100%	International professional proficiency	C2

Table 4.2: TOEIC and Council of Europe (2001) proficiency classification models

The Educational Testing Service (2015:4) states that the test marking forms as well as the test grades' conversion table are not released to the public because they are "reused multiple times in different areas of the world" (i.e. for the same reason that test questions and key answers are not released to the public). Fortunately, this study was interested in a time-group effect on learners' EFL proficiency, and this could be deduced from the participants' raw scores on the EPT. In addition, this study was not primarily interested in identifying and ranking the individual participants' EFL proficiency levels; proficiency level data were used to compare the participants' sample groups, not individuals (cf. Section 6.5). The participants' raw scores (for listening, for reading and for the two sections taken together, i.e. their total scores) were statistically analysed per

sample group by using the analysis of variance (ANOVA) test. The results of this analysis are presented and discussed in Chapter 6.

4.6.3. Training and Learning Materials

Recall that the current study attempted to integrate the use of MTLT into the formal EFL classroom, in a way that is guided by the constructivist approach to second language acquisition (SLA). According to constructivism, “the goal of instruction is to accurately portray tasks, not to define the structure of learning required to achieve a task” (Ertmer and Newby 2013:57). It follows that the role of a teacher in the teaching-and-learning process, which is (i) to make it clear to the learners what they need to do / what the task at hand is, instead of showing them how to do it; and (ii) to specify to the learners what the learning objective is, instead of showing them how it should be achieved.

As discussed in Section 4.5, the participants of this study were divided into four sample groups (cf. Table 4.1) who received different types of EFL learning materials, with the purpose of quantitatively investigating the extent to which different sources of language input can contribute to EFL learners’ proficiency (cf. Section 1.3).

All the language learning materials were selected and provided to the participants with reference to the constructivist view that the materials’ “content [does not have to be] ...pre-specified; [instead,] information from many sources is essential” for successful language acquisition (Ertmer and Newby 2013:58). The following subsections elaborate on the specific EFL learning materials which were provided to each of the sample groups, and how they were used during the experimental period. All the participants, regardless of the sample group they belonged to, were also required to attend all their formal EFL classes, and to make use of the materials which were provided by their English teacher in addition to those provided by the researcher.

From a constructivist view, in addition to providing learning materials to the language learners, i.e. the participants as far as this study is concerned, there are two specific tasks that the language materials’ designer or administrator must complete, namely, “(1) to instruct the student on how to construct meaning, as

well as how to effectively monitor, evaluate, and update those constructions; and (2) to align and design experiences for the learner so that authentic, relevant contexts can be experienced” (Ertmer and Newby 2013:59). The way in which the researcher completed these tasks for each sample group is also discussed in the following subsections.

4.6.3.1. Experimental Group (EG)A1: Training and Use of MTLL

As discussed in Section 4.5, the EGA1 members received formal MTLL training from the researcher, and made use of MTLL in EFL learning during the experimental period. They were the key sample group for the current study, in that they had to be compared with each of the other three sample groups.

As discussed in previous chapters, especially in Chapter 2, Sections 3.2 and 3.3, the use of MTLL was found to have the potential to contribute to the development of learners’ general language skills and proficiency, even though “it does not in itself provide a panacea to enable successful language learning for any learners” (Jones 2013:25). This is mainly due to the fact that all language “learners are not necessarily as competent in using the range of functionality mobile devices offer as the so-called ‘digital natives’ concept... may suggest” (Stockwell and Hubbard 2013:4). The term “digital natives’ was coined by Prensky (2001), and it is used to refer to the generation of modern technologies’ users who were born during the digital technology and internet era which started in the early 1980s (Uwizeyimana 2018).

Apart from some learners’ lack of sufficient competence in using all the functionalities of mobile technological devices, Stockwell and Hubbard (2013:4) argue that the “knowledge of how to use mobile devices for specific personal or social functions is not always a good indicator of knowledge of *educational* functions” (own emphasis). This is the reason why the use of MTLL should always be combined with expert guidance of and assistance to the users. A comparison between the data from EGA1 and CGA2 will serve to verify this perspective (cf. Chapter 6).

Returning to the above-mentioned concept of ‘digital natives’, nowadays, “language teachers and researchers using both established and emerging

technological applications appear to assume that their students already have the knowledge and skills needed to turn these to their best use in language learning” (Hubbard 2013:163). This assumption is made on the basis of the ‘digital nativeness’ qualification which is attributed to the current generation of students. There is no doubt that the majority of these students are digital natives in terms of using modern technologies for various purposes. However, as far as the use of these technologies for educational purposes is concerned, “learners need both initial scaffolding and in many cases ongoing guidance to thrive in this new learning environment” (Hubbard 2013:163). In this regard, the MTLL training was designed for the EGA1 members with the following objectives:

- To introduce the participants to the concept of ‘technology for language learning’ with the focus on ‘mobile-assisted language learning (MALL)’,
- To introduce the participants to using mobile technologies in language learning (MTLL), and more specifically using mobile apps for EFL learning,
- To equip the participants with sufficient knowledge and skills to find and install mobile apps, and to use MTLL for EFL learning purposes, and thus
- To reinforce the concept of ‘mobility’ in the language teaching-and-learning process, while creating and sustaining the language learners’ autonomy within the process.

At the beginning of the training, all the members of EGA1 received the training hand-out which contained four sections, namely (i) an introduction, which highlighted the objectives of the training listed above, (ii) a section titled ‘technology for language learning’, which discussed the concepts of ‘technology for language learning’, ‘computer-assisted language learning’, ‘mobile-assisted language learning’, and ‘the use of MTLL for EFL learning purposes’, (iii) a conclusion, and (iv) a bibliography.

The background of the participants and the geographical location of the study were considered in selecting the content of the second section, which was the key component of the training. Recall that this study was conducted in Rwanda and that the participants were recruited from the university students who were majoring in mathematics and physics, i.e. who might not have a lot of knowledge

of or insight into language acquisition concepts and issues. For this reason, the training hand-out contained a lot of information on the use of technology in language learning, ranging from an introduction to its history and the definition of key concepts, to the practical skills required for using MTLL.

More specifically, the historical evolution of using technology in the language teaching-and-learning process, was highlighted to the EGA1 members, starting from the traditional audio-visual equipment in the early 1950s (Abbott 2013; Alotaibi, Alamer and Al-Khalifa 2015), throughout the time of the PLATO project in the 1960s (Park and Slater 2014), to the rise of modern computers and language computer labs in the 1970s (Alotaibi, Alamer and Al-Khalifa 2015) (cf. Section 3.2). The participants learned about the genealogy of the key terms from the birth of ‘computer-assisted language learning (CALL)’ in the 1980s (Alotaibi, Alamer & Al-Khalifa 2015), the emergence of Internet and modern computer labs in the early 1990s (Alotaibi, Alamer & Al-Khalifa 2015), the rise of mobile devices such as PDAs, and the birth of ‘mobile-assisted language learning (MALL)’ in 1994 (Burston 2014), to the current use of ‘mobile technologies in language learning – MTLL’.

The differences between CALL and MALL (cf. Sections 3.2.1 and 3.2.2) and their affordances for teaching and learning were discussed, and the challenges associated with using different types of technologies in language learning (as well as possible solutions for these challenges) were discussed in the context of Rwanda. The potential of the constructivist approach to guide the integration of MTLL in the L2/FL classroom was discussed (cf. Section 3.3.2); and the training was thus narrowed to MALL, the component of technology for language learning which was found to have the potential to “improve access to education and [promote] learning that is learner-centered, personalized, collaborative, situated, and ubiquitous” (Chen 2013:20), a kind of learning which does not seem to be easily implemented in EFL classrooms in Rwanda (cf. Section 1.2).

Next, the participants were trained in the practical use of MTLL for EFL learning purposes. It is important to note that over a three-week period, all the EGA1 members received five sessions of the formal MTLL training, which were lasting two hours each session. During this period, the researcher was meeting all the

members in one of the lecture rooms at UR on Monday and Thursday for the formal training, which was provided in addition to the regular support and guidance which were provided per individual participant request (these are elaborated on further below). At the beginning, they were trained in the basic skills of finding, installing and updating EFL learning apps on their mobile devices from different app stores. All the procedures which were applicable to Google Play (on Android devices), App Store (on Apple iOS devices) and Microsoft Store (on Windows devices) were illustrated, practised and applied during the experimental period. Following a thorough literature search on English language learning apps which have the potential to support SLA (cf. Section 3.3.2), the training focused on the use of the following apps according to the constructivist approach (cf. Section 5.5 for apps which the participants had already been using):

- i. 'Grammar Up', 'Practice English Grammar', and 'English Grammar Book' as English general language and grammar apps;
- ii. 'Oxford', 'Dictionary.com' and 'Merriam-Webster' as electronic dictionaries (Hazaea and Alzubi 2016);
- iii. 'Evernote' as a note taking and sharing app (Kukulska-Hulme, Norris and Donohue 2015);
- iv. 'TuneIn', 'YouTube' and 'iTunes' for podcasting (Kukulska-Hulme and Shield 2008), and using mobile internet browsers and apps to access 'massive online open courses (MOOCs), online English learning content and podcasts from different providers such as the British Council's 'Learn English' and the British Broadcasting Corporation's 'BBC Learning English';
- v. 'iTranslate', 'Google Voice Typing' and 'Google Translate' as automatic speech recognition (ASR) and translation apps (Liakin, Cardoso and Liakina 2015);
- vi. Camera and voice recording apps for self-recording, self-listening and multimedia sharing (Alotaibi, Alamer and Al-Khalifa 2015);
- vii. 'Facebook' and 'Twitter' as social networks and microblogs, as well as 'Skype' (Kukulska-Hulme and Shield 2008) and 'WhatsApp'

- (Kukulska-Hulme, Norris and Donohue 2015; Hazaea and Alzubi 2016; Stockwell and Hubbard 2013) as instant messengers;
- viii. Lang-8, English Café, iTalki, English Club, and Polyglotclub as social network sites for language learning (SNSLLs) (Liu, Abe, Cao, Liu, Ok, Park, Parrish and Sardegna 2015);
 - ix. Search engines and eBook reader apps such as ‘Kindle’ for Android devices, and ‘iBooks’ for Apple iOS devices.

The participants were encouraged to extend the list by installing and using any other apps which they might find useful for EFL learning. Hubbard (2013:164) defines the language learners’ training in the use of technology as the “process aimed at the construction of a knowledge and skill base that enables language learners to use technology more efficiently and effectively in support of language learning objectives than they would in the absence of such training”. Instead of becoming a channel for pre-determined language course content delivery, Hubbard (2013:164) states that “learner training can be narrowly defined for a specific application as part of a given course or more broadly defined in the context of aiding the development of independence”, something which matches the constructivist approach to SLA. In other words, the language learners’ training can be considered only as a template or an illustration of technology use, in order to leave the learners with room for the individualized and extended application of technology in their learning activities. However, in order to ensure that training leads to the effective use of technologies, such training should be complemented by practical activities which have to be completed by the trainees in the presence of the trainer.

Ertmer and Newby (2013:57) state that “one does not learn to use a set of tools simply by following a list of rules. Appropriate and effective use comes from engaging the learner in the actual use of the tools in real-world situations”. Furthermore, as discussed in Section 4.6.3 above, “the goal of instruction [from a constructivist perspective] is to accurately portray tasks” (Ertmer and Newby 2013:57). It is in this regard that for the purposes of the current study, Park and Slater’s (2014:111) “typology of potential task types and target tasks” was adopted and supplemented with examples of apps to be used for each language

skill and task (cf. Table 4.3 below). With guidance and support from the researcher, these apps were installed and used by the EGA1 members during this study's experimental period.

Language skills	Task types	Target tasks	Specific mobile apps to complete the tasks
Reading	Locating information from TL online sources	Define words using an online dictionary; Read online course materials specific information; Search for specific content in an online newspaper; Search for specific content on a website; Search for specific content online; Find a content source to use in writing assignment	General language and grammar apps; Electronic dictionaries; eBook readers; internet browsers and search engines; Social networks and blogs; SNSLLs; MOOCs
Speaking and listening	Using the devices to make voice and video calls	Call friends; Call classmates and relay content from class; Call for reservation (e.g., hospital, restaurant); Make an appointment; Call faculty to ask for information; Order from a restaurant	Normal telephone voice and video calls; Instant messengers
	Using a dictation / video app	Summarize your thoughts orally for later transcribing; Record your voice to compare pronunciation; Create a video-recording of a short presentation	ASR apps; Note taking apps; Camera; Voice recording apps
Listening	Gathering information from the TL online sources	Listen to a lecture and text key info to classmate; Listen to the news and call classmate to talk; Listen to podcasts and text / call classmate; Watch videos and text key info to classmate	Normal telephone voice and video calls, SMS and MMS; Instant messengers; internet browsers and search engines; MOOCs and podcasting apps
Writing	Taking notes from an online	Fill in graphics to take notes;	Note taking apps

	source	Take notes without graphic assistance	
	Sending e-mails and messages	Write formal e-mail (to faculty, etc.); Write informal e-mail (to friends, etc.); Chat with classmates about the course; Use online sources to outline a paper; Use app functions for remembering and taking notes; Take a picture and send it with an e-mail	Normal telephone SMS and MMS; internet browsers and e-mail apps; Social networks and instant messengers; SNSLLs and search engines; Camera; Note taking apps
	Posting written contents online	Post on social networking sites; Submit assignments on the course website; Reply to classmates' comments on the course website	Internet browsers; SNSLLs; Social networks and blogging apps

**Table 4.3: Typology of potential task types, target tasks and MTLT
(adapted from Park and Slater 2014:111)**

Regarding technology training and use, from a constructivist view, Hubbard (2013:175) states that “it is not just the technology that matters, nor is it just how teachers use that technology that matters. What really matters is how learners use it”. The learners have to be independent and autonomous in using MTLT, but of course “teachers, researchers, and developers can – and should – provide significantly more guidance in how to use it well” (Hubbard 2013:175). This is why during the entire experimental period, in addition to providing the formal MTLT training with the purpose of enabling the learners to use MTLT to complete the TL learning tasks illustrated in Table 4.3 above, the researcher continued to encourage, monitor and guide the EGA1 members to use MTLT for EFL learning purposes.

As a way of continuously monitoring and guiding the learners, a WhatsApp group, in which only interaction in English was permitted, was created by the researcher, and all the EGA1 members were added. In this WhatsApp group, the participants were allowed to talk about any topic, to record, share and provide

comments on each other's multimedia files, and to talk about how they were using MTLL in general, including their progress with using MTLL, and their discovery of new apps, as well as challenges which they were facing. The researcher was in the group as an observing member, and played a modulator role, to encourage all the members to participate, and of course to provide assistance and guidance on solving problems which seemed to be too difficult to be sorted out by only the participants. Because of confidentiality and ethical issues, the conversations which took place in the WhatsApp group were not recorded as research data, and at the end of the experimental period, all the group members were removed, and the group was deleted by the researcher.

Finally, concerning the use of MTLL after the training, given that the research was guided by the constructivist approach to SLA, the EGA1 members were required to use MTLL on their own, and to seek help and assistance primarily from the worldwide online community and their peers, instead of relying on the assistance and help of the researcher. Below are a few screenshots which illustrate some of the EFL learning apps which were downloaded and used by the members of EGA1.

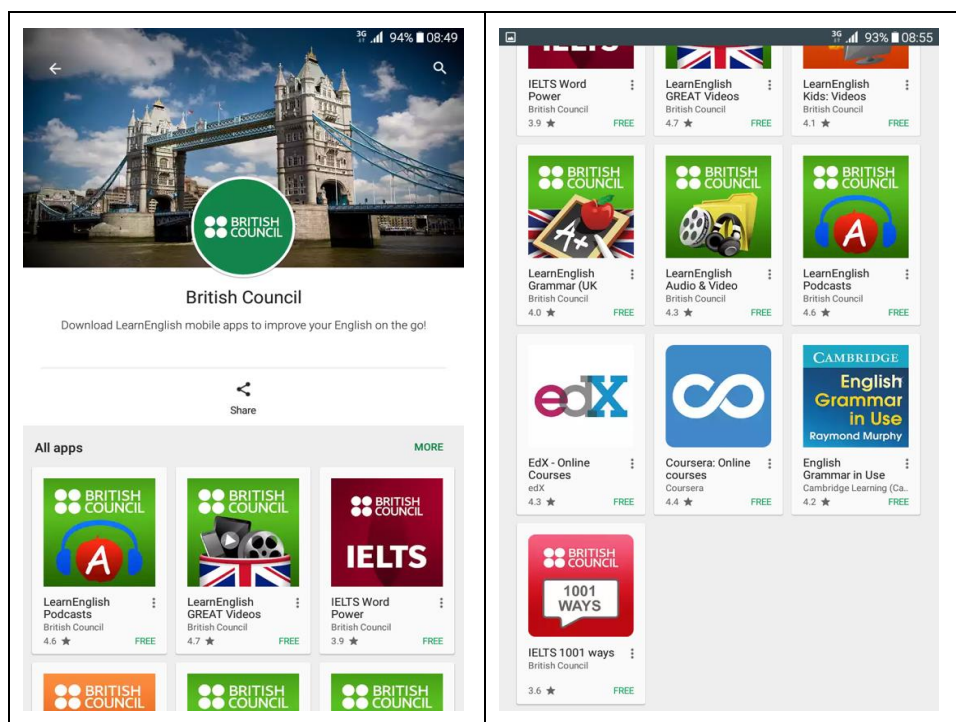


Figure 4.3: Some EFL apps in mobile app store

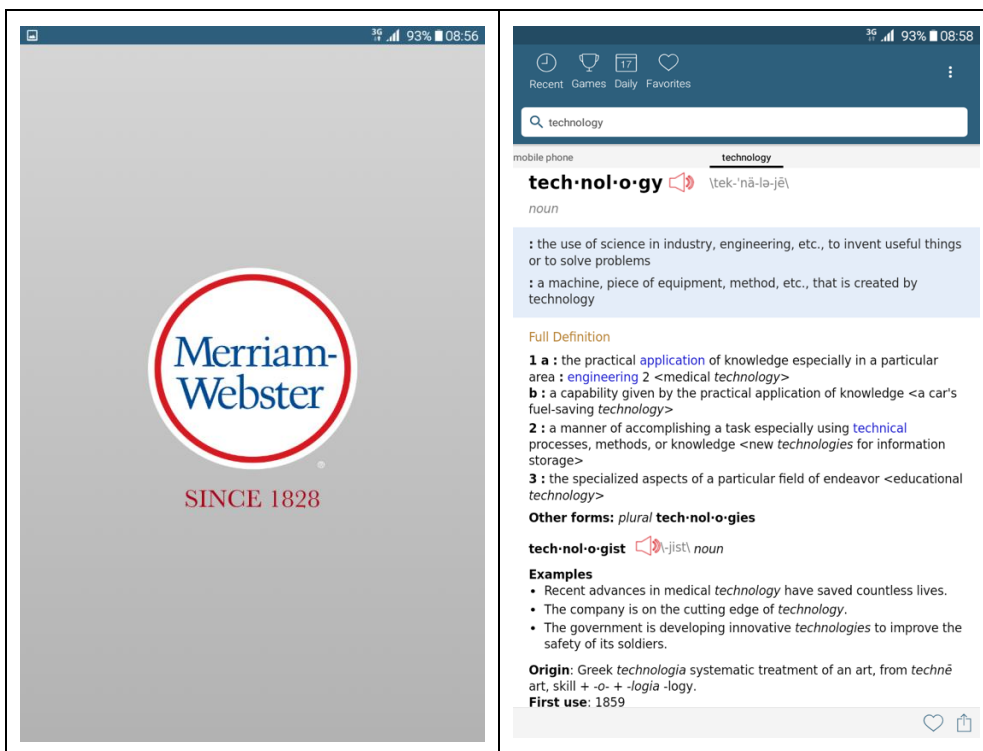


Figure 4.4: Merriam-Webster mobile offline dictionary

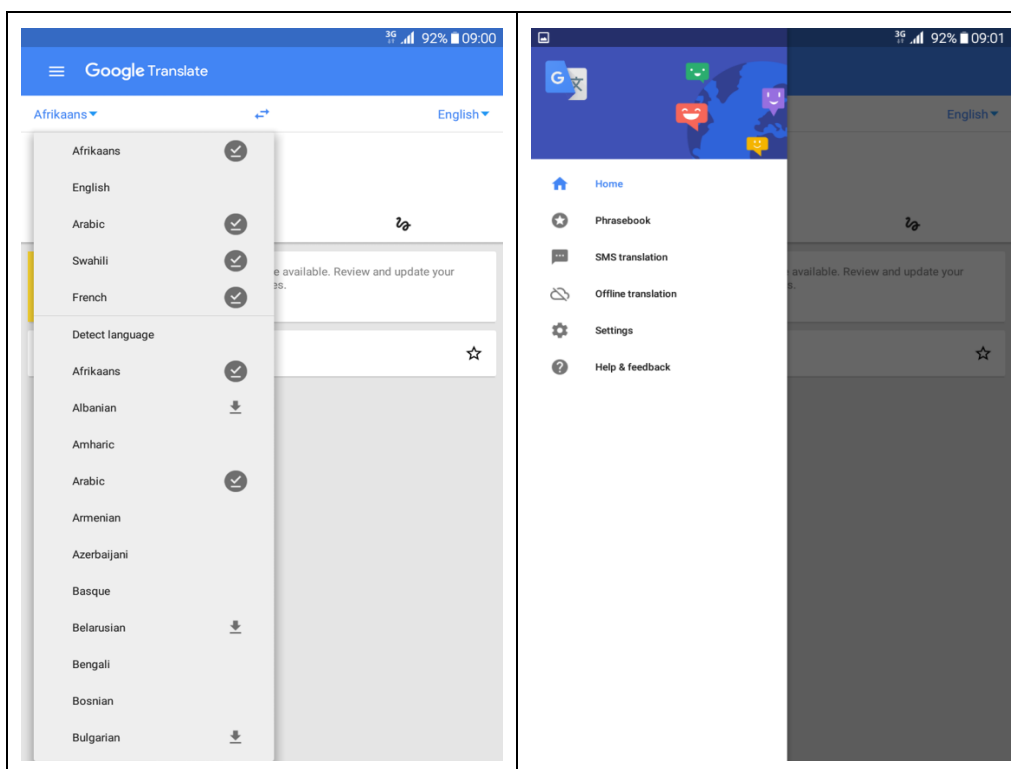


Figure 4.5: Google's mobile offline translator

4.6.3.2. Control Group (CG)A2: Use of MTLL without Training

CGA2 was composed of 15 students who used their mobile technological devices for EFL learning, but without being trained in this (cf. Section 4.5). The members of this group were recruited from the students who had mentioned that they had their own mobile technological devices, and that they had already been using them in EFL learning.

Even though they did not receive formal MTLL training like the previous group EGA1 (cf. Section 4.6.3.1 above), the researcher provided them with a list of useful apps for language learning (the same list as the one provided to EGA1), as well as technical support and guidance, but only in terms of how they could install and run these apps on their devices. This created an opportunity for having frequent meetings with individual group members, which helped the researcher to (i) monitor the group members' use of MTLL on a regular basis, (ii) solve any problem which could arise on the participants' side during the experimental period, and (iii) make sure that this sample group was indeed using MTLL.

All mobile apps which were selected to be used by EGA1 for the purpose of the current study (as discussed in Section 4.6.3.1), were also suggested to the members of CGA2; but as was mentioned in the above paragraph, the latter did not receive any formal training on using them, except some individual guidance and support which the researcher provided on individual members' request, and only in order to ensure that the experimental activities were running smoothly. The researcher tried to ensure that the CGA2 members were using almost the same apps as the EGA1 members in order to increase the comparability of these two groups (so that the most important variable would be MTLL training versus no MTLL training). Recall that in conformity with constructivism, "the goal of instruction is [only] to accurately portray tasks" (Ertmer and Newby 2013:57). It is in this regard that for both the EGA1 and the CGA2, the objective of the researcher was to ensure that every member had installed and used at least one app from each of the app categories which had been selected to complete the language learning tasks (cf. Table 4.3 above).

4.6.3.3. *Experimental Group (EG)B1: Use of Additional Conventional Materials*

As illustrated in Table 4.1, EGB1 was not made up of participants who received any MTLL training, or any other kind of support in using mobile technologies for EFL learning purposes. Instead, it was primarily made up of participants who had stated either that they did not have their own mobile devices, or that they were not using their mobile devices in language learning (cf. Sections 4.5 and 4.6.1). These participants were provided with additional conventional language learning materials to supplement the language input which they were receiving from their formal language classroom.

As explained in Section 4.6.2, this study used the EPT to measure the extent to which the participants' proficiency in English had improved, depending on the type of language input which they were receiving (MTLL versus conventional learning materials), and the learning environment from which they were receiving this input (mobile-enhanced sources versus conventional materials). Because the primary purpose of the EPT was to measure changes in the learners' general EFL proficiency, as mentioned above, the EGB1 members were provided with additional conventional materials which might help them to improve their general proficiency in English. This inclusion of material which might help learners in the EGB1 to improve their EFL proficiency stacked the odds against the hypothesis that the study set out to test, namely that MTLL use and/or training has a positive effect on learners' EFL proficiency (cf. Section 1.3.3). This means that if evidence is found that the hypothesis is true, this evidence would be even stronger and the argument for the hypothesis even more convincing. Among other materials, printed copies of a Rwandan daily English newspaper entitled "The New Times" were provided to the participants in order to help them with their reading skills. Participants were also provided with compact discs (CDs) and audio tapes to help them with English grammar, vocabulary and general knowledge, as well as with listening, speaking, reading and writing skills. Fifteen copies of each of the four books in the series "The new Cambridge English course" (Swan and Walter 1990a, 1990b, 1992, 1993) were borrowed from the library. These books focus on general aspects of the English language, including grammar, vocabulary and language skills, and each of them was accompanied by

either three audio tapes or three CDs for the listening and speaking practical activities referred to in the books. A total of 60 books and 180 audio tapes and CDs were available for use by the EGB1 members during the six-week period between the pre-test and the post-test. These members were required to collect the materials which they needed from the researcher's office at any time that was convenient for them, to exploit the materials, to return them and to then collect other materials which they had not yet exploited. In this process, the researcher's role was to encourage the participants to keep on using all these different types of additional EFL learning materials as a means to improve their EFL proficiency.

4.6.3.4. Control Group (CG)B2: Use of Formal Language Classroom Materials Alone

As mentioned in Section 4.5, CGB2 was made up of 15 participants who did not receive any additional EFL input whatsoever from the researcher. Specifically, they were not trained in using MTL (unlike EGA1), and according to the information they had provided, they were not using their mobile devices for language learning purposes (unlike CGA2). Furthermore, they did not receive any additional EFL learning materials from the researcher (unlike EGB1). The members of this group were only relying on the input provided in the formal EFL classroom as a means of improving their EFL proficiency.

To ensure that this group members were not treated unfairly, i.e. were not abandoned or neglected outside the classroom, they were also assisted, guided and monitored by the researcher. They were not trained in MTL or provided with any additional language learning materials, but the researcher did provide them with regular guidance and advice on exploiting the EFL input from the formal language classroom and the university library. They were also encouraged to exploit the affordances offered by the technology infrastructures provided by the university (such as using the free wi-fi internet connection on campus and the computers available in the university labs), and by their learning environment in general (such as the free wi-fi internet connection available on buses and in public spaces in Kigali). In other words, the researcher was always at these participants' service, and encouraging them to do their best with what

they had at their disposal in order to improve their proficiency in English. They were, for example, reminded that English is one of the official languages of Rwanda, and one of the most dominant international languages. Again, the idea was to stack the odds against the hypothesis that MTLT use and/or training would have a greater effect on learners' EFL proficiency than the use of only the input provided by the EFL classroom.

In addition to what has been mentioned in the last four subsections (i.e. 4.6.3.1 to 4.6.3.4), as mentioned in Section 4.5, it is important to note again that the researcher also attended the participants' English classes during the entire experimental period, and sometimes lectured there (on behalf of the responsible lecturer). These were the classes being attended by all of the participants in the study (i.e. by all four sample groups). This was done to offer additional encouragement to the participants to attend all formal EFL classroom sessions.

4.6.4. Observation, Discussion Group and Semi-Structured Interview

Ellis (2003: 63-64) states the following:

Constructivist views of language acquisition hold that simple learning mechanisms... while exposed to language data in a communicatively rich human social environment navigated by an organism eager to exploit the functionality of language are sufficient to drive the emergence of complex language representations.

The observation, discussion group and semi-structured interview methods were used to collect data on the role of mobile technologies in creating a favourable environment in which an EFL learner can receive sufficient and rich EFL input, and thus become able to learn through interactions with EFL speakers, interactions with English NSs and proficient NNSs, i.e. what Ellis refers to (above) as "a communicatively rich human social environment". Specifically, these methods were used to collect qualitative data on variables ranging from the EFL learning environment, and the EFL learners' experience with and attitudes towards EFL learning tools including MTLT, to the EFL teaching-and-learning process, and challenges and difficulties related to language learning at UR in Rwanda.

The researcher started with observation of the conventional EFL teaching-and-learning materials and technology-related facilities available for the students at UR's College of Education in Kigali. Whereas the survey was used to gather background information on the participants (cf. Section 4.6.1), observation was used to collect background information on the learning environment.

Table 4.4 below illustrates the variables that were investigated through observation, and the specific activities which were carried out by the researcher in the process of collecting the related data.

<i>Variables</i>	<i>Researcher's activities</i>
i. Conventional EFL learning materials	The researcher observed and took notes on the conventional EFL teaching-and-learning materials available for use by university students and lecturers inside the language classroom, in the library and on campus in general.
ii. Access to technology and infrastructures	The researcher observed and took notes on the infrastructure and technological devices available on campus, for use by university students and lecturers in the course of the EFL teaching-and-learning process.

Table 4.4: Observation protocol

In addition to the observation method which was used to collect data on the EFL learning environment, the discussion group was used to collect data regarding both the environment and the participants' experience with and attitudes towards the use of MTLL. The discussion group was conducted with all 60 participants (cf. Section 4.5) at once¹², at the end of the experimental period, specifically immediately after administering the EFL proficiency (EPT) post-test

¹² The ideal would, of course, have been to have focus group discussions with the participants in much smaller groups (such as six groups of ten participants each) instead of one larger discussion group, but time did not allow for this.

(cf. Section 4.6.2)¹³. The researcher modulated the discussion by asking questions and introducing topics, and recorded students' statements by taking notes¹⁴.

The discussion was guided by Sharples' approach to technology evaluation, which suggests that in the process of evaluating the use of technology, the focus should be on its users' attitudes towards its "usability (will it work?), effectiveness (is it enhancing learning?) and satisfaction (is it liked?)" (Sharples 2009:22). The discussion group was used to qualitatively investigate Sharples' three variables together with another variable, namely the participants' experience with MTLL training and/or use. Appendix H illustrates the protocol which guided the discussion. The questions fell into nine categories, namely MTLL usability, MTLL effectiveness, MTLL user satisfaction, participants' experience with MTLL, MTLL and language learning environment, MTLL and learner autonomy, MTLL and the availability of data, quality of MTLL input, and MTLL and learners' interactions with English speakers.

As discussed in Section 4.3, this study used triangulation methods of data collection and analysis, methods which involve using multiple sources of information. Brown and Rodgers (2002:244) state that "using multiple sources of information, usually people with different roles, helps you to understand and moderate the natural biases of those people". They specify that "in language course / program evaluation [for example], you might use students, teachers, and administrators" (Brown and Rodgers 2002:244).

¹³ As mentioned in Section 2.2, it is important to note again that the EPT pre-test was administered on Friday, 19 May 2017, and the post-test on Friday, 30 June 2017, the date on which the discussion group was conducted with the participants.

¹⁴ It would have been ideal to audio record the discussion, and this will most certainly be done in future research. The specific ways in which this discussion was conducted and recorded for the purposes of the current study are discussed in Chapter 7.

The use of multiple sources of information is also recommended in mobile learning studies because they “may involve a variety of personal, institutional and public technologies” (Sharples 2009:17). It is in this regard that a semi-structured interview (cf. Appendix I) was conducted with one of the university staff members, who was simultaneously serving as a lecturer of English, and as a member of the university administrative council (cf. Section 5.3 for more details). This interview was conducted in order to investigate the EFL teaching-and-learning process at UR, and the EFL learning materials and technology infrastructure available to students, and to obtain data for the MTLLE evaluation from an additional perspective. Note taking and audio-recording were used to capture the interview which was conducted in English. The interview was then transcribed by the researcher.

The data collected by each of the data collection instruments discussed in Section 4.6 are discussed in the following three chapters.

Chapter 5 : BACKGROUND INFORMATION ON PARTICIPANTS – INDIVIDUAL DIFFERENCES, LEARNING ENVIRONMENT AND USE OF MOBILE TECHNOLOGIES

5.1. Introduction

As explained in Chapter 4, the current study collected both qualitative and quantitative data by using different instruments. At the beginning of the study's experimental period, as discussed in Sections 4.5 and 4.6, the background data on the participants were collected by using a survey which was administered to 60 undergraduate students at the University of Rwanda (UR). In addition to the survey (cf. Appendix F), observation (cf. Table 4.4) and a semi-structured interview (cf. Appendix I) were also used to obtain background information on the learning environment of the participants. In the following sections, the variables which were investigated, are grouped into four main categories, namely participants' language background and individual differences (cf. Section 5.2), the EFL teaching-and-learning process (cf. Section 5.3), access to mobile technologies (cf. Section 5.4), and the use of MTLL (cf. Section 5.5). Finally, the participants' scores on the English proficiency test (EPT) prior to the experimental period are analysed in order to determine whether the participants and sample groups were comparable in terms of their EFL proficiency, regardless of their background and individual differences, at the beginning of the experimental period (cf. Section 5.6).

5.2. Language Background and Individual Differences

This study attempted to integrate training in and the use of MTLL into the formal language classroom in conformity with constructivism, with the purpose of determining whether this might help learners to improve their EFL proficiency. As discussed in Chapter 2, especially in Section 2.3, there are different factors which affect L2 learners' proficiency, and these include learners' language background and individual differences (IDs). Focusing on the participants' IDs,

the survey data on their age, gender (cf. Section 5.2.1), motivation, and attitudes towards EFL learning (cf. Section 5.2.2) are presented below. In terms of their language background, the survey data on their current language use, and their L1, as well as their prior and current experience with EFL, are presented in Sections 5.2.3 and 5.2.4 below.

5.2.1. Individual Differences: Age and Gender

In the survey, the participants were requested to specify their gender (cf. Question 3 in Appendix F). Their responses showed that among the 60 first-year mathematics-and-physics students who participated in this study, 35 (58.3%) were male, and 25 (41.7%) were female.

In terms of their age (cf. Question 2 in Appendix F), the participants ranged from 19 to 28 years, and the majority were 23 and younger. Specifically, 43 (71.66%) of the participants were 23 and younger, whereas only 17 (28.34%) were 24 and older, including only one participant who was 27 and another who was 28.

5.2.2. Individual Differences: Motivation and Attitude

In collecting the data on the participants' motivation to learn English and to increase their proficiency in this language, the participants were asked to rate their motivation by selecting one of five responses, namely 'I am not motivated at all', 'I am a little motivated', 'I am motivated', 'I am very motivated', or 'I am highly motivated' (cf. Question 11 in Appendix F).

The participants' responses showed that in general, they seemed to have a relatively high level of motivation to learn EFL and to increase their proficiency in it. The majority of participants, 39 (65% of the cohort), were 'highly motivated', 13 (21.7%) were 'very motivated', and the remaining eight (13.3%) were 'motivated'. No participant reported being only "a little motivated" or "not motivated at all".

Regarding the reasons why the participants experienced such a high level of motivation to learn EFL and to increase their proficiency in it (cf. Question 12 in Appendix F), the survey showed that this was because English is one of the official languages of Rwanda, and the sole medium of instruction (MoI) at UR.

The participants specified that they were highly motivated to learn English and to increase their proficiency level in this language because it would help them to succeed in their university studies, and because being proficient in English would help them to find good jobs and to be professionally successful at the end of their studies. Focusing on the role of English as MoI in Rwanda, the participants who were planning to work in the education sector after completing their studies, mentioned that they expressed such high levels of motivation to learn EFL because it was the language that they would need at work, i.e. to secure a teaching job in Rwanda.

Other reasons which were mentioned by participants include the fact that English is considered to be an international language, a global language, a global lingua franca, the language of science and technology, as well as the language of international business and communication. It was found that some participants considered English as a tool which would help them to find and qualify for international opportunities, specifically international jobs and scholarships for studying abroad – some mentioned that they would like to stay, work or study specifically in an English-speaking country, and that knowing English would help them in these endeavours, because it is the most spoken language in the world. Finally, a few participants linked their high level of motivation to their positive attitudes towards the English language. This was expressed by using statements such as ‘I am motivated to learn EFL because I like/love it’ in their responses.

The next ID targeted by the survey was the learners’ attitudes towards EFL learning. The participants were asked to rate their attitudes towards EFL learning by selecting one of five statements, namely ‘I hate EFL learning’, ‘I don’t like EFL learning’, ‘I like EFL learning’, ‘I really like EFL learning’, and ‘I love EFL learning’ (cf. Question 13 in Appendix F). All 60 participants reported positive attitudes towards EFL learning.

The majority of the participants, 45 (75%), responded that they loved EFL learning, i.e. they really had a positive attitude towards EFL learning. Only five participants (8.3%) chose the ‘I like EFL learning’ option, and the remaining 10 participants (16.7%) chose the option ‘I really like EFL learning’. No participant

chose one of the last two options, which were 'I hate EFL learning' and 'I don't like EFL learning'.

The reasons which the participants provided for their relatively positive attitudes towards EFL learning (cf. Question 14 in Appendix F) match the ones that they provided for their high level of motivation to learn EFL and to increase their proficiency in it. As was the case for motivation, the factors which were referred to most frequently included the advantages linked to being proficient in English (cf. Sections 1.1 and 1.2). Some participants specified that their positive attitude towards EFL learning was due to English being a useful subject, a valuable tool which at the time helped them to perform well in their university studies, and which would help them later in their professional lives after the completion of their university studies. Other participants expressed positive attitudes towards EFL learning because English is the most spoken language in the world, and the most dominant language in the fields of information, communication, science and technology. Another factor which was found to influence the participants' attitudes towards EFL learning is related to the teaching methods which were being used in their formal EFL classroom. They reported that the EFL class was always motivating, entertaining and interactive, and thus it was making English an easy subject to learn.

5.2.3. Language Background: First Language and General Language Use

In terms of the participants' language background, data related to their L1, as well as their everyday current use of, and previous experience with the English language, were collected. This information was collected in order to better understand the Rwandan linguistic situation, which forms the background to this study.

As was discussed in Sections 1.1 and 1.2 of this dissertation, Rwanda is a de facto monolingual Kinyarwanda-speaking country. But in matters of language policy, Rwanda has Kinyarwanda, English and French as its three official languages, as well as Swahili as the official language of the East African Community (EAC) which is a six-country association of which Rwanda is a member. Since the current study was interested in university students who learn English as a

foreign language (EFL) in a Kinyarwanda-speaking country characterized by relatively recent language policy changes (cf. Section 1.1), all the participants were asked to state their L1 (cf. Question 4 in Appendix F).

Among the 60 participants, only five (8.3%) said that their L1 was English, whereas the remaining 55 (91.7%) responded that Kinyarwanda was their L1. After specifying their L1, the participants had to specify the language which they used most frequently in their everyday life (cf. Question 5 in Appendix F). Importantly, all of the participants, including the five participants who had mentioned English as their L1, answered that Kinyarwanda was the language that they used most frequently in their everyday life, and the participants' EPT pre-test scores were also highly comparable (cf. Section 5.6 and Chapter 6) – the five participants who had reported their L1 to be English were not outliers on the EPT pre-test, as one would have expected them to be if they were native speakers of the language¹⁵.

As discussed in Section 1.3, the current study was interested in investigating the effect that the use of MTLL could have on the EFL learners' proficiency, more specifically by comparing the participants' scores in the EPT pre-test to their scores in the EPT post-test. The differences among the participants in terms of their language background and IDs would have been investigated further as secondary variables, *if* there had been significant differences between participants' scores in the EPT pre-test, and specifically between the five participants who stated that English was their L1, on the one hand, and the 55 participants who stated that Kinyarwanda was their L1, on the other hand (cf. Section 5.6). However, as mentioned above, the participants' EPT pre-scores were highly comparable. Note that this study's findings about the participants'

¹⁵ Note that this does not (necessarily) mean that these five participants were being untruthful when they said that English was their "first language". It might be that they simply had a different understanding of "first language" than the one denoted by the term in SLA research and in this study.

everyday, general language use matches what previous studies found in terms of language use in Rwanda (cf. Section 1.1).

5.2.4. Language Background: English as the Focus of this Study

After having obtained some information on the participants' general language background, the focus was shifted to English. The participants were asked to provide detailed information about the period of time during which they had been exposed to English, the contexts in which they had received their first significant exposure to English, and with whom and how often they used English in different environments.

Starting with their length of exposure to English, the participants were requested to specify the number of years during which they had been studying and/or using English (cf. Question 6 in Appendix F). The participants' length of exposure to English ranged from four to 24 years (cf. Figure 5.1 below). For the majority of the participants (46 of the 60, corresponding to 76.6% of the total participants), the period of exposure fell within the range of nine to 12 years. Given that these participants were recruited from first year university students, this nine-to-12-year length of exposure to English could be interpreted with reference to the linguistic background of Rwanda and its language policy changes, as discussed in Section 1.1.

More specifically, even though the participants were not requested to provide more details in this regard, it can be assumed that these 46 participants had been exposed to English since 2008 when the Rwandan government implemented the English-as-sole-MoI policy. Some schools had already been using English as MoI before 2008, and some had a curriculum with English as a compulsory subject for all learners. For the remaining 14 participants, the length of exposure to English was reported to be either less than nine years or more than 12 years. Among these, as illustrated in Figure 5.1 below, two participants (corresponding to 3.3% of the total participants) mentioned that they had been using/studying English for 20 years, only one participant (corresponding to 1.7%) for 24 years, four participants (6.7%) for eight years, another four participants (6.7%) for seven years, two participants (3.3%) for six years, and only one participant

(1.7%) for four years. As was the case for the other language background differences and IDs, this variable – length of exposure to English – was not the focus of the current study, and its effect on the learners' EPT scores was thus not investigated further.

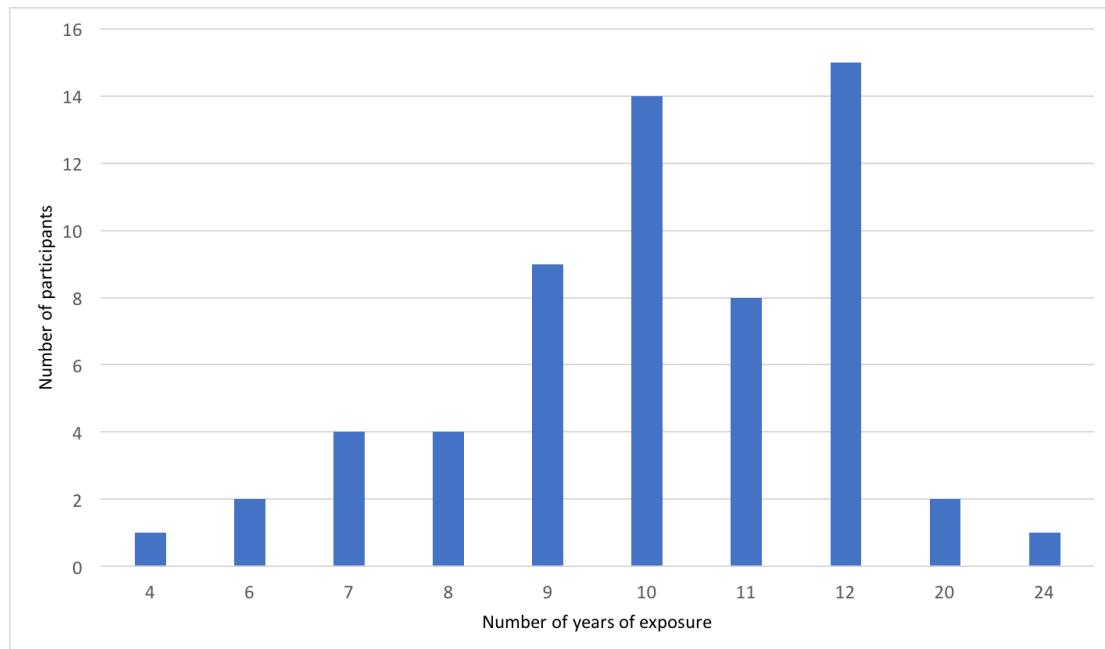


Figure 5.1: Length of exposure to English

Next, the participants were requested to specify the contexts in which they had received their first significant exposure to English (cf. Question 7 in Appendix F). In response to this question, only three participants reported that they had received their first significant English input from their homes and family members. Among the remaining 57 participants, 56 (93.3%) reported that they had received their first significant English input at school, and only one participant (1.7%) reported having received his/her first significant English input abroad, in an English-speaking country. Focusing on this participant who received his/her first significant English input abroad, it would have been ideal to know what his/her circumstances were, where he/she was born, when he/she went abroad and where, and when he/she returned to or came to Rwanda. However, as discussed in Section 4.4, such private information was not collected from the participants, and this specific information was not the focus of the study.

Next, the participants were given four types of environment, namely (i) physical environment outside the classroom, (ii) online, offline and on-air environment on mobile technological devices, i.e. digital or electronic environment, (iii) physical environment inside the EFL classroom, and (iv) physical environment inside other classrooms at university. They were requested to specify their English interlocutors in each environment by selecting the relevant options, i.e. they were allowed to select as many options as they wanted to for each environment: ‘English native speakers’, ‘friends’, ‘classmates’, ‘parents’, ‘siblings’ and ‘new people’ (cf. Question 8 in Appendix F). The data on the participants’ English language use are presented in Table 5.1 below.

	English native speakers		Friends		Classmates		Parents		Siblings		New people	
	n	%	n	%	n	%	n	%	n	%	n	%
Outside the classroom (physical environment)	24	40.0	21	35.0	18	30.0	5	8.3	6	10.0	35	58.3
Mobile device (online, offline and on-air environment)	50	83.3	57	95.0	45	75.0	11	18.3	14	23.3	49	81.7
Inside the EFL classroom (physical environment)	5	8.3	9	15.0	58	96.7	<u>3</u> ¹⁶	<u>5.0</u>	<u>4</u>	<u>6.7</u>	3	5.0
Inside other classrooms at university (physical environment)	3	5.0	10	16.7	57	95.0	<u>2</u>	<u>3.3</u>	<u>3</u>	<u>5.0</u>	4	6.7

Table 5.1: English interlocutors in different settings

In general, as Table 5.1 shows, most of the participants reported to speak English with their classmates inside the EFL classroom (96.7%) and inside other classrooms at university (95%). The reason for this is most likely the fact that

¹⁶ The underlined numbers are the cases in which participants noted that they speak English to their parents and/or siblings in university classrooms, something which is not possible except if their parents and/or siblings are either their classmates or their teachers. Otherwise, these numbers may indicate that the concerned participants most probably did not understand exactly how to complete this table in the survey, or they did not understand the questions/content of the table completely.

English is the MoI, and thus students have to speak English with their teachers during formal lectures, and probably get into the habit of also speaking English amongst themselves.

Regarding the use of English in environments outside the classroom, the highest percentage is 95%, the percentage of participants who reported to use English with their friends on mobile devices, and the lowest percentage is 8.3%, the percentage of participants who reported to use English outside their university classrooms with their parents. As discussed in Chapter 3, especially in Section 3.2.3, language learners show greater enthusiasm to increase the use of the TL on their mobile devices than in other environments because, compared to the physical environment, mobile devices create a more personalized, motivating, interactive and collaborative learning environment (Stockwell and Liu 2015; Naismith and Corlett 2006). Such environments also “reduce shy students’ anxiety by offering them some degree of privacy and assuring their anonymity” (Alotaibi, Alamer and Al-Khalifa 2015:1308).

After providing details about people with whom they used English, the participants were requested to specify how often they used English in the same four environments (cf. Question 9 in Appendix F). They were requested to select, for each environment, one of the following five options: using English (i) ‘most of the time’, (ii) ‘a lot of the time’, (iii) ‘some of the time’, (iv) ‘almost none of the time’, or (v) ‘none of the time’. The data are presented in Table 5.2 below.

	Most of the time (1)		A lot of the time (2)		Some of the time (3)		Almost none of the time (4)		None of the time (5)	
	n	%	n	%	n	%	n	%	n	%
The formal English language classroom	7	11.7	11	18.3	37	61.7	5	8.3	-	-
Other classrooms at university	5	8.3	4	6.7	22	36.7	29	48.3	-	-
Outside the classroom, face-to-face	-	-	5	8.3	15	25.0	32	53.3	8	13.3
Outside the classroom with your mobile device	19	31.7	20	33.3	21	35.0	-	-	-	-

Table 5.2: Frequency of English use in different environments

As can be seen in Table 5.2 above, no participant reported that he/she used English ‘most of the time’ outside the classroom in the physical environment,

whereas 19 participants (31.7%) did report using English ‘most of the time’ outside the classroom on their mobile devices. Focusing on the electronic or digital environment, 20 participants (33.3%) reported that they used English on mobile devices ‘a lot of the time’, and the remaining 21 (35%) reported doing this ‘some of the time’. There was no participant who reported that he/she used English ‘almost none of the time’ or ‘none of the time’ on mobile devices. This finding confirms that the participants did indeed interact with their friends in English on their mobile devices, as reported in Table 5.1.

In addition to the use of English on mobile devices, which seemed to surpass the use of English in other environments, 37 participants (61.7%) reported that they used English ‘some of the time’, 11 participants (18.3%) ‘a lot of the time’, and seven participants (11.7%) ‘most of the time’ inside the formal EFL classroom. As far as the use of English inside the other classrooms is concerned, 22 participants (36.7%) reported that they used English ‘some of the time’, four participants (6.7%) ‘a lot of the time’, and five participants (8.3%) ‘most of the time’. Only five participants (8.3%) mentioned that they used English ‘almost none of the time’ inside the EFL classroom, compared to 29 participants (48.3%) who reported that they used English ‘almost none of the time’ inside other classrooms. In the physical environment outside the classroom, eight participants (13.3) reported that they used English ‘none of the time’, 32 participants (53.3%) ‘almost none of the time’, 15 participants (25%) ‘some of the time’, five participants (8.3%) ‘a lot of the time’, and no participant reported using English ‘most of the time’ in this environment. The following section describes the EFL teaching-and-learning process at UR, the university where the current study was conducted.

5.3. Teaching and Learning EFL at UR

In this section, the EFL teaching-and-learning methods at UR and the EFL learning materials which were available to learners at UR’s (Kigali) College of Education, are discussed as some of the factors which might have had an effect on the participants’ proficiency in EFL, since they had already spent a semester on campus before this study’s experimental period and this is also where they were during the experimental period. By using the survey method, the

participants provided details about the available EFL teaching-and-learning materials, and these data were triangulated through observation (cf. Section 4.6.4) and a semi-structured interview with a university staff member (cf. Appendix I). In addition to the available teaching-and-learning materials, data regarding the methods of EFL teaching-and-learning, as well as the challenges and difficulties faced by UR in this regard were also collected.

Starting with the EFL teaching-and-learning materials, observation was done both inside and outside the classrooms on campus, and the observed materials were grouped into two categories, namely (i) MTLL and (ii) the conventional materials, which include different printed materials such as books, journals, etc., as well as desktop computers and other non-mobile technologies. Table 5.3 below lists the EFL teaching-and-learning materials observed to be available. The table also includes some comments with regard to MTLL use.

Location		Conventional materials	MTLL and/or comments
Inside the classroom		Whiteboard, wi-fi internet connection	The teaching-and-learning process is not technologically enhanced. Different types of mobile technological devices which are owned by students and lecturers were observed in the classroom setting, but their use is considered as a distraction during the lecture sessions, and as a way of cheating during assessment sessions.
Outside the classroom on campus	Computer labs	Desktop computers connected by the internet local area network (LAN)	Each computer in the lab is equipped with the basic peripherals, namely a wired keyboard and mouse. Lecturers can book the computer lab for their students when there is a need, but no language lecturer booked or used the lab during this study's experimental period.
	Gardens and open yards	Wi-fi internet connection	Some students were seen in the gardens and open yards on campus, using their laptop computers and mobile technological devices connected to the available free internet connection.

	Lecturers' offices	Printed materials, and desktop computers connected by internet LAN	The observed lecturers had different types of mobile technological devices which they were using for communication purposes. And they had computers and printed materials to use in their academic work.
	Library	Printed materials, compact discs (CDs), tapes/audio cassettes, desktop computers connected by internet LAN, and free wi-fi internet connection	Students were observed borrowing and returning the printed books. Most of the students were observed in the library's reading area using the printed materials, and a few students using their own laptop computers connected to the available wi-fi internet connection.
	Students' restaurant	-	Students were observed using their mobile technological devices for communication purposes.

Table 5.3: EFL teaching-and-learning materials at UR, College of Education

After observing the EFL teaching-and-learning materials available on campus, a question on the survey was used to determine whether students were aware of the availability of these materials. If students are not aware of certain materials, it follows logically that they do not use them either. Having observed that most of the teaching-and-learning materials available on campus were located in the university's library (cf. Table 5.3 above), the participants were requested to specify the types of English language learning materials which were available at the library (cf. Question 10 in Appendix F).

Starting with the conventional materials, all the participants answered that printed EFL books were available from their university library, whereas only six participants (10%) answered that computers were available. Given that 54 participants (90%) were not even aware of the availability of computers in their library, it can safely be deduced that these students preferred using printed learning materials such as books, which they were familiar with, and which do not require additional skills. This is unsurprising given that only 2.5% of the total Rwandan population had access to computers (cf. Section 1.1).

Regarding other conventional EFL learning materials, starting with the printed materials, 60% of the participants were aware of the availability of newspapers, whereas 43.3% were aware of the availability of journals. In addition to these printed materials, 55% of the participants were aware of the availability of CDs, whereas 53.3% were aware of the availability of tapes.

Regarding the use of MTLL, both the survey and observation found that there were no mobile technological devices available for use at UR, except the lecturers' and students' own devices, which were observed as not really used inside the classroom during lectures or assessment, even though some students mentioned that they did (cf. Section 5.5). During the semi-structured interview with a university staff member (cf. Section 4.6.4), it was found that the university was distributing laptop computers to all registered first-year students. UR would probably consider the laptop computers as mobile technologies simply because they are portable. However, the affordances which laptops provide to their users are almost the same as those provided by desktop computers (cf. Section 3.2.1), and the level of computer literacy which is required to operate a laptop computer is much the same as that required for a desktop computer. For this reason, laptop computers used for language learning do not fall under MTLL (cf. Sections 3.2.2); instead, for the purposes of the current study, they fall under conventional materials (together with desktop computers).

Additional information regarding the teaching-and-learning materials, and the teaching methodology, was obtained during the semi-structured interview that was conducted with a male university staff member, who was at the academic rank of associate professor, who had been working at the same university since the early 2000s, and whose work during this time had included teaching in, and during a certain period of time chairing, the Department of Languages and Linguistics, as well as the Faculty of Education.

According to this interviewee, the university students had access to the conventional language learning materials which were available from the university library, including printed books and academic journals. In addition to these conventional materials, the interviewee specified that by making use of the free internet connection available on campus, as well as the laptop computers

which were provided by the university, students could find electronic materials for EFL learning from online sources. The interviewee described the methodology of EFL teaching and learning at UR as a “transition from... chalk-and-talk methodology” to technology-enhanced methodology; and therefore, “both students and academic staff... need[ed] ...trainings ...in using technologies”¹⁷.

According to the interviewee, such transition is a difficult journey, not only “on the side of [EFL] lecturers, but also on the side of students”, mainly due to the fact that neither the students nor the lecturers are familiar with using the new technological tools, especially mobile devices and electronic materials, in the formal teaching-and-learning process. In addition to these challenges, the interviewee added that such journey has to take the users’ attitudes into consideration. In this regard, it is important to note that even though the students showed positive attitudes towards MTLL (cf. Section 7.2), the interviewee noted that there were lecturers who expressed negative attitudes towards, and thus resistance to, the integration of modern technologies into the formal teaching-and-learning process at UR.

Focusing on EFL teaching and learning, the interview revealed a number of challenges which were faced by both the lecturers and students. The first challenge was the “lack of up-to-date materials”. UR did not have an electronic library, and thus the lecturers relied on using the old printed materials available from the university’s physical library. The second challenge was the large number of students per classroom. For example, there were 119 students in first year mathematics and physics, and these students sometimes had to be taught in combination with students from other classes, for the subjects they had in

¹⁷ In the rest of this subsection, quotation marks indicate the interviewee’s direct words. These are provided verbatim – no errors (grammatical or otherwise) have thus been corrected. Square brackets are used to indicate insertions by the researcher.

common, such as English and education modules¹⁸. According to the interviewee, this made student-lecturer interactions, as well as the active participation of students in the teaching-and-learning process, virtually impossible.

As far as the teaching-and-learning process of different EFL skills is concerned, the above-mentioned challenges explain the reason why listening and speaking skills were being taught by playing audio cassettes to the large number of students in the classroom, who were supposed to listen to the cassettes and then practise the language through responding to the related comprehension questions which were asked by their lecturer. Reading and writing skills were meant to be acquired by means of group assignments, since the lecturer could not really have sufficient time to mark all the assignments if students did them individually. Focusing on reading and writing skills, it was found that the lecturer provided the students (divided into groups of around 10 members) with different printed reading materials that they had to read and understand, then summarize in writing and submit to the lecturer, who marked it.

The third challenge that EFL learners was facing is the lack of a natural environment in which English had to be used. University students in Rwanda were not in general exposed to NS English input; they had to rely on the EFL input which they were receiving in the formal classroom, and they could not get enough opportunity for EFL output outside the classroom. In addition to this, the interviewee mentioned that the quality of the language input which the students were receiving in the classroom was not high as some lecturers were not proficient in the target language, and that for this reason, they were using “the kind of a mixture of Kinyarwanda and English”.

¹⁸ The researcher got the information regarding this specific class size since this study’s participants were recruited from this class, and sometimes during the experimental period, the researcher was lecturing this class on behalf of the responsible lecturer (cf. Section 4.5).

The last challenge that the interviewee mentioned is the lack of a reading culture among the university students. The interviewee stated that “when it comes to reading, even in [Kinyarwanda as the] ...mother-tongue”, students “have not developed the culture of reading”. He noted that UR’s College of Education had collaborated with the Government of Rwanda, in running a project with the aim “to build this culture of reading among not only the university students, but also among the Rwandan population in general”. Focusing on university students, the interviewee specified that it was very rare “to find students [in the library] reading books [since they only] ...read [the class] notes when exams are near”. And according to the interviewee, this lack of a reading culture does not affect reading proficiency only; it has a negative effect on other types of language proficiency, as well, since you cannot listen to and understand the L2/FL discourse “when you have not acquired sufficient number of grammatical rules, syntax, ...[and] vocabulary [in that language]”.

All the challenges referred to above have a negative effect on assessment practices as well. According to the interviewee, all the courses taught at UR were being assessed by means of “continuous assessment tests”, which had to be administered by lecturers at different intervals during the course of teaching, and “final examinations”, of which the administration had to be coordinated at the faculty level, and which had to take place at the end of the academic semester.

From the semi-structured interview data, it was found that due to the challenges discussed above, not all the required EFL knowledge could be taught to and/or constructed by the language learners at UR, and thus not all the different types of proficiencies could be attained by the learners either. This becomes a vicious cycle when the assessment is considered as part of the teaching-and-learning process: L2/FL knowledge and different types of L2/FL proficiencies cannot be assessed if they were not taught to and/or constructed by the learners. According to the interviewee, the problem in this regard has thus become that the EFL assessments at UR was mainly focusing on general language knowledge, as well as on reading and writing proficiencies only. Due to the challenges discussed above, it was very difficult to assess the learners’ listening and

speaking proficiencies. The assessment, similarly to the teaching-and-learning process, was paper-based and was mainly focusing on grammar, vocabulary, reading comprehension, and essay writing.

By integrating the use of mobile technologies in language learning (MTLL) into the formal language classroom, it was hoped that the above-mentioned problems could be addressed, and that the EFL teaching and learning, as well as the assessment processes could then be carried out more adequately. According to the interviewee, both the language learners and language lecturers at UR had their own modern mobile technological devices, but they were not exploiting the affordances which these devices could provide in matters of education in general, and in language teaching and learning in particular.

In terms of language education in Rwanda, according to the interviewee, there was a hope that if mobile devices were well exploited, they would make a significant contribution to the teaching-and-learning process of “not only English, but also any other foreign and second language, by creating [a favourable] environment in which the [target] language is used, and [in which] the language learners are exposed to the [TL input from its] ...NSs”. Focusing on English, there was a hope that the use of MTLL would help the language learners to develop their EFL proficiency since they would not be relying solely on the input that they were receiving in the formal language classroom, which, according to the interviewee, was characterized by a great deal of “interference of Kinyarwanda, French and other languages” that were spoken by both the language learners and the lecturers.

5.4. Access to Mobile Technology

For the purposes of this study, the concept of ‘access to mobile technology’ was narrowed down to include only individually owned device(s). Devices which were not owned by the user, such as university-owned devices (not found at UR), devices borrowed from friends, family members or classmates, and devices available for use in public spaces, were not included in this study, because access to such devices is limited, and therefore, it cannot be considered to be sufficient to facilitate the constructivist L2/FL learning.

As discussed in Section 1.1 of this dissertation, 63.6% of the total households in Rwanda own mobile technological devices, specifically different types of mobile phones. With reference to the data collected from this study's participants at UR (discussed below), the percentage of students who had access to mobile technological devices which they owned, approached 100%.

In the survey, the 60 participants were asked whether they had their own mobile technological devices (cf. Question 15 in Appendix F). To this question, 53 participants (83.3%) responded that they had their own mobile device, and only seven (11.7%) said that they did not. The 53 participants who reported that they had their own mobile technological devices, were requested to provide details about their devices, specifically the number of devices which they owned, their brands and models, the operating systems which they run, and the language which the devices were set to (cf. Question 16 in Appendix F). The details about the mobile devices were requested with the purpose of allowing the researcher to assign the participants to the relevant sample groups, and to provide the researcher with enough information for designing MTL training which would be relevant for the participants and would provide sufficient assistance to them (cf. Sections 4.6.3.1 and 4.6.3.2).

Starting with the language which the devices were set to, all the participants said that all their devices were set to English. The language which the participants were using on their mobile devices was needed in order to check if in using mobile technologies for EFL learning, there might be some cases in which English language learners were going to use devices and apps set to other languages such as French, Kinyarwanda or Swahili, the other languages which were also used in Rwanda (cf. Section 1.1). If such cases were found, it would have been necessary to investigate the effect which such other languages (being used on mobile devices) might have in mediating between the learners' L1 and the TL (English).

Regarding the types and number of devices, the majority of the participants (41) reported that they had one device each, specifically a smartphone in the case of 31 participants, and a classic phone in the case of 10 participants. The remaining 12 participants who owned mobile technological devices, indicated that they

owned both a smartphone and a classic phone. The popularity of the smartphone can be linked to the students' needs for specific features which are provided by the devices (cf. Figure 5.2 below), and also to the availability of affordable smartphones on the Rwandan market, which was dominated by Chinese brands (described in the following paragraph) priced as low as \$30 (USD).

Regarding the brands and models of the devices, the most popular brands among the participants were Huawei, Tecno, KZG and other Chinese brands for the classic phones, and Samsung and Tecno for smartphones. Among 22 classic phones, there were only one Samsung, and three Nokia devices. Among the 43 smartphones, there were two Nokia Lumia devices, running Windows as their operating system, and five Apple iPhones (4S, 5, 5S and 6 models) running iOS. Other smartphones were Samsung Galaxy (Note 2, Note 3, S3, S4 and S5 models), Tecno (Y2, H6 and Camon CX models), and Huawei, all running Android as their operating system.

Regarding other types of mobile devices, only one participant had a Tecno tablet, running Android as its operating system, and nine participants reported that they had laptop computers (HP, Positivo, Dell, Compaq and Acer brands), running Windows as their operating system. Although the participants listed their laptop computers as mobile technological devices, laptop computers were not treated as MTLT for the purposes of this study (as explained in Section 5.3 above).

In addition to stating the types, language settings, number, brands, models, and operating systems of their mobile devices, the participants were requested to provide details about what they were using their devices for, in general (cf. Question 17 in Appendix F). Figure 5.2 below presents the information which the participants reported in this regard.

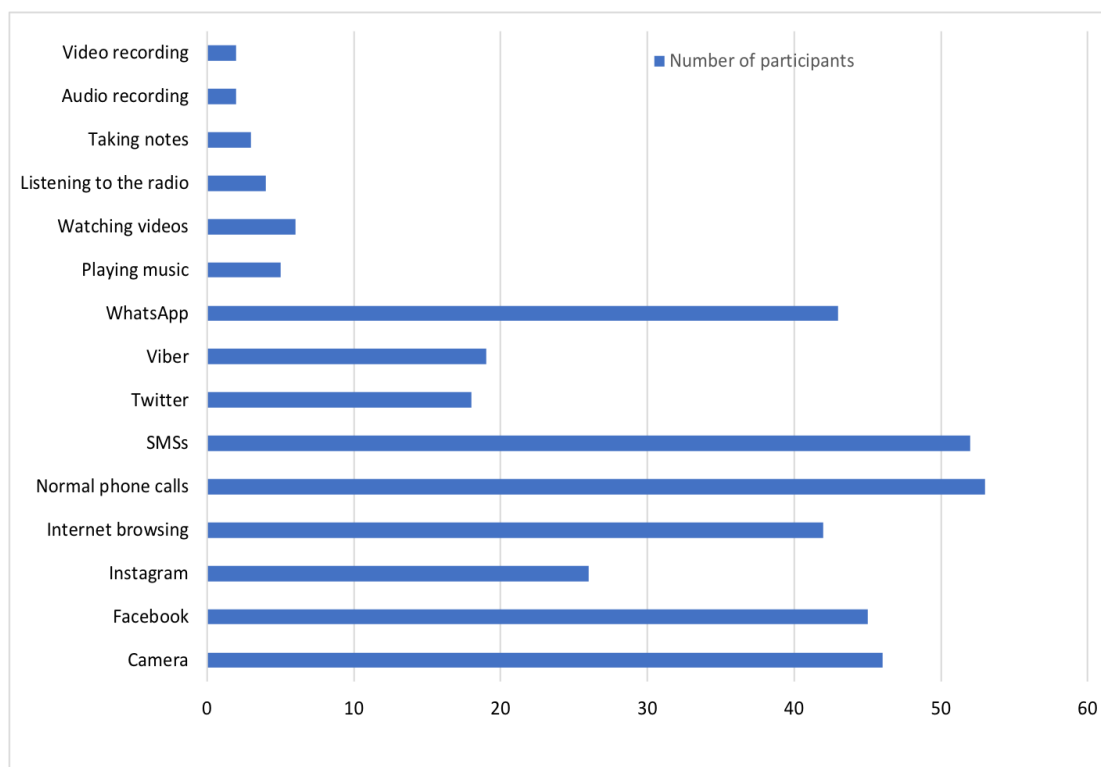


Figure 5.2: General use of mobile devices

As Figure 5.2 above shows, the most common use of mobile devices was to make phone calls (reported by all participants), and to send SMSs (reported by all but one participant). The other popular uses of mobile devices included taking photos with the device's camera (46 participants, 86.8%), internet browsing (42 participants, 79.2%), and communicating through social network tools such as Facebook (45 participants, 84.9%) and WhatsApp (43 participants, 81.1%). Only a small number of participants reported using their devices to take notes, watch videos, or listen to music and different radio stations. These features were not found to be popular among the research participants, probably because of their devices' limited capabilities.

5.5. Use of Mobile Technologies in English Language Learning

After providing details on their mobile devices and indicating their general use (cf. Section 5.4), the participants were asked whether they made use of their mobile devices in English language learning (cf. Question 18 in Appendix F). Among the 53 participants who owned mobile devices, 31 (58.5%) said that they

used their devices for EFL learning purposes, whereas the other 22 (41.5%) said that they did not.

Of the 31 participants who reported that they used their devices in EFL learning, 15 were assigned to the experimental group (EG)A1, 15 to the control group (CG)A2. Since, according to their score in the EPT pre-test, all the participants were highly comparable in terms of EFL proficiency (cf. Section 5.6 and Chapter 6), the remainder of those 31 participants (i.e. one participant) was assigned to CGB1, the sample group that made use of the additional EFL conventional learning materials from the researcher. As discussed in Section 4.6.3.3, similarly to the other three sample groups' members, all the members of EGB1, including the particular one mentioned above, were encouraged, followed, monitored and guided in order to ensure that they were indeed making use of the EFL conventional learning materials during this study's experimental period.

The last two sections of the survey involved questions which had been designed only for those participants who indicated using their mobile devices for EFL learning purposes. Those 31 participants were asked to specify which EFL learning materials they used on their devices (cf. Question 19 in Appendix F), as well as how often and where they used those materials (cf. Questions 19 and 20 in Appendix F).

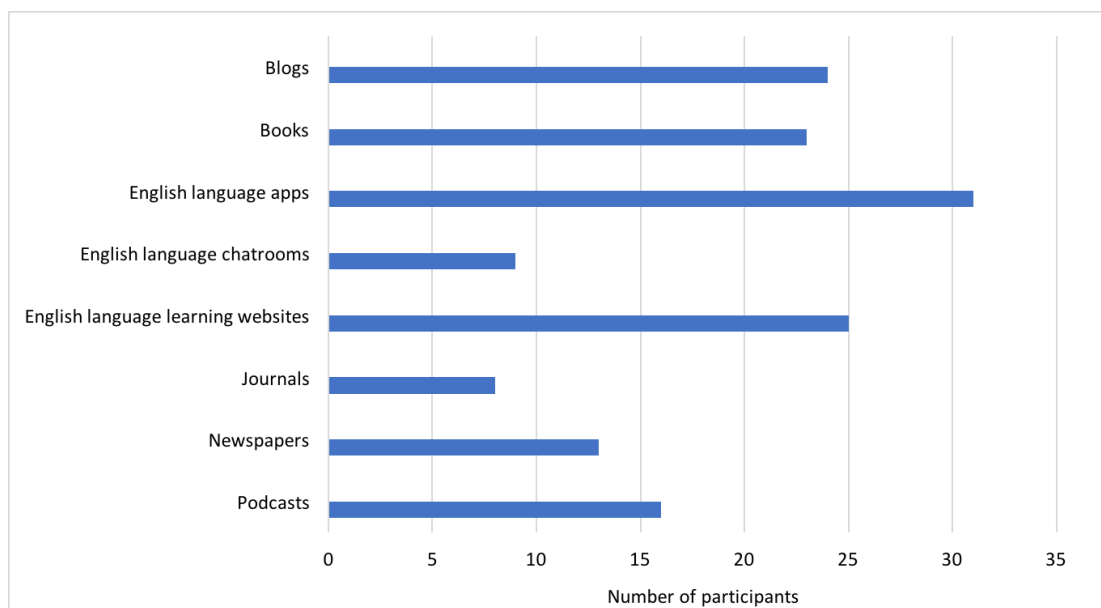


Figure 5.3: English language learning materials accessed on mobile devices

As Figure 5.3 above shows, all 31 participants said that they made use of different mobile apps specifically designed for English language learning, something which will be elaborated on in Section 5.5.2. The majority of the participants reported that they also accessed English language learning websites (25 participants, i.e. 80.6%), and that they read electronic English language books (23, i.e. 74.2%) on their mobile devices. The use of generic blogs for English language learning purposes was found popular among the participants (24, i.e. 77.4%), but only nine participants (29%) said that they made use of English language chatrooms, even though the latter may be regarded as more useful than blogs in terms of their potential contribution to language learning. Other materials which were found to be used by the participants included podcasts (16 participants, i.e. 51.6%), newspapers (13, i.e. 41.9%), and journals (eight participants, i.e. 25.8%).

5.5.1. The Use of MTLL inside the Classroom

In order to determine how to integrate the use of MTLL into the EFL classroom, it was necessary to first determine the nature and extent to which the participants made use of MTLL prior to the experimental period, i.e. which apps they were already using before the onset of the MTLL training, and how often they were using them inside the classroom.

The 31 participants concerned (cf. Section 5.5), were requested to specify how often they used each of the mentioned language learning apps (cf. Figure 5.3 above) inside the formal EFL classroom (cf. Question 20 in Appendix F). More specifically, the participants were requested to rate the frequency with which they were using each of the apps or app categories on an eight-point scale: (i) 'once an hour', (ii) 'once 2 to 3 hours', (iii) '4 times a day', (iv) 'at least once daily', (v) 'once every 2 days', (vi) 'once a week', (vii) 'only when I have a piece of homework or a task that I have to complete', and (viii) 'never'. The data which were collected in this regard, are presented in Table 5.4 below. Note that the percentages presented in this table indicate the frequency of use per app, i.e. what percentage of the 31 participants reported using that app with the given frequency. (For example, 35.48% of the 31 participants reported using blogs once an hour, an additional 25.81% reported using blogs every two to three hours, and so forth.) The only exception to this is that only one participant's data is at issue in the last line: In Question 20 of the survey, there was a space marked "others", where participants could add apps that were not part of the list. One participant added "dictionary" as an app and indicated that he/she uses this app once an hour. The 100% is thus due to the calculation "one out of one". This percentage is disregarded in the discussion below, because it is uncertain whether this was the only participant of the 31 who actually used an electronic mobile dictionary or whether some of the other participants also used electronic mobile dictionaries but simply did not pause at the "others"-space and take the time to try and think of other apps that they used.

	Once an hour (1)		Once 2 to 3 hours (2)		4 times a day (3)		At least once daily (4)		Once every 2 days (5)		Once a week (6)		Only when I have a piece of homework or a task that I have to complete (7)		Never (8)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Blogs	11	35.48	8	25.81	1	3.23	4	12.90	-	-	1	3.23	2	6.45	4	12.90
Books	1	3.23	2	6.45	3	9.68	7	22.58	1	3.23	1	3.23	9	29.03	7	22.58
English language learning apps	3	9.68	1	3.23	7	22.58	3	9.68	1	3.23	1	3.23	15	48.39	-	-
English language chatrooms	1	3.23	-	-	2	6.45	4	12.90	1	3.23	2	6.45	-	-	21	67.74
English language learning websites	1	3.23	1	3.23	-	-	2	6.45	2	6.45	1	3.23	18	58.06	6	19.35
Journals	1	3.23	-	-	-	-	1	3.23	1	3.23	4	12.90	3	9.68	21	67.74
Newspapers	2	6.45	-	-	-	-	4	12.90	1	3.23	4	12.90	4	12.90	16	51.61
Podcasts	3	9.68	-	-	5	16.13	7	22.58	-	-	1	3.23	1	3.23	14	45.16
Others: Dictionary	1	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.4: Frequency with which different apps are used inside the classroom

As Table 5.4 above shows, blogs are the tools which were reported to be used more often than any other apps. Among the participants who were using blogs in EFL learning, 11 (35.48%) reported using them once an hour, eight (25.81%) once every two to three hours, and four (12.90%) never. Some apps and materials were found to be used by many learners only when they had a task to complete. These include different types of English language learning apps, which 15 participants (48.39%) indicated as only using when there was a task to complete, and English language learning websites, which 18 participants (58.06%) indicated as only using when there was a task to complete. On the other hand, there are apps and materials which were found not to be used by many learners at all, including English language chatrooms, journals, newspapers, and podcasts, which 67.74%, 67.74%, 51.61% and 45.16%, respectively, of the participants reported as never using. The following section describes the participants' use of MTLL outside the classroom.

5.5.2. The Use of MTLL outside the Classroom

Question 21 of the survey (cf. Appendix F) asked participants whether they were using MTLL for English language learning outside the classroom. Only three participants (9.7%) answered that they were not, whereas the majority of participants (28, i.e. 90.3%) indicated that they were indeed using MTLL outside

the classroom. These 28 participants who reported the use of MTLL outside the classroom, were then requested to specify which MTLL they were using (cf. Question 22 in Appendix F), as well as at what time (cf. Question 23 in Appendix F) and place (cf. Question 24 in Appendix F). All the data collected in this regard are presented and discussed in the current section, starting with Figure 5.4 below, which shows which MTLL the participants indicated using outside the classroom.

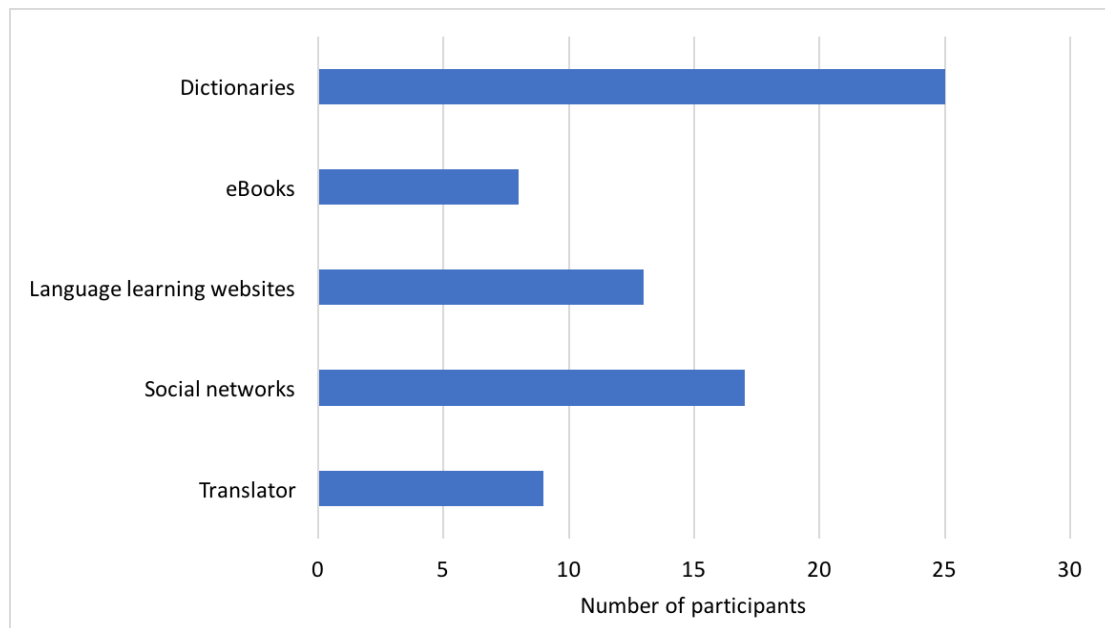


Figure 5.4: Mobile apps used for EFL learning outside the classroom

As Figure 5.4 above shows, dictionaries are the most used apps, reported as being used by 25 participants, corresponding to 89.3% of the concerned 28 participants. Other apps which were found to be used by the participants for EFL learning outside the classroom included social networking apps (reported as being used by 17 participants, corresponding to 60.7%), internet browsers for English language learning websites (13 participants, i.e.46.4%), translators (nine participants, i.e. 32.1%), and eBook reader apps (eight participants, i.e. 28.6%).

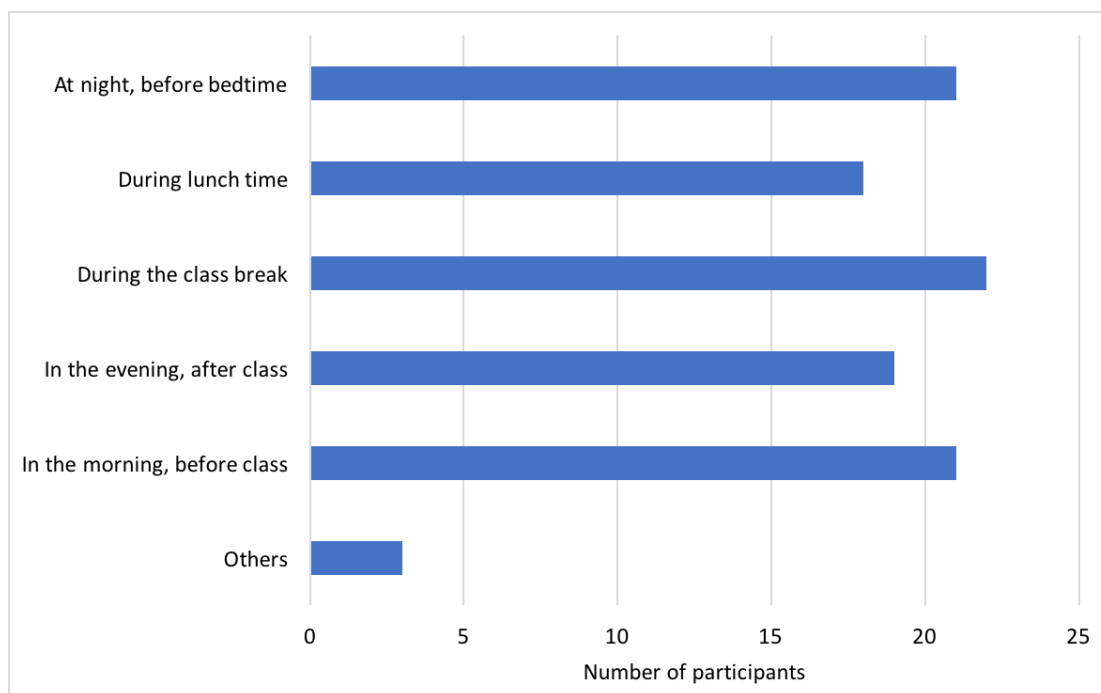


Figure 5.5: Time when students use MTLT outside the classroom

Regarding the specific time when the participants were using MTLT outside the classroom, as illustrated in Figure 5.5 above, the data showed that most of the participants who were using MTLT outside the classroom, were mostly doing so during the class break (22 participants, corresponding to 78.6%), at night before bedtime (21 participants, i.e. 75%), and in the morning before their formal classes started (21 participants, i.e. 75%). Some participants also reported using MTLT during lunch time (18 participants, i.e. 64.3%), as well as in the evening after their classes (19 participants, i.e. 67.9%). Only three participants added that they were using MTLT (respectively) when interacting with their classmates, at any time when they came across a new English word, and sometimes when they were in bed.

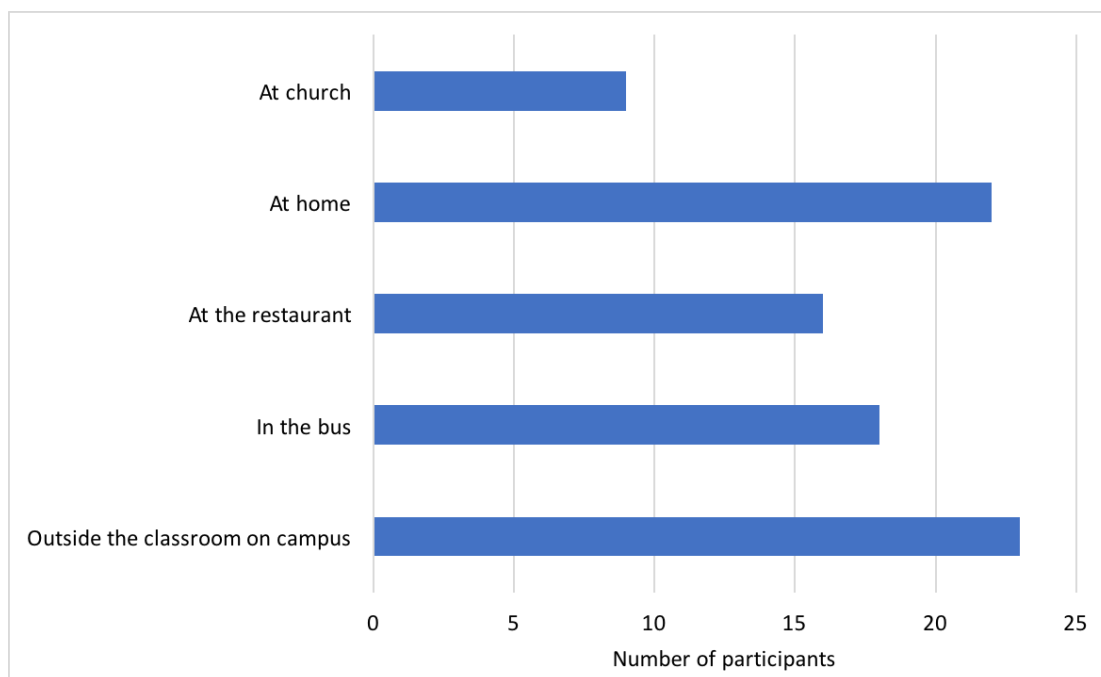


Figure 5.6: Places outside the classroom where students use MTLT

Figure 5.6 above summarises the data related to the places where MTLT were being used for EFL learning outside the classroom. It was found that the most popular places where the participants were using MTLT were at their homes (22 participants, corresponding to 78.6%), and outside the classroom on campus (23 participants, i.e. 82.1%). Other popular places included public buses (18 participants, i.e. 64.3%) and restaurants (16 participants, i.e. 57.1%), whereas the place where the fewest participants (only nine, i.e. 32.1%) reported using MTLT was in church¹⁹.

5.6. EFL Proficiency Prior to the Experimental Period

Apart from the survey, semi-structured interview and observation data, all 60 participants completed the English proficiency test (EPT) as a pre-test (cf.

¹⁹ In the case of churches, the low number of participants might be due to not all of the participants attending a church and/or the use of MTLT in church being regarded as inappropriate by some churches (even though this might be changing worldwide – cf. for example, Christians making use of the Bible app during services).

Chapter 2, Section 2.2 and Chapter 4, Section 4.6.2). This was done in order to determine whether the participants and sample groups were comparable in terms of their EFL proficiency prior to the experimental period (i.e. before the onset of any intervention from the researcher).

In this regard, the scatter plot in Figure 5.7 below presents the raw scores of the 60 participants who were divided into the four sample groups (cf. Section 4.5). The numbers on the vertical axis correspond to EPT scores, and the numbers on the horizontal axis correspond to participant numbers. For each participant, there are three data points, one below the other: a listening score out of 25 (blue dot), a reading score out of 25 (orange dot), and a total score out of 50 (grey dot). To determine the exact value of a score, one refers to the vertical axis. The participants' scores are divided so that each sample group's scores appear between two vertical lines: participants 1 to 15 form the sample group EGA1 (between the first vertical line, which is the vertical axis, and the second vertical line), participants 16 to 30 form the sample group CGA2 (between the second and third vertical lines), participants 31 to 45 form the sample group EGB1 (between the third and fourth vertical lines), and participants 46 to 60 form the sample group CGB2 (between the fourth and fifth vertical lines).

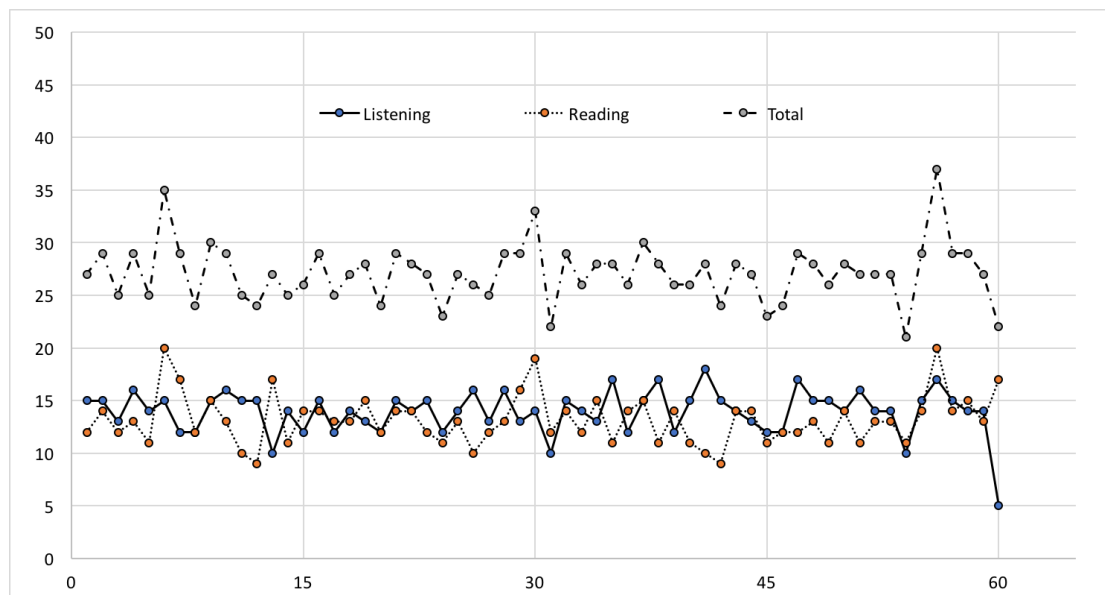


Figure 5.7: A scatter plot of the participants' EPT pre-test results

As Figure 5.7 above shows, the ranges of the four sample groups' total scores seem to be quite similar: the total score ranged from 24 to 35 for EGA1, 23 to 33

for CGA2, 22 to 30 for EGB1, and 21 to 37 for CGB2. In fact, the four sample groups' score ranges and distributions seem highly comparable to each other, for the listening section, the reading section and the EPT as a whole (i.e. the total score). This first impression that the groups were highly comparable in terms of their EFL proficiency level prior to the experimental period, was confirmed by ANOVA statistical tests, the results of which are presented and discussed extensively in Chapter 6.

Chapter 6 : EFFECT OF MTLL ON ENGLISH LANGUAGE PROFICIENCY

6.1. Introduction

As an attempt to address the primary aim of the current study (cf. Section 1.3), this chapter reports the results of an English proficiency test (EPT) which was administered to the participants in all four of the sample groups before and after the intervention (cf. Section 4.6.2 and Appendix G). As discussed in Section 4.5, recall that the four groups were (i) the experimental group (EG)A1, which was made up of participants who used mobile technologies in language learning (MTLL) after being trained in it, (ii) the control group (CG)A2, which was composed of participants who used MTLL without being trained in it, (iii) the experimental group (EG)B1, which was made up of participants who received and used the additional conventional language learning materials, and (iv) the control group (CG)B2, which was composed of participants who relied solely on the formal language classroom for learning English as a foreign language (EFL) (i.e. which neither used MTLL nor received any additional input or training).

As discussed in Section 4.6.2, this study used the TOEIC format to design a more suitable EPT, which was administered twice to the participants, specifically at the beginning of the experimental period as a pre-test (on Friday, 19 May 2017), and at the end of the experimental period as a post-test (on Friday, 30 June 2017). Recall that the TOEIC Listening and Reading test has two sections. The first section of the test measures the learners' listening proficiency (henceforth referred to as the "listening section"), and the second section measures the learners' reading proficiency (henceforth referred to as the "reading section"). Although the test does not measure the learners' speaking or writing abilities directly, research has found that it still provides an accurate reflection of learners' overall English proficiency (cf. Sections 2.2 and 3.6.2).

This chapter first reports the results of the listening section and the reading section of the EPT, separately, in Sections 6.2 and 6.3, before reporting the results for overall English proficiency in Section 6.4. Each of these sections

contains a description of the participants' scores, a discussion of the results of statistical analyses, and an interpretation of these results in terms of the effect of MTL training and/or use. At the end of this chapter, these results are interpreted in terms of the standard language proficiency classification (Section 6.5) before a short conclusion is provided (Section 6.6).

6.2. Listening Proficiency

The purpose of this section is to describe the participants' EFL listening proficiency prior to the experimental period (pre-test) and at the end of the experimental period (post-test), as indicated by their performance on the listening section of the EPT (cf. Appendix G). The range, mean and standard deviation of each group's pre-test and post-test scores (out of a total of 25) are presented in Table 6.1 below.

Group	Pre-test			Post-test		
	Range	Mean	Std. Dev.	Range	Mean	Std. Dev.
EGA1 (n=15)	10 - 16	13.93	1.75	14 - 20	17.20	1.42
CGA2 (n=15)	12 - 16	13.87	1.36	14 - 19	16.60	1.40
EGB1 (n=15)	10 - 18	14.13	2.20	13 - 20	16.47	2.23
CGB2 (n=15)	5 - 17	13.80	3.00	12 - 17	15.20	1.57
Total (n=60)	5 - 18	13.93	2.11	12 - 20	16.47	1.80

Table 6.1: Pre-test and post-test results in the listening section of the EPT

As can be seen in the pre-test column of Table 6.1 above, the four groups' mean scores on the listening section of the pre-test seem to be similar, and this is confirmed by statistical tests (specifically, an analysis of variance (ANOVA)), as shown by the *p*-values in Table 6.2 below.

Group	EGA1	CGA2	EGB1	CGB2
EGA1	---	0.93	0.78	0.85
CGA2	0.93	---	0.71	0.93
EGB1	0.78	0.71	---	0.64
CGB2	0.85	0.93	0.64	---

Table 6.2: Statistical results of between-groups comparison of pre-test scores in the listening section of the EPT (*p*-values)

Table 6.2 above shows that there were no significant differences between any of the groups in terms of their listening scores on the pre-test²⁰. The groups were thus highly comparable, which is ideal for comparing the effect of the different experimental settings in this study, i.e. determining the effect of the use of MTLL following training (EGA1) versus the use of MTLL without training (CGA2), versus access to and use of additional conventional language learning material (EGB1), and versus formal language classroom input alone (CGB2).

The results of comparing each group's pre-test scores to their post-test scores is presented first visually in Figure 6.1 below, and then numerically in Table 6.3.

²⁰ Note that α – the level of significance – is set at 0.05 for the current study. A *p*-value of 0.05 or less is thus taken to indicate significance. See also the next footnote.

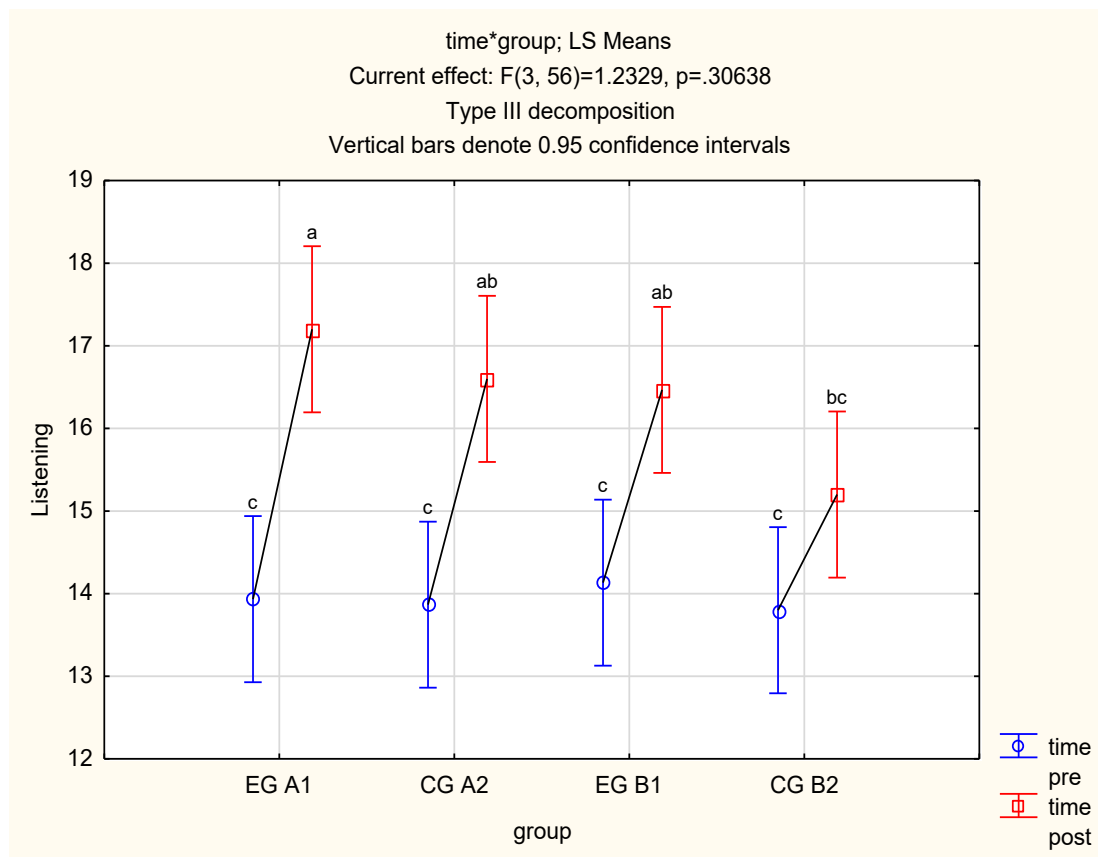


Figure 6.1: A within-group comparison of pre- and post-test scores for the listening section of the EPT

By looking at the vertical bars in Figure 6.1 and at the p -values column in Table 6.3 below, it is clear that there are statistically significant differences between the pre-test and post-test scores for all four groups. From Figure 6.1 above, it is also clear that all the sample groups showed a *comparable* improvement in terms of their listening proficiency, as indicated by the obtained F-value ($F=1.2329$) and the corresponding p -value ($p=0.30638$). If the study's alternative hypothesis were true, then one would have expected a significantly greater improvement for EGA1, the group that was using MTLT following training. The F- and p -values, thus, lead to a rejection of the alternative hypothesis, and the conclusion that MTLT use following training does not provide a significant advantage for EFL *listening* proficiency improvement. Given the earlier comparison of the groups' pre-test scores, it is still worthwhile to compare their post-test scores, as explained below.

Group	Pre-test			Post-test			Pre-test vs. Post-test (<i>p</i> -values)
	Range	Mean	Std. Dev.	Range	Mean	Std. Dev.	
EGA1 (n=15)	10 - 16	13.93	1.75	14 - 20	17.20	1.42	0.00** ²¹
CGA2 (n=15)	12 - 16	13.87	1.36	14 - 19	16.60	1.40	0.00**
EGB1 (n=15)	10 - 18	14.13	2.20	13 - 20	16.47	2.23	0.00**
CGB2 (n=15)	5 - 17	13.80	3.00	12 - 17	15.20	1.57	0.05*

Table 6.3: Pre-test and post-test results in the listening section of the EPT, including *p*-values for time effect

Given that the improvement from pre-test to post-test is highly significant for the first three groups ($p < 0.01$) and significant for the last group ($p = 0.05$), the next question is how much of this improvement is due simply to time, i.e. TL exposure which the groups would have received even if the current study had not been conducted and no intervention had occurred, and how much is due to the different types of intervention (MTLL training and/or use and/or additional conventional TL input). Given that the four groups were highly comparable in terms of their *pre-test* scores, this can be determined by testing for differences between the groups' *post-test* scores. Table 6.4 below presents the results of such a between-groups comparison.

²¹ Throughout this dissertation, statistical significance at $\alpha = 0.05$ (i.e. where the *p*-value is higher than 0.01 but lower than or equal to 0.05) is indicated with a single asterisk (*), and significance at $\alpha = 0.01$ (i.e. where the *p*-value is equal to or lower than 0.01) with a double asterisk (**).

Group	EGA1	CGA2	EGB1	CGB2
EGA1	---	0.40	0.31	0.01**
CGA2	0.40	---	0.85	0.05*
EGB1	0.31	0.85	---	0.08
CGB2	0.01**	0.05*	0.08	---

Table 6.4: Statistical results of between-groups comparison of post-test scores in the listening section of the EPT (*p*-values)

Table 6.4 above shows that EGA1 and CGA2 differ significantly only from CGB2, i.e. from the group that did not receive any intervention and that thus only received the regular TL input provided in the EFL classroom. This means that, in terms of learners' EFL listening proficiency, MTLT use and/or training seemed to have provided the learners with an advantage over the true control group, i.e. the sample group which did not receive any additional input. However, (i) MTLT training did not lead to a statistically significant advantage over MTLT use without training (compare EGA1 and CGA2), (ii) MTLT use (with or without training) did not lead to an advantage over the use of additional conventional input (compare EGA1 and CGA2 to EGB1), and (iii) the use of additional conventional input did not lead to a significant advantage over any other test condition (compare EGB1 to each of the other three sample groups). This echoes what was illustrated by the graphs, F-value and *p*-value in Figure 6.1 above. In the next section, the groups' pre-test and post-test scores on the reading section of the EPT are considered.

6.3. Reading Proficiency

This section involves a description of the participants' scores (out of 25) in the reading section of the EPT (cf. Table 6.5 below), a presentation of sample group differences with regards to the learners' English reading proficiency, and a discussion about the effect that the different types of intervention seemed to have had on the learners' English reading proficiency.

Group	Pre-test			Post-test		
	Range	Mean	Std. Dev.	Range	Mean	Std. Dev.
EGA1 (n=15)	9 - 20	13.33	2.94	17 - 25	21.07	2.40
CGA2 (n=15)	10 - 19	13.40	2.16	14 - 22	17.87	2.50
EGB1 (n=15)	9 - 15	12.47	1.92	12 - 19	16.40	1.76
CGB2 (n=15)	11 - 20	13.53	2.42	8 - 17	14.47	2.20
Total (n=60)	9 - 20	13.18	2.37	8 - 25	17.45	3.26

Table 6.5: Pre-test and post-test results in the reading section of the EPT

Statistical tests were used to determine whether the sample groups were comparable in terms of their EFL reading proficiency at the beginning of the experimental period. The results of these tests are presented in Table 6.6 below.

Group	EGA1	CGA2	EGB1	CGB2
EGA1	---	0.94	0.31	0.81
CGA2	0.94	---	0.27	0.88
EGB1	0.31	0.27	---	0.21
CGB2	0.81	0.88	0.21	---

Table 6.6: Statistical results of between-groups comparison of pre-test scores in the reading section of the EPT (*p*-values)

Table 6.6 shows that all the obtained *p*-values are greater than 0.05 ($p > 0.05$), i.e. they are not significant. This confirmed that there were no statistically significant differences between the four sample groups in terms of their EFL reading proficiency at the beginning of the experimental period, and that they were thus highly comparable in this regard.

The results of comparing each group's pre-test scores to their post-test scores are presented first visually in Figure 6.2 below, and then numerically in Table 6.7.

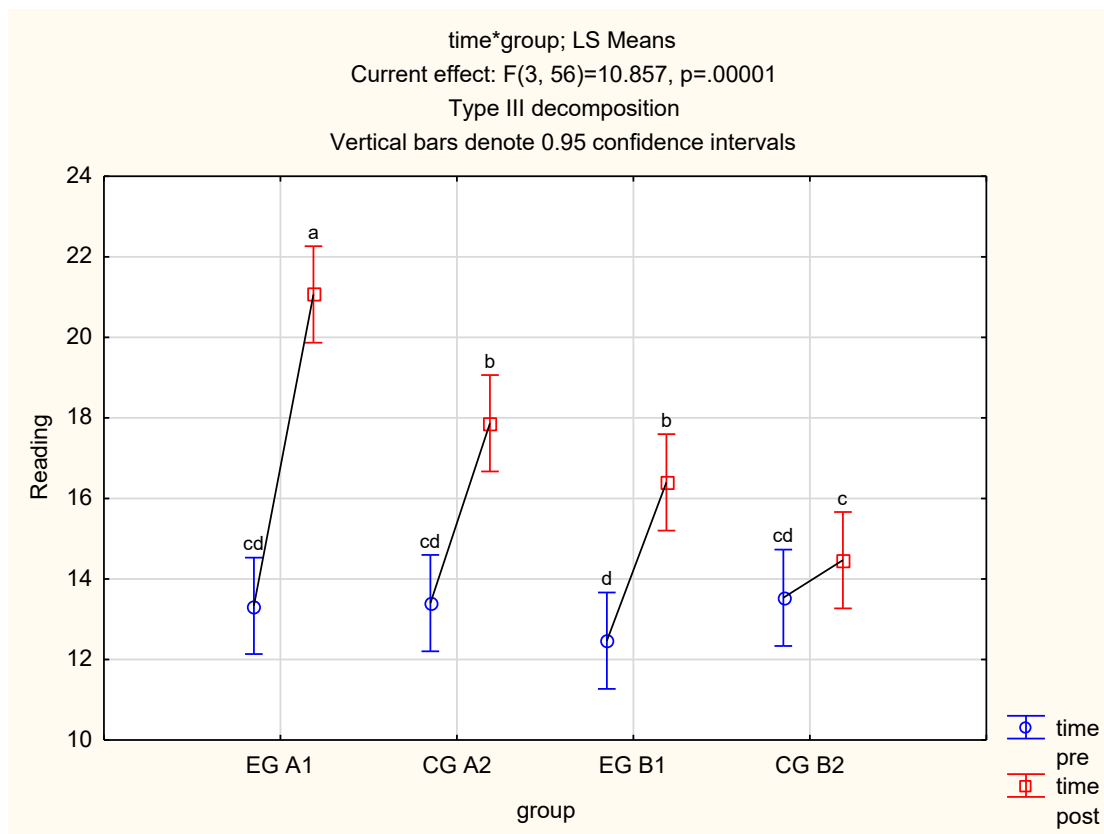


Figure 6.2: A within-group comparison of pre- and post-test scores for the reading section of the EPT

The vertical bars in Figure 6.2 above present visually what is shown by the final column in Table 6.7 below, which presents the p -values obtained by comparing each sample group's performance in the reading section of the EPT pre-test to their performance in the post-test. These p -values show that only the first three groups' improvements were statistically significant: only the true control group, CGB2 (which was made up of students who relied on their formal EFL classroom input alone), did not improve their EFL reading proficiency significantly in the course of the experimental period. In terms of the degree of improvement of the four groups, Figure 6.2 above shows that this was similar for groups CGA2 and EGB1, while group EGA1's improvement is greater than that of all three the other groups, and group CGB2's improved to a lesser extent than all three the other groups. This difference in the four groups' improvements is supported by the obtained F-value ($F=10.857$) and the corresponding p -value ($p=0.00001$). These values provide support for the alternative hypothesis of this study, i.e. that the use of MTL following training has a greater effect on L2/FL learners' *reading*

proficiency than does the use of MTLT without training and the use of conventional language teaching-and-learning materials and methods.

Group	Pre-test			Post-test			Pre-test vs. Post-test (p-values)
	Range	Mean	Std. Dev.	Range	Mean	Std. Dev.	
EGA1 (n=15)	9 - 20	13.33	2.94	17 - 25	21.07	2.40	0.00**
CGA2 (n=15)	10 - 19	13.40	2.16	14 - 22	17.87	2.50	0.00**
EGB1 (n=15)	9 - 15	12.47	1.92	12 - 19	16.40	1.76	0.00**
CGB2 (n=15)	11 - 20	13.53	2.42	8 - 17	14.47	2.20	0.27

Table 6.7: Pre-test and post-test results in the reading section of the EPT, including p-values for time effect

At this stage, it is again worthwhile to compare the learners' post-test scores on the EPT, given that the four sample groups were highly comparable in terms of their EFL reading proficiency according to their *pre-test* scores. This comparison was done in order to verify what the most likely cause was of the groups' improvement from pre-test to post-test: (i) the TL exposure which the groups would have received even if the current study had not been conducted and no intervention had occurred, or (ii) the different types of intervention (MTLL training and/or use, language classroom input and/or additional conventional TL input) they had received during the experimental period. Table 6.8 below presents the results of the statistical tests in this regard.

Group	EGA1	CGA2	EGB1	CGB2
EGA1	---	0.00**	0.00**	0.00**
CGA2	0.00**	---	0.09	0.00**
EGB1	0.00**	0.09	---	0.03*
CGB2	0.00**	0.00**	0.03*	---

Table 6.8: Statistical results of between-groups comparison of post-test scores in the reading section of the EPT (p-values)

Table 6.8 above shows that each group differs significantly from every other group, except for the case of EGB1 versus CGA2, which are, respectively, the group that received the additional conventional English language learning materials from the researcher, and the group which made use of MTLT without training. (Again, this is in line with graphs, F-value and *p*-values reported in Figure 6.2.) This implies that each of the intervention methods seemed to have

provided the learners with an advantage over the true control group (CGB2). Importantly, Table 6.8 also shows that although the use of MTLL *without* training did not lead to a statistically significant advantage over the use of additional conventional input (compare CGA2 to EGB1), the use of MTLL *with* training did (compare EGA1 to EGB1). In fact, the advantage that the use of MTLL *with* training provided for the EGA1 is highly significant, with $p = 0.00$ in each case (compare EGA1 to each of the other groups). This, in turn, indicates that training students in the use of MTLL, rather than simply encouraging them to use MTLL, is important. The following section discusses the research findings as far as the participants' overall performance in the EPT is concerned.

6.4. Overall Language Proficiency

This section considers the participants' total score (out of 50) in the EPT, i.e. the score which combines their listening scores (cf. Section 6.2), with their reading scores (cf. Section 6.3).

In the previous sections of this chapter, it was noted that there were no significant differences between the participant groups in terms of their listening proficiency (cf. Table 6.2), or their reading proficiency (cf. Table 6.6) at the beginning of the experimental period. Table 6.9 below shows that the groups appear equally similar in terms of their overall proficiency, i.e. their total score on the EPT pre-test.

Group	Pre-test			Post-test		
	Range	Mean	Std. Dev.	Range	Mean	Std. Dev.
EGA1 (n=15)	24 - 35	27.27	2.96	33 - 45	38.27	3.24
CGA2 (n=15)	23 - 33	27.27	2.49	31 - 39	34.47	2.29
EGB1 (n=15)	22 - 30	26.60	2.23	31 - 36	32.87	1.64
CGB2 (n=15)	21 - 37	27.33	3.66	20 - 31	29.67	2.72
Total (n=60)	21 - 37	27.12	2.83	20 - 45	33.82	3.99

Table 6.9: The total score in the pre-test and post-test of the EPT

As noted in Chapter 5, Section 5.6, this similarity among all the four sample groups in terms of their overall EFL proficiency was confirmed by ANOVA statistical tests, the results of which are presented in Table 6.10 below.

Group	EGA1	CGA2	EGB1	CGB2
EGA1	---	1.00	0.50	0.95
CGA2	1.00	---	0.50	0.95
EGB1	0.50	0.50	---	0.46
CGB2	0.95	0.95	0.46	---

Table 6.10: Statistical results of between-groups comparison of the total scores in the EPT pre-test (*p*-values)

The *p*-values in Table 6.10 above show that there were indeed no significant differences between any of the four sample groups in terms of their total score in the pre-test of the EPT, and that the groups are thus highly comparable in this regard, as well.

The results of comparing each group's pre-test scores to their post-test scores is presented first visually in Figure 6.3 below, and then numerically in Table 6.11.

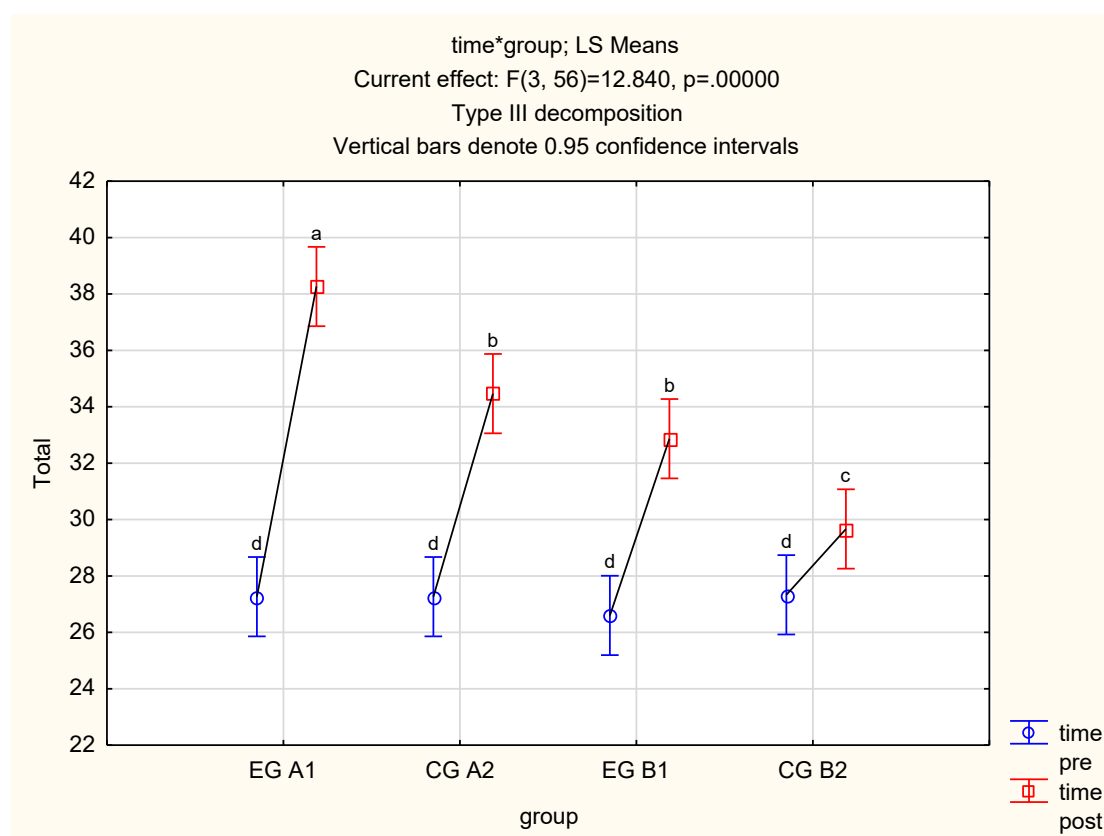


Figure 6.3: A within-group comparison of pre- and post-test EPT total scores

The vertical bars in Figure 6.3 above and the *p*-values in Table 6.11 below show that all four groups' overall EFL proficiency had improved significantly from the pre-test to the post-test. In fact, this improvement is highly significant (with

$p=0.00$) in the case of all three the first groups, i.e. for all of the sample groups except CGB2 which was the true control group in that it did not receive any intervention from the researcher (cf. Chapter 4, Section 4.5). The F-value ($F=12.840$) and the corresponding p -value ($p=0.00000$) reported in Figure 6.3 above, support this study's alternative hypothesis that the use of MTLL following training has a greater effect on L2/FL learners' overall proficiency than the use of MTLL without training and the use of conventional language teaching-and-learning materials and methods.

Group	Pre-test			Post-test			Pre-test vs. Post-test (p-values)
	Range	Mean	Std. Dev.	Range	Mean	Std. Dev.	
EGA1 (n=15)	24 - 35	27.27	2.96	33 - 45	38.27	3.24	0.00**
CGA2 (n=15)	23 - 33	27.27	2.49	31 - 39	34.47	2.29	0.00**
EGB1 (n=15)	22 - 30	26.60	2.23	31 - 36	32.87	1.64	0.00**
CGB2 (n=15)	21 - 37	27.33	3.66	20 - 31	29.67	2.72	0.02*

Table 6.11: The total score in the pre-test and post-test of the EPT, including p -values for time effect

Given that there were no differences between the sample groups in terms of their overall EFL proficiency at the beginning of the experimental period, the sample groups' total scores in the post-test of the administered EPT were compared to one another in order to determine what exactly had led to their improved proficiency scores. Table 6.12 presents the results of this between-groups comparison.

Group	EGA1	CGA2	EGB1	CGB2
EGA1	---	0.00**	0.00**	0.00**
CGA2	0.00**	---	0.11	0.00**
EGB1	0.00**	0.11	---	0.00**
CGB2	0.00**	0.00**	0.00**	---

Table 6.12: Statistical results of between-groups comparison of the total scores in the EPT post-test (p -values)

Similarly to the findings regarding the reading proficiency scores (cf. Section 6.3), the above table shows that there were highly statistically significant differences between all the sample groups at the end of the experimental period, except between CGA2 (which was composed of the learners who made use of

MTLL without training) and EGB1 (which was composed of the learners who made use of the additional conventional language teaching-and-learning materials provided by the researcher). This means that each of the intervention methods, namely the use of MTLL after being trained in it, using MTLL without being trained in it, and using the additional language learning materials, provided the participants with a significant advantage over the true control group that relied on the TL input received from the formal language classroom alone (compare CGB2 to each of the other sample groups). However, the use of MTLL without training did not lead to a statistically significant advantage over the use of additional conventional learning materials which were provided by the researcher (compare CGA2 to EGB1), again indicating an important role for MTLL training (compare EGA1 to CGA2 and to EGB1).

6.5. MTLL and EFL Proficiency Classification

As was discussed in Chapter 2, specifically in Section 2.2, there are different models for language proficiency level classification, and the most popular one is the Common European Framework of Reference for Languages (CEFRL) of the Council of Europe (2001), which makes use of six categories, ranging from 'basic – A1' to 'proficient user – C2'. As was discussed in Chapter 4, Section 4.6.2, the current study used an EPT, which was designed using the template of the TOEIC Listening and Reading to measure learners' EFL proficiency prior to and after the experimental period, and the TOEIC also rates test takers' overall EFL proficiency levels according to the Council of Europe's (2001) CEFRL (cf. Table 4.2, repeated here as Table 6.13).

TOEIC Scaled Score	Percentage Equivalence	Proficiency Level	Council of Europe (2001)
10 – 250	0 – 25%	Basic proficiency	A1
255 – 400	26 – 40%	Elementary proficiency	A2
405 – 600	41 – 60%	Elementary proficiency plus	B1
605 – 780	61 – 78%	Limited working proficiency	B2
785 – 900	79 – 90%	Working proficiency plus	C1
905 – 990	91 – 100%	International professional proficiency	C2

Table 6.13: TOEIC and Council of Europe's (2001) CEFR proficiency classification

Of course, one could question the validity of interpreting the current study's data in terms of the CEFR because these data come from a non-standardised test (i.e. the EPT). However, given that the EPT was based on the TOEIC, it was decided to (cautiously) apply the CEFR model to the current study's data, simply in order to determine whether such a classification might lead to additional insights. Therefore, the arithmetic range (R) of each group's raw scores, as well as each group's mean score out of 50 (M) for the EPT pre-test and post-test were converted into percentages so that they could be interpreted according to the Council of Europe's (2001) CEFR model²².

²² Since the formula which is used in converting the TOEIC raw scores to the scaled scores are not made public by the Educational Testing Service (cf. Section 4.6.2), the scales scores in Table 6.13 are irrelevant here. It is in the same regard that the participants' EPT raw scores were converted to percentages (since they could not be converted to the scaled scores) in order for them to be interpreted in terms of the standard language proficiency levels.

Sample groups	EFL proficiency levels at the beginning of experimental period (EPT pre-test)	EFL proficiency levels at the end of experimental period (EPT post-test)
EGA1	R: 48 – 70% (Elementary proficiency plus, B1 to limited working proficiency, B2) M: 54.54% (Elementary proficiency plus, B1)	R: 66 – 90% (Limited working proficiency, B2 to working proficiency plus, C1) M: 76.54% (Limited working proficiency, B2)
CGA2	R: 46 – 66% (Elementary proficiency plus, B1 to limited working proficiency, B2) M: 54.54% (Elementary proficiency plus, B1)	R: 62 – 78% (Limited working proficiency, B2) M: 68.94% (Limited working proficiency, B2)
EGB1	R: 44 – 60 % (Elementary proficiency plus, B1 to limited working proficiency, B2) M: 53.20% (Elementary proficiency plus, B1)	R: 62 – 72% (Limited working proficiency, B2) M: 65.74% (Limited working proficiency, B2)
CGB2	R: 42 – 74% (Elementary proficiency plus, B1 to limited working proficiency, B2) M: 54.66% (Elementary proficiency plus, B1)	R: 40 – 62% (Elementary proficiency plus, B1 to limited working proficiency, B2) M: 59.34% (Elementary proficiency plus, B1)

Table 6.14: The participants' EFL proficiency levels at the beginning and at the end of experimental period, classified according to the CEFRL (Council of Europe 2001)

(Note: "R" = "range of participants' scores and proficiency levels",
and "M" = "group's mean score and proficiency level".)

Table 6.14 above presents the EFL proficiency levels of the sample groups prior to and at the end of the experimental period, based on their percentage ranges and percentage means, and according to the CEFRL.

Considering firstly the groups' mean proficiency levels (M) in Table 6.14 above, it can be noted that at the beginning of the experimental period, all the sample groups were at the 'elementary proficiency plus' level (B1). At the end of the experimental period, all the sample groups had improved their mean proficiency level from B1 to B2, except the true control group, i.e. CGB2 whose mean proficiency level had remained at B1.

Given the indisputable fact that L2 acquisition takes time, especially in terms of improving learners' overall proficiency in the language, the fact that each of the intervention groups – EGA1, CGA2 and EGB1 – improved their proficiency to such an extent that they moved to the next proficiency level on the CEFRL *within six weeks*, is highly significant. This means that each of the intervention methods

employed in this study – MTLL training and use, MTLL use without training, and additional conventional language learning material – *seem* to be successful at improving learners’ overall proficiency. The fact that all three of the “intervention” groups improved to this extent within six weeks, and the true control group (i.e. CGB2) did not, in the course of the experimental period, should be encouraging for EFL teachers, since it means that they can choose which type(s) of additional input to provide their learners with, based on the resources available to them and to their learners: Given the results of the current study, MTLL training and use is the ideal type of input, but if this is not possible for teachers, then they should know that providing the learners with additional conventional language learning material and/or simply making them aware of MTLL and encouraging them to use these, could *also* lead to an improvement in their learners’ overall EFL proficiency.

Next, considering the range of proficiency levels (R) within each group, Table 6.14 shows that at the beginning of the experimental period, the proficiency levels within all four sample groups ranged from ‘elementary proficiency plus’ (B1) to ‘limited working proficiency’ (B2). The range of proficiency levels, just like the mean proficiency levels, changed for all groups except CGB2. At the end of the experimental period, this group’s proficiency levels still ranged from ‘elementary proficiency plus’ (B1) to ‘limited working proficiency’ (B2).

In contrast, none of the members of CGA2 and EGB1 had remained at level B1; all of them had improved from B1 to B2 or had stayed at B2. As far as the top performing sample group (i.e. EGA1) is concerned, all of its individual members had either improved from B1 to B2 and C1, or stayed at B2. And among the five members who improved to C1, one even managed to obtain 90%, which is only one percentage point less than that of the ‘international professional proficiency’ level, which is the highest proficiency level, known as level C2.

Again, one might be sceptical about applying the CEFRL to the scores of a non-standardised test, but it is noteworthy that (i) the raw EPT-scores, (ii) the results of the statistical analyses performed on these raw scores, and (iii) the result of applying the CEFRL to the raw scores (converted to percentages), all lead to the

same conclusion, namely that the three intervention groups outperformed the true control group.

6.6. Discussion and Conclusion

By adopting a constructivist approach to language learning (cf. Sections 2.5.8) and integrating this with mobile-assisted language learning (MALL) (cf. Chapter 3, Section 3.3 in particular), the primary aim of this study was to investigate the extent to which MTLL training and use can contribute to foreign language (FL) learners' proficiency in the target language (TL). This was compared to the effect of the use of MTLL without prior training, the use of additional conventional language learning materials, and relying on the formal language classroom input alone (cf. Section 1.3.1). The purpose of this chapter was to report the EPT pre-test and post-test results in a manner conducive to addressing this primary aim.

The research questions pertaining to the study's primary aim were the following (cf. Section 1.3.2):

- i. Does training in and/or use of MTLL have a significant effect on FL learners' proficiency?
- ii. If yes, what is the extent and the nature of the contribution of MTLL to the FL learners' proficiency?
- iii. What are the language learners' attitudes towards and experience with MTLL training and use?

In this section, the research questions which are related to the use of MTLL and FL proficiency, i.e. the first two questions, are addressed. The last research question, regarding the learners' attitudes towards and experience with MTLL training and use, will be addressed in the next chapter.

The EPT post-test results reported in the previous sections can be summarised as in Table 6.15 below, in which the >-sign is used to mean "significantly outperformed".

	EGA1 MTLL use with training	CGA2 MTLL use without training	EGB1 Additional conventional material	CGB2 TRUE CONTROL GROUP
Listening section	>CGB2	>CGB2		
Reading section	>CGA2 >EGB1 >CGB2	>CGB2	>CGB2	
Overall EPT score	>CGA2 >EGB1 >CGB2	>CGB2	>CGB2	

Table 6.15: Representation of summarised EPT post-test results with > denoting “significantly outperformed”

From the results reported in the previous sections of this chapter and summarised in Table 6.15 above, it is clear that we cannot simply respond to research question 1 that “MTLL use (with or without training)” or “MTLL use and/or training” has a significant effect on learners’ EFL proficiency. The EPT results show that the effect of MTLL use was different *with* than *without* prior training. Furthermore, the results also differed depending on whether one considered the EPT as a whole or its two sections (i.e. listening and reading) separately; a comparison which pertains to research question 2 as well.

Specifically, when one considers the groups’ scores for the listening section alone, (i) EGA1 and CGA2 both scored significantly higher than CGB2, and (ii) EGB1 did not score significantly higher than CGB2. This might be taken to indicate the positive effect of MTLL use on EFL listening proficiency. However, neither EGA1 nor CGA2 significantly outperformed EGB1, something which one would have expected if MTLL use offered a significant advantage that additional conventional input did not. The listening section’s results also do not offer any evidence for the effect of MTLL training, as EGA1 did not significantly outperform CGA2. The results of the listening section thus show that all three types of intervention provided in the study seem to have a positive effect on learners’ listening proficiency.

The summarised results for the reading section alone are the same as those for the EPT as a whole: (i) EGA1 significantly outperformed CGA2, EGB1 and CGB2; (ii) CGA2 significantly outperformed CGB2; and (iii) EGB1 significantly

outperformed CGB2. Since EGA1 outperformed all three of the other groups, this shows a significant positive effect for MTLL use *with* training. Importantly, since CGA2 did not significantly outperform EGB1, the use of MTLL without training does not seem to provide learners with an advantage over the use of additional conventional material. It could thus be argued that MTLL use without training simply purports to additional input and that there is nothing about MTLL input alone that makes it more effective than conventional input. This would be surprising given the many affordances offered by MTLL, which are not offered by conventional input (cf. Sections 3.2 and 3.3). Alternatively, one could deduce that the affordances offered by MTLL and the advantage offered by MTLL use are only sufficiently realised when a learner has been trained to use MTLL (cf. Sections 1.1, 3.2.2 and 4.6.3.1). In this way, the results of the reading section and of the EPT overall indicate an important role for training learners to make effective use of the MTLL at their disposal.

One question that arises is whether EGA1 outperforming CGA2 on the EPT overall (as well as in the reading section separately) is due to MTLL use being more effective after training or to MTLL training in itself, i.e. whether there was something about the training itself (rather than the subsequent MTLL use) that led to a significant advantage for EGA1 over CGA2. To answer this question, it is important to note again that, as discussed in Chapter 3, mobile devices have numerous affordances which make the use of MTLL more effective than the use of other language teaching-and-learning tools. Regarding their affordances, in addition to portability, mobility and accessibility, mobile technological devices increase the language learners' motivation, engagement, and sense of community, and create a personalized, interactive and collaborative language learning environment (cf. Sections 3.2 and 3.3). Both EGA1 and CGA2 exploited these mobile device affordances which contributed to their improvement in terms of their overall proficiency. In addition to the mobile technological devices' affordances, the outstanding performance of EGA1 is linked further to the fact that the MTLL training and assistance provided by an expert to the language learners, i.e. mobile technological devices' users, facilitate the coordination of the three levels which were suggested by Cacchione, Procter-Legg, Petersen and

Winter (2015) on the pyramid of factors which contribute to the outcome, and relative success, of an MTLL-related project (cf. Figure 3.1).

In terms of these three factors, from the bottom to the top levels, Cacchione, Procter-Legg, Petersen and Winter (2015:1259) suggest that for the success of an MTLL-project, there must be (i) the relevant technology, (ii) institutional involvement, and (iii) the relevant pedagogy. For both learners who make use of MTLL without training, and learners who make use of MTLL following training, the first requirement, namely technology, is met in terms of access and connectivity, as well as other related considerations. But the second and third requirements are only partly, if at all, met in the case of learners who make use of MTLL without training. This is due to the fact that without expert training, guidance and monitoring of learners' MTLL use, institutional support does not really reach the learners to the extent that it should, even though it may be provided in other forms, such as facilitating the learners to own the devices and giving them access to internet connection. In addition to this, without expert involvement, learners' use of MTLL without training can conflict with the type of pedagogy practised in the formal EFL classroom. Both of these factors may thus negatively affect the outcomes of the teaching-and-learning process in ways that can be overcome by the use of MTLL following training.

Returning to the nature of the contribution of MTLL training and/or use to EFL learners' proficiency, as discussed above, a statistically significant advantage was found for the use of MTLL following training over the use of MTLL without training, but only in terms of reading proficiency and the learners' overall proficiency, and not in the case of listening proficiency (cf. Table 6.15, where EGA1 > CGA2 only in terms of the learners' reading scores and their overall EPT scores, but not in terms of their listening scores). As stipulated in Chapter 1, especially in Section 1.5, the current study was limited to determining the extent and nature of the effect which MTLL use with / without training can have on the FL learners' proficiency, compared to the use of conventional language teaching-and-learning materials and methods. The question above thus remains to be addressed in future research, as noted in Section 8.6 of the final chapter of this dissertation.

The next chapter reports on the discussion group that was conducted in order to determine what learners' attitudes were towards MTLT and how they experienced the MTLT training and/or use.

Chapter 7 : ATTITUDES TOWARDS AND EXPERIENCE WITH MTLL

7.1. Introduction

As stipulated in Chapter 1, specifically in Section 1.3, in addition to investigating the effect of using mobile technologies in language learning (MTLL) on university students' EFL proficiency, another objective of this study was to investigate the language learners' attitudes towards and experience with MTLL training and use. Here it is important to remind the reader of the argument (presented in Section 4.3) that this objective was a necessity because the implementation of this study was guided by constructivism which considers the learners as the primary and main component of the teaching-and-learning process. In addition, as was noted in Section 4.3, what the different approaches to implementing MALL projects have in common is the emphasis on evaluating the project by considering the technology users' experiences and attitudes. The specific topics which were investigated by this study in this regard are discussed further in the next section.

As discussed in Section 4.6.4 and presented in Appendix H, the students' attitudes towards and experience with MTLL were investigated by means of a discussion group. Recall that this discussion was conducted at the end of the experimental period with all 60 participants (cf. Section 4.5). More specifically, the discussion was conducted immediately after administering the English proficiency test (EPT) post-test on Friday, 30 June 2017 (cf. Section 4.6.2); i.e. on the same day as the EPT post-test and at the same venue.

The researcher guided the discussion by posing the pre-designed questions (cf. Appendix H), one question at a time, to all the participants, in general. All participants were allowed and encouraged to provide input during the discussion. Every time a participant provided input, i.e. said something, the researcher – who was acting as a modulator – would listen attentively, and would then ask all the other participants in general whether or not they agreed with their classmate's statements or sentiments. The discussion thus often resembled a lively debate and in the case of each separate point, participants

usually continued discussing/debating it back and forth until there was general agreement about the group's attitude/opinion/sentiments, which the researcher would then write down on paper.

The discussion was conducted in English, and lasted 90 minutes. All the collected data, i.e. the participants' general agreements, were recorded in writing. As will become apparent from the detailed discussion in this chapter, the data clearly indicated that the participants – the MTLL users in this context – had positive attitudes towards the use of MTLL and the MTLL training they had received. Section 7.2 reports on the qualitative data under discussion, and Section 7.3 provides a conclusion to this chapter.

7.2. Participants' Attitudes Towards and Experience with MTLL

This study was conducted at the University of Rwanda (UR)'s College of Education. As discussed in Chapter 5, Section 5.3, at the time of data collection, UR was in the process of transitioning from using conventional teaching methods to using technology-enhanced methods, but was facing a number of challenges, including some lecturers resisting the integration of technologies into the university's formal teaching-and-learning process. During the semi-structured interview conducted with a UR employee (cf. Sections 4.6.4 and 5.3), the latter stated that "this transition is not an easy journey because it is something that must work on mentality of people, on the way people are behaving; it must work on attitudes, mindset change, etc." (interviewee's direct words). It is in this regard that among other methods (cf. Section 4.6), a discussion group with all the participants was used to collect qualitative data related to their experience with and attitudes towards using MTLL.

The topics addressed during the discussion, were informed by two primary considerations. Firstly, the fact that all technology-related projects should be evaluated both in matters of technology usability and effectiveness, as well as in matters of technology user satisfaction (cf. Section 4.6.4). And, secondly, the fact that this study was conducted within a constructivist framework, which prioritizes the role of the learners' experience and the learning environment in

the teaching-and-learning process (cf. Section 2.5.8). Keeping these two facts in mind, the discussion group was used to collect qualitative data on the following nine topics:

- usability
- effectiveness
- user satisfaction
- language learners' experience and attitudes
- language learning environment
- language learners' autonomy
- quantity of target language (TL) input
- quality of TL input
- language learners' interaction with TL speakers

These topics are discussed in the sections which follow.

7.2.1. MTLL Usability, Effectiveness and User Satisfaction

Starting with the usability of MTLL (cf. Topic 1 in Appendix H), the participants were asked to explain how easy it was for them to use their mobile devices in general and for language learning purposes more specifically. They were also requested to give their views on the feasibility of integrating MTLL training and use into the formal English language classroom at UR. The participants exchanged their views, and agreed that using their mobile devices for any purposes, i.e. for both language learning and general purposes, was easy, and that the use of their mobile devices for general purposes did not require them to have any special training. Regarding the specific ways in which mobile devices were being used, the participants said that they were using their devices on a regular basis for communication purposes, mostly to make and receive telephone calls, to send and receive SMSs, and to communicate via e-mails and different social networking tools. This information matched what the participants had reported on the survey (cf. Section 5.4).

Regarding the effectiveness and feasibility of integrating MTLL training and use into the formal English as a foreign language (EFL) classroom (cf. Topic 2 in Appendix H), the researcher addressed the question primarily to the participants

who had been using MTLL during the experimental period. After discussing this topic, these participants agreed that MTLL training and use are useful in EFL learning, and that it would be possible to integrate it into the formal EFL classroom at UR, if all the students had suitable mobile devices, and if there were experts to guide the process. As far as the way in which MTLL training and/or use can contribute to EFL learning, the participants (who had made use of MTLL) specified that by using their mobile technological devices, they had been able to find a lot of EFL input, and to practise EFL through interactions with apps and online communities, at any time and place, opportunities which would not have been available if they had relied solely on the formal EFL classroom.

MTLL user satisfaction was another topic that was investigated by means of the discussion group (cf. Topic 3 in Appendix H). In this regard, all the participants who had been using MTLL in EFL learning (with and without training) during the experimental period said that they had really liked it, and that they were motivated to keep on using MTLL even after the experimental period of this study. The participants who had used the additional conventional language learning materials, and their peers who had made use of the formal classroom input alone, also said that they would be keen to use MTLL for EFL learning if they owned the relevant devices and got the opportunity to do so.

7.2.2. Learning Environment and Language Learners' Experience with, and Attitudes towards MTLL

Regarding their experience with MTLL (cf. Topic 4 in Appendix H), the participants said that they enjoyed participating in this MTLL study, and that they had benefited from it. Among other benefits, the participants said that they became aware that mobile technological devices could be used as language teaching-and-learning materials with the possibility to integrate them within the formal language classroom. On the one hand, the participants who had made use of MTLL during the experimental period said that they had gained additional skills and received training and/or guidance in using MTLL in EFL learning. On the other hand, the participants who had not made use of MTLL said that they had benefited from this study by receiving and making use of the additional EFL input in the form of conventional materials, and/or by receiving guidance in EFL

learning which were provided by the researcher all along the study's experimental period. As a result of these benefits, all the participants said that they would volunteer to participate in another MTLL study.

From a constructivist perspective, as discussed in Chapter 2, specifically in Section 2.5.8, learning occurs as a result of the learner's experience with the learning environment. It is in this regard that in addition to collecting information related to the language learners' experience with MTLL and their attitudes towards the latter, this study also collected the learners' views on MTLL with respect to the language learning environment (cf. Topic 5 in Appendix H). The participants were requested to identify the MTLL learning environment (i.e. the environment in which they had been taught by means of MTLL), compared to the formal EFL classroom, as 'social', 'formal', 'academic' or 'other'. The participants agreed that the MTLL learning environment could be referred to as social, whereas the EFL classroom environment was formal. They also said that they felt most comfortable in a social environment because it was more interactive, flexible, friendly and motivating.

7.2.3. MTLL with Respect to Target Language Input and Learners' Autonomy

As discussed in Chapter 1, especially in Section 1.3.1, problems which are commonly faced by FL learners include the lack of rich TL input in terms of both quantity and quality, the lack of sufficient opportunities for TL output, and the lack of learners' autonomy in the language learning process. It was mentioned that in most contexts, the foreign language (FL) is taught by non-native speakers (NNSs) of the TL, and the FL has to be learnt on the basis of the formal language classroom input alone. In order to improve their skills and proficiency in the TL, learners have to rely on the classroom environment which is not flexible in terms of time or place or the teaching methods employed, which are often not learner-centred.

In the discussion, the participants of the current study were asked if they thought that they could teach themselves another language by using their mobile technological devices (cf. Topic 6 in Appendix H), given that these provide not only rich TL input but also sufficient opportunities for TL output. In response to

this question, the participants said that they believed that by adequately and regularly using different language learning apps, as well as the communication tools accessible on mobile technological devices, and by exploiting all the affordances (cf. Section 3.2.2) which could be offered by their mobile technological devices, they might indeed be able to teach themselves another language.

In addition to their views on the contribution of MTLL to language learners' autonomy, the participants' views on MTLL with respect to TL input quantity and quality were also considered in the discussion. The participants who had made use of MTLL with and without training during the study's experimental period, responded to these questions.

Starting with the use of MTLL and TL input quantity (cf. Topic 7 in Appendix H), the participants were requested to rate the TL learning data available on their mobile technological devices versus the TL learning materials accessible at their university library. In this context, the concept of 'availability of the TL learning data' was discussed not only in terms of quantity, but also in terms of accessibility, more specifically how easy or hard it was to find TL learning resources.

In terms of accessibility, the participants were given five options to choose from, in rating how easy or hard it was to find language learning materials online and offline by using their mobile technological devices. These options were 'extremely easy', 'very easy', 'easy', 'not very easy' and 'difficult'. The participants who had been using MTLL expressed that, compared to using their university library, it was 'very easy' to find language learning materials online and offline by using their mobile technological devices.

Next, the participants were also given five options to choose from, to rate the quantity of EFL learning materials which were available at their university library compared to the materials and tools which were available by using MTLL. The options in this regard were 'extremely rich', 'very rich', 'rich', 'not very rich' and 'poor'. The participants said that compared to the materials available at their university library, the online environment which they could access by using their

mobile technological devices was 'extremely rich' in terms of the quantity of EFL learning materials.

Apart from its quantity, the quality of the TL input was also considered (cf. Topic 8 in Appendix H). In this regard, the participants were requested to rate the quality of the TL learning materials accessible through MTLL, compared to the TL books and other resources available at their university library. Here, the options were 'excellent', 'very good', 'good', 'not very good', and 'bad'. After exchanging their views, the participants agreed that, compared to the materials available at their university library, the EFL learning materials found online by using their mobile technological devices were 'very good'.

7.2.4. MTLL with Respect to Target Language Output

The lack of sufficient opportunities for TL output was addressed next (cf. Topic 9 in Appendix H), to elicit EFL learners' views on the potentialities of MTLL use to create a platform and provide opportunities for TL output, which is one of the requirements for successful FL learning (cf. Sections 2.5.6 to 2.5.8).

The participants were asked if during this study's experimental period, their mobile technological devices had helped them to interact with more proficient EFL speakers and native speakers (NSs), and to participate in conversations which were (slightly) beyond their level of proficiency, i.e. conversations in which the learners' EFL proficiency level was (slightly) lower than that of their interlocutors. As discussed in Chapter 2, especially in Section 2.5.6, such conversations would encourage learners to negotiate meaning and, as a result, improve their L2/FL skills and proficiency (Satar 2015; Long 1996; Mackey, Gass and McDonough 2000). The participants reported that by exploiting the connectivity affordance of their mobile technological devices, they had a lot of opportunities to interact in both oral and written English with different people who included English NSs. Furthermore, the participants reported that these interactions sometimes involved being exposed to English vocabulary, phrases and structures with which they were not familiar. Since such interactions required the learners to negotiate meaning, they should have contributed to successful language acquisition (cf. Section 2.5.7).

As discussed in Sections 2.5.6 and 2.5.7, it is important to note that the creation of the contexts in which the learners express themselves fully in L2/FL, and convey their personal own meanings, is one of the requirements for a successful L2/FL classroom (Johnson 1995). It is in this regard that at the end of the discussion, the participants were asked if they thought that their mobile devices could create different contexts in which they had to use EFL to express their own personal opinions as well (as opposed to the formal classroom). The participants responded that, especially when they were using social networking tools to interact with new people, who included English NSs, they sometimes had to use only English to introduce themselves and to express their opinions to their interlocutors. The participants believed that this helped them to improve their English proficiency, since this gave them more opportunities to use English freely, and to get the feedback from their interlocutors in a social way, which was more comfortable and relaxing than the way it was done inside the formal language classroom. Scholars such as Mackey, Gass and McDonough (2000:471) found that such interactions provide the learners “with opportunities [not only] to use [the target] language [(TL), but also], ... to reflect on their own language use”. Furthermore, Long (1996:451-452) states that the ““negotiation of meaning [(which of course occurs in such contexts)] ... facilitates [the L2/FL] acquisition because it connects input, internal learner capacities... and output in productive ways”. Mackey, Gass and McDonough (2000:471) add that in such contexts, “learners may receive feedback on their [L2/FL] utterances” (something that the participants indeed reported to receive), and thus improve their proficiency (cf. Section 2.5.6).

7.3. Conclusion

In conclusion to this chapter, it is important to note that the findings of this study in matters of language learners’ attitudes towards and experience with MTLL match the findings of previous studies in this subfield of SLA. Among others, scholars such as Amer (2014:285) found that in general the language learners “have strong positive attitudes toward the use of mobile technology in language learning”. Other scholars, such as Chen (2013), adopted Sharples’ (2009) approach to evaluate students’ attitudes towards using MTLL, the same

approach adopted for the purposes of the current study. These scholars also found that the language learners' "attitudes towards the usability, effectiveness, and satisfaction of [MTLL] ...were quite positive", which is, in turn, "similar to what other MALL studies have found" (Chen 2013:29).

As far as the practical implementation of mobile-technology-related projects into the teaching-and-learning process is concerned, scholars such as Stockwell and Liu (2015:301) found that "learners have generally ... very positive attitudes towards the mobile-based activities they are assigned to complete", and these attitudes lead to the success of such projects.

As stated earlier, specifically in Chapter 5, Section 5.3, some language teachers and lecturers still prefer conventional teaching-and-learning methods, and have negative attitudes towards, and some degree of resistance to, the integration of mobile technologies into the formal teaching-and-learning process. Language learners' positive attitudes stand in contrast to such negative attitudes towards MTLL incorporation. Chen (2013:29) states that the language learners' positive attitudes show that they "are willing to make use of mobile technologies for their studies, opening a whole new world of possibilities for language teaching and learning". One could argue that the learners are the clients and the teachers the providers in a formal classroom, and that the focus should therefore be on the *learners'* needs and preferences. This is a good reason for studies on the use of MTLL to adopt a theoretical framework such as constructivism, which considers *learners* as the centre of the teaching-and-learning process.

In the next chapter, a summary of this study with respect to its aims, objectives, research questions and hypotheses is provided, and its general findings in these regards are discussed. In addition, the chapter includes a discussion of the role which was played by constructivism as a theoretical framework that guided this study, and the success of the current study as an m-learning project. Finally, the practical recommendations for integrating MTLL training and use into the L2/FL classroom, the study's strengths and limitations, as well as the recommendations for further research are elaborated on.

Chapter 8 : DISCUSSION, CONCLUDING REMARKS AND RECOMMENDATIONS

8.1. Introduction

The study reported in this dissertation investigated the effect of using mobile technologies for language learning (MTLL) on language learners' proficiency in a foreign language (FL). Specifically, the study investigated the effect of MTLL on the English as a foreign language (EFL) proficiency of first-year students at the University of Rwanda (UR).

Chapter 1 of the dissertation provided the background to the study, specifying the research problem, aims, objectives, research questions and hypotheses of the study. Chapter 2 provided a thorough literature overview of research conducted on language proficiency and different ways of testing it, as well as factors affecting language proficiency. One of these factors, namely input, was then dealt with in more detail. The chapter also provided an overview of second language acquisition (SLA) theories, and argued that the theory of constructivism was best suited as a framework for the current study. Finally, Chapter 3 provided an overview of research conducted in the field of technology for language learning (i.e. in computer-assisted language learning (CALL) and mobile-assisted language learning (MALL)), before discussing the integration of mobile technologies in language learning (MTLL) into a formal language learning context in a way that is compatible with a constructivist approach to SLA.

Chapter 4 discussed the study's research design and methodology, introducing the research population and sample groups, and describing the selected methods for data collection and analysis. Data were collected by means of observation, a survey, an English proficiency test (referred to as the "EPT"), a semi-structured interview with one of the UR staff members, and a discussion group.

Chapter 5, 6 and 7 each reported a subset of the study's research findings. Chapter 5 reported the survey, observation and interview data, which were used to describe the participants and their learning environment in detail. Chapter 6 reported the results of the EPT pre-test and post-test and discussed the meaning

of these results for claims about the effect of MTLL use and/or training on learners' EFL proficiency. Chapter 7 reported on the insights gained from the discussion group with the participants following the experimental period.

This final chapter of the dissertation firstly, in Section 8.2, returns to the study's primary aim, to explicate how the findings reported in Chapter 5 to 7 address this aim, as well as, more specifically, the study's objectives, research questions and hypotheses. Section 8.3 then evaluates the study's success as an m-learning project, and Section 8.4 explicates how constructivism contributed to the relative success of the study as an m-learning project. At the end of this chapter, following this study's findings, Section 8.5 addresses the secondary aim of this study by stating the practical recommendations for L2/FL pedagogy. Finally, the strengths and limitations of the study, as well as some recommendations for future research are provided in Section 8.6.

8.2. Returning to Aims, Objectives, Research Questions and Hypotheses

As discussed in Chapter 4, the study reported in this dissertation was conducted with first year students at UR's College of Education in Kigali (Rwanda), whose compulsory subjects included EFL (cf. Section 4.5). As stated in Chapter 1, Section 1.3, the primary aim of this study was to investigate the effect of the use of MTLL (with and without training) on FL learners' proficiency in the TL. It is in this regard that the study made use of four sample groups of 15 participants each, which involved two experimental groups (EGA1 and EGB1) and two control groups (CGA2 and CGB2) (cf. Section 4.5). The experimental groups were made up of participants who made use of MTLL following training (EGA1) and participants who received additional conventional learning materials from the researcher (EGB1) (cf. Table 4.1). The control groups were made up of participants who made use of MTLL without being trained in this (CGA2), and participants who were learning the TL solely on the basis of the input they received in the formal language classroom (CGB2) (cf. Table 4.1).

In order to achieve the above-mentioned primary aim, three objectives were set for the study (cf. Section 1.3.1). The first objective was to design and implement a

short course for training the EGA1 members in the use of MTLT for EFL learning purposes. As was made clear throughout this dissertation, the study adopted constructivism as its framework. According to constructivism, learning does not occur by teachers transmitting knowledge to their learners; instead, it occurs when learners construct knowledge through their interaction with the learning environment (cf. Section 2.5.8). However, this does not exclude the role of instruction from the teaching-and-learning process. As discussed in Section 4.6.3, constructivism recognises the role of instruction, but limits the teacher's role to that of a facilitator, who, amongst other things, portrays the tasks to the learners (Ertmer and Newby 2013:57). It is in this regard that the aim of the MTLT training in this study was not to show the participants how they had to use MTLT for the purposes of this study. Instead, the primary aim of the training was to introduce the participants to MALL and to show them the potential contribution that the use of MTLT might make to their proficiency in EFL. The secondary aim of the training was to equip the participants with basic skills to enable them to adequately exploit the affordances provided by their mobile technological devices, and thus to move from using their devices for general, basic purposes only, to using them for educational purposes, including EFL learning. As a result, EGA1 members received training on the EFL resources available on their mobile devices, but they were still in control of which resources and apps they used and how they used them to execute the portrayed tasks (cf. Section 4.6.3.1).

Since the study adopted a constructivist framework, each of the participant groups had to receive some form of constructivist-based instruction from the researcher. In addition to EGA1 receiving MTLT training, three other types of intervention were therefore provided to the other groups, in conformity with constructivism. All four types of intervention were provided not only for the purpose of instruction – they also served to monitor and guide the participants, as well as making sure that they had the same learning objective (i.e. they understood the task at hand, which was to improve their EFL proficiency), and that they were indeed learning the TL in conformity with constructivism, by adequately exploiting the different learning tools that were recommended by the researcher. Specifically, the participants in EGA1 received the formal MTLT training (cf. Section 4.6.3.1), and the participants in CGA2, who made use of

MTLL without training, received guidance (not formal training) and advice with regard to the apps they could use in EFL learning (cf. Section 4.6.3.2). EGB1 received additional conventional EFL learning materials and encouragement to exploit these materials (cf. Section 4.6.3.3), and CGB2 received encouragement to make the most of the formal language classroom input (cf. Section 4.6.3.4). In addition to these interventions, related to the first objective of the study, different data collection methods were also used to achieve the second and third objectives, as discussed below.

An English proficiency test (EPT) was created on the basis of the TOEIC (cf. Section 4.6.2), and was used to achieve the second research objective, which was to investigate the effect of being trained in and/or using MTLL on the learners' EFL proficiency, versus using the additional conventional EFL learning materials, and relying on the formal language classroom input alone. As discussed in Section 4.6.2, the effect of using MTLL on learners' EFL proficiency was determined by administering the EPT twice to all the participants. Specifically, the EPT was administered as a pre-test at the beginning of the experimental period, i.e. before the above-mentioned intervention took place, and as a post-test at the end of the six-week experimental period, i.e. after the intervention had taken place.

A discussion group was used to achieve the third objective of the study (cf. Section 4.6.4), which was to investigate the language learners' attitudes towards and experience with MTLL training and use. Finally, as discussed in Chapter 4, other methods – a survey (Sections 4.6.1), observation and a semi-structured interview (cf. Section 4.6.4) – were also used to collect background data on the language learners, the EFL teaching-and-learning process, and the learning environment, i.e. factors which the constructivist theory of language learning takes into consideration as potentially affecting the learners' proficiency (cf. Sections 2.5.8 and 2.6).

All these research activities were conducted in order to achieve the above-mentioned objectives (related to the primary aim of this study), as well as to address the study's three research questions (cf. Section 1.3.2), and thus to test the three hypotheses which had been formulated (cf. Section 1.3.3).

By using the results of the EPT pre- and post-test, the first research question was addressed: Does training in and/or the use of MTLL have a significant effect on FL learners' proficiency (i.e. more so than increased conventional input)? As discussed in Chapter 6, this study found that the use of MTLL had a significant effect on FL learners' proficiency, and that the effect of using MTLL following training surpassed the effect of using MTLL without training. It was also found that the effect of using MTLL following training on FL learners' proficiency surpassed the effect of using additional conventional learning materials, as well as the effect of making use of the formal language classroom input alone (cf. Sections 6.4 and 6.6). These findings support the first hypothesis of this study, that the use of MTLL following specific training has a significant positive effect on FL learners' proficiency. The same findings also supported the second hypothesis, that the effect of the use of MTLL following specific training surpasses the effect of the use of MTLL without training, as well as the effect of using (additional) conventional language teaching-and-learning methods and/or materials.

The results of the EPT were also used to address the second research question: What is the extent and the nature of the contribution of MTLL to the FL learners' proficiency? As discussed in Chapter 6, especially in Sections 6.2 to 6.4, and in Section 6.6, this study found that the extent to which the use of MTLL contributes to the FL learners' proficiency varies, depending on the types of proficiency under investigation, and depending on whether or not learners had received training in MTLL use. Table 6.15 (repeated below as Table 8.1) presents the results of the EPT post-test by comparing the four groups' performance in terms of listening proficiency, reading proficiency, and overall proficiency.

	EGA1 MTLL use with training	CGA2 MTLL use without training	EGB1 Additional conventional material	CGB2 TRUE CONTROL GROUP
Listening and speaking	>CGB2	>CGB2		
Reading and writing	>CGA2 >EGB1 >CGB2	>CGB2	>CGB2	
Overall proficiency	>CGA2 >EGB1 >CGB2	>CGB2	>CGB2	

Table 8.1: Representation of summarised EPT post-test results with > denoting “significantly outperformed”

As discussed in Chapter 6, this table shows that the use of MTLL does not seem to affect listening proficiency to the same extent as reading proficiency. The effect of using MTLL following training did not surpass significantly the effect of using MTLL without training or using additional conventional learning materials as far as the EFL learners’ listening proficiency is concerned. However, as far as their reading proficiency and their overall proficiency are concerned, the effect of using MTLL following training surpassed significantly the effect of using MTLL without training, as well as the effect of the increased use of conventional language learning materials. As discussed in Section 6.6, and presented in Table 8.1, the effect of using MTLL without training did not surpass significantly the effect of using the additional conventional learning materials for any type of proficiency. However, just like the use of MTLL after training, the use of MTLL without training and the use of additional conventional material surpassed significantly the effect of the use of formal classroom input alone, for both reading proficiency and overall proficiency.

The third and last research question reads “What are the language learners’ attitudes towards and experience with MTLL training and use?”, and the corresponding hypothesis is that language learners have positive attitudes towards MTLL training and use. This research question and hypothesis were addressed by using the data collected through the discussion group. As discussed in Chapter 7, the study found that the FL learners had positive attitudes towards MTLL training and use. The participants who had made use of MTLL during the

experimental period expressed their satisfaction with MTLL, and reported having found it to be usable and effective as far as EFL learning is concerned. Furthermore, all participants expressed their willingness to participate in future MTLL-related studies, and agreed that they thought it would be possible and useful to integrate the use of MTLL into the formal language classroom.

8.3. Success of the Current Study as an m-Learning Project

As discussed in Chapter 3, specifically in Section 3.2.2, the use of MTLL is part of mobile-assisted language learning (MALL), which is in turn part of the broader fields of mobile learning (m-learning) and technology for language learning. Recall that, according to Cacchione, Procter-Legg, Petersen and Winter (2015:1259), any m-learning project succeeds depending on three factors, namely (i) the relevant technology, (ii) institutional involvement, and (iii) the relevant pedagogy (cf. Sections 3.3.1 and 6.6). It is important to note here that the current study was conducted in the framework of constructivism, a theory which treats the learner as the centre of the teaching-and-learning process, and according to which learning occurs as a result of the learner's interaction with environment (cf. Section 2.5.8). It is in this regard that the above Cacchione, et al. (2015)'s three factors for the success of m-learning projects should be extended into five factors to match the factors introduced by Naismith and Corlett (2006:12-17) in the same regard: (i) the availability of technology; (ii) institutional support; (iii) connectivity; (iv) integration with the curriculum and the student experience or 'real life'; and (v) the promotion of "ownership over learning" (in that the learner owns the technological device which offers the MTLL input).

Here, it will be argued that the current study is indeed successful when measured against these five factors: The learners had access to relevant mobile technological devices (i.e. factor (i)), which they themselves owned (i.e. factor (v)), with their mobility and connectivity affordances, specifically also free internet connection at university, on buses and in public places throughout most of Kigali (i.e. factor (iii)). Furthermore, an explicit attempt was made by the researcher to integrate the use of MTLL within the formal EFL curriculum and

EFL instruction, and within the language learners' 'real life' outside the formal classroom (i.e. factor (iv)).

The one factor that might be regarded as problematic in the current study, is factor (ii) – institutional support. According to the interview with the UR employee (cf. Section 5.3), there was little institutional support in matters of using MTLL at the university, but the university did express its willingness to provide such support to the students as soon as there were sufficient technological, methodological and human resources. The resistance of some academic staff members to MTLL use, as well as the lack of training in the use of mobile technologies in education, were some of the main challenges that UR was facing (cf. Section 5.3). However, the positive attitudes, expressed by all the participants in the study, towards MTLL usability, effectiveness and user satisfaction are encouraging, and the results of the study indicate that it would be worthwhile to try and address these problems.

However, despite this general lack of institutional support at the time that the current study was conducted, the study can still be evaluated as a successful m-learning project in terms of this factor, as well: The researcher actually provided “institutional support” for the integration of MTLL into the formal EFL classroom (even though this was only temporary support and not officially provided by UR) by providing MTLL training and continuous guidance to the participants in EGA1, as well as continuous guidance in MTLL use to the participants in CGA2 (cf. Sections 4.6.3.1 and 4.6.3.2).

The value of such training and guidance should not be underestimated. In his study, Chen (2013:28) found that simply “providing students with ... [a] mobile device did not result in its effective usage in language learning”. With reference to his findings, Chen (2013:28) recommends that the “learners need to be properly guided not only technologically, but also methodologically”, in order for MTLL use to be effective. These findings and recommendation match the findings of the current study. As discussed in Chapter 5, university students who participated in this study were in possession of different types of mobile technological devices, and some mentioned that they had already been using them in EFL learning prior to this study. However, as discussed in both Chapter 5

and Chapter 6, the EPT pre-test showed that there were no significant differences between students who reported using MTLL and their peers who reported not using MTLL (among others, cf. Sections 5.6 and 6.4). However, on the EPT post-test, the learners who had made use of MTLL following the specific MTLL training provided by the researcher (i.e. the members of EGA1) significantly outperformed their peers who had only been using the classroom input (i.e. the CGB2 members) and those who had received additional conventional language learning materials (i.e. the EGB1 members). Following Chen (2013)'s recommendation above, the performance of participants who had used MTLL following training was compared to that of their peers who had used MTLL without training. It was found that the MTLL technological and methodological training accompanied by the relevant guidance did indeed have a significant positive effect on the learners' EFL proficiency – the MTLL users who had received training (i.e. the EGA1 members) significantly outperformed those who had not (i.e. the CGA2 members). It can be deduced that without training and guidance, learners probably do not adequately exploit all the affordances offered by MTLL.

The MTLL training and guidance provided by the researcher in the current study are thus part of the support that should be offered by the institution, in this case UR. However, for obvious reasons, this support only lasted six weeks, i.e. the duration of the experimental period. If one would like to see a sustained positive effect of MTLL use on learners' EFL proficiency, then it is clear that the formal / official, continuous institutional support is vital.

8.4. Contribution of Constructivism to the Study

Throughout this dissertation, the advantages of couching the current study within a constructivist approach to SLA have been pointed out. In Section 8.2 above, it was noted how the MTLL training provided to EGA1, as well as the intervention provided to all three other sample groups, were guided by this approach. Another respect in which constructivism guided the current study, was that the learners were treated as the focus of the language teaching-and-learning process. It is in this regard that I argue that in addition to Naismith and Corlett's (2006) five factors for a successful m-learning project (cf. Section 8.3),

two other factors need to be considered, namely (i) the language learners' ability to use the technological tools at their disposal, and (ii) the learners' awareness of the potential contribution of different technological tools to the improvement of their EFL proficiency.

The importance of this awareness creation in the teaching-and-learning process is twofold. According to Nikou and Economides (2016:1246), "previous studies have shown that students' perceptions of their own ability and efficiency to use digital technologies positively influence not only their motivation but also their achievement". This could be noted in the current study as well: the participants had positive attitudes towards MTLL use, and were very motivated and enthusiastic to participate in the study (cf. Chapter 7), and they showed a significant improvement in their EFL proficiency (cf. Chapter 6). Following Nikou and Economides' claim above, one could thus argue that, in the current study, the participants achieved a higher level of proficiency in the TL as a result of (i) being more aware of their individual abilities to take control of the language learning process, (ii) being aware of the efficiency of MTLL in improving their EFL proficiency, (iii) being motivated and enthusiastic, and (iv) having positive attitudes towards MTLL (and towards the study itself).

Finally, the concept of 'mobility' is not only inherently part of MTLL, but is actually conducive to precisely a constructivist approach to L2/FL teaching and learning. As discussed in Sections 3.2 and 3.3, this concept is meant to "free" the teaching-and-learning process from taking place at a specific place and time, and from using specific and limited physical resources accessible from the formal educational environment. Mobility allows the teaching-and-learning activities to take place both inside and outside the classroom, at any time and place, and by using a large number of resources which can be accessed online and offline by using mobile technological devices. Because of their mobility affordance, MTLL are considered to be "ideal tools to foster learner autonomy and ubiquitous learning in informal settings" (Chen 2013:29). However, this can only be achieved once the MTLL "affordances have been carefully studied and clearly manifested to student users, who usually have a positive attitude towards the usability, effectiveness, and satisfaction of mobile technologies as language

learning tools” (Chen 2013:29) – a requirement which is in line with the constructivist approach to teaching and learning as reflected throughout this dissertation.

In addition to being accessible at any time and place, and allowing the learners the autonomy and control in the language learning process, the use of MTLL allows learners to use the L2/FL and to interact with others in the L2/FL anonymously, which is impossible in the classroom or in other face-to-face interactions (cf. Sections 3.2.3 and 5.2.4). Apart from autonomy, ubiquitous learning and anonymity, it is highly likely that the convenience of MTLL increases learners’ motivation. Language learners are more motivated to actively increase their proficiency in the L2/FL because it involves so much less of an effort to do so via MTLL than taking notes in the formal language classroom or studying what was discussed in this classroom or obtaining and reading conventional material. This type of learning also involves a medium – technology – which is desirable, comfortable and familiar to the digital native generation (cf. Section 4.6.3.1) that most university students belong to.

It should be noted that the L2/FL teacher is not at all regarded as obsolete in a constructivist view on L2/FL learning. Instead, if L2/FL teachers were to adopt a constructivist approach to L2/FL teaching, their roles would simply change from trying to “transmit” their L2/FL knowledge to learners, to trying to encourage and enable learners to “construct” their own L2/FL knowledge. The possible implications of the current study’s findings are explored further in the next section.

8.5. Practical Recommendations for L2/FL Pedagogy

According to Liakin, Cardoso and Liakina (2015:14), the integration of modern technologies within the language teaching-and-learning process increases “the overall interest and motivation of the students”, and thus makes the process more successful. However, as mentioned in Section 1.3.1, from his review, Burston (2014:103) found that “in reality, with few exceptions, published studies of MALL... have not progressed much beyond pilot testing”. And according to Burston (2014:103), “what is most striking about published MALL... studies is

the virtual absence of... curricular integration”. In an attempt to address Burston (2014)’s concern, the current study’s secondary aim was to offer practical suggestions regarding how MTLL can be effectively integrated into the conventional L2/FL classroom (cf. Section 1.3.1).

Before addressing this secondary aim, it is necessary to understand the possible causes of the lack of MTLL integration within the language pedagogy, which characterises most of the published MALL studies. In this regard, Burston (2014:115) explains that “historically, the lack of integration of MALL into the curriculum can be attributed to technological limitations and cost factors; however, that is much less so now than ever before”. Nowadays, a wide variety of affordable mobile technological devices is available on the market, and almost everyone owns at least one mobile device which he/she uses for different purposes. This was confirmed by the current study’s findings, as discussed in Chapter 5, more specifically in Section 5.4. In addition, according to Alotaibi, Alamer and Al-Khalifa (2015:1309), “there is no need for teachers or institutions to provide students with sophisticated, high-priced equipment or installations to enable the integration of mobile-assisted language learning (MALL) into their teaching environment”. This removes the “technological limitations and cost factors” that Burston (2014:115) refers to as a possible barrier to MTLL integration within language pedagogy. In other words, Alotaibi, Alamer and Al-Khalifa (2015) argue that even a relatively cheap and simple mobile technological device can be used for language learning, the argument which the current study supports.

As discussed in Section 5.5, some of the study’s participants were making use of MTLL even before any instruction or advice was provided to them. This is one sign that the integration of MTLL within the formal language teaching-and-learning process is possible and welcome on the learners’ side, although on the teachers’ side it might still be problematic (cf. Section 5.3). The findings of other scholars who also investigated the status of integrating MTLL with the acquisition of English as a second language (ESL), match those of the current study. One example includes Park and Slater (2014:93) who “found that ESL learners already use various mobile device functions, but that ESL instructors

were less inclined to use these for teaching”. This lack of willingness and the related negative attitudes, which were still observable on the side of some language teachers at UR (cf. Section 5.3), seem to be a significant hindrance to the process of integrating MTLL within the formal language pedagogy.

The challenges related to the integration of MTLL within the formal pedagogy must be resolved at both micro (i.e. the learners and teachers) and macro (i.e. the institutions, governments and other education stakeholders) levels. At the macro level, “language policies should encourage informal learning outside school, and contemplate the contact with language through different types of media” (Costa and Albergaria-Almeida 2015:2373). And once the relevant policies are implemented, the educational institutions should set up “an easily accessible supportive environment in which [MTLL] expert and peer advice can be consulted” (Chen 2013:28) by both learners and teachers.

At the micro level, “teachers may need further support and ideas [so that] ...they can help their learners [to] take advantage of their mobile devices for language learning” (Park and Slater 2014:93). More specifically, language teachers should be provided with “a technology push in the form of professional development to build their confidence with mobile technology, so that they can attain the same levels of comfort and familiarity with mobile devices as their students” (Park and Slater 2014:111-112). Once the teachers have sufficient skills and knowledge in using MTLL, it is their turn to ensure that all the learners are able to adequately use the relevant technologies as well, and this should be done through instructor guidance. This instructor guidance must be provided not only on the general use of technologies, but also on the learning activity design and objectives, as well as on the role of interaction and collaboration in the teaching-and-learning process. This guidance is a necessity because in most cases learners are not even “aware of the technological affordances of the new technology, the cognitive underpinnings of language learning or how they could be combined to foster competence” (Chen 2013: 29).

The findings of the current study suggest that, in addition to providing guidance on how MTLL can be used, teachers should also play the role of constructivist instructors throughout the teaching-and-learning process. As explained in the

previous section, such instructors should not attempt to transmit knowledge to the learners through mobile technologies (cf. Section 8.4). Instead, they should provide the learners with instruction which meets the following requirements, as listed by Kukulska-Hulme, Norris and Donohue (2015:13):

- “incorporate tasks relating to learners’ communicative needs within and beyond the classroom”
- “expose learners to language as a dynamic system”
- “integrate the four skills of speaking, listening, reading and writing”
- “provide learners with timely feedback and scaffolding”
- “give opportunities for learners to interact socially, negotiate meaning and produce varied and creative communication with peers and with English language users beyond the classroom across boundaries of time and place”
- “enable learners to rehearse speech and writing, which can be particularly challenging in a classroom setting”
- “encourage learners to develop skills in ‘learning how to learn’ and attend mindfully to the learning process”
- “allow learners choices in what and how to learn”
- “contribute to learners’ sense of progress and achievement”

The study reported in this dissertation can be used as one example of how the integration of MTLL within the formal L2/FL pedagogy can be successful. This study attempted to integrate the use of MTLL within the formal FL classroom (cf. Chapter 1 and Chapter 4), and its results showed that such integration is possible and effective as far as the FL learners’ proficiency in the TL is concerned (cf. Chapter 5 onwards). In light of the discussion in the previous section, it can be argued that the study’s successful integration of MTLL within the formal language classroom resulted from the presence of a constructivist instructor, providing training and guidance (here, the researcher) at the micro level, combined with the university’s support and permission to conduct this study at the macro level. More specifically, at the macro level, the university, as an institution and as a physical and social community, played a significant role in the execution of the study. And at the micro level, the researcher provided constructivist instruction, and integrated himself into the research population, not only as an informed and willing teacher with a positive attitude towards the

use of MTLL in the formal teaching-and-learning process, but also as a mentor, adviser, guide and friend (cf. Chapter 4). Although it might not suit all L2/FL teachers to take on all of these roles, it is worth noting that the fact that the researcher did this, probably contributed to the successful MTLL integration observed in the current study.

8.6. Strengths, Limitations and Recommendations for Future Research

As discussed in Section 1.5, the scope of the current study was limited in terms of its practical and theoretical frameworks. On the theoretical side, all the research interventions discussed in Section 8.1 above were designed and implemented in conformity with constructivism, whereby the researcher played the role of a constructivist instructor or facilitator. On the practical side, this study was limited to investigating the effect that these interventions had on the participants' EFL proficiency. Recall that these interventions took place during a six-week period, the focus was on the overall EFL proficiency of 60 first-year university students of mathematics and physics at UR's College of Education (cf. Section 4.5). As discussed in Sections 1.1 and 1.4, there is still a need for more studies to investigate the use of MTLL, in conformity with different theories, in varied geographical locations, with larger sample sizes and different types of populations (e.g. primary and high school learners, university students, and other adults), as well as in cases where the L2/FL is a language other than English.

The claims regarding the contribution of constructivism to the current study's success as an m-learning project (cf. Sections 8.3 and 8.4 above) should, for example, be tested by conducting studies which adopt a different, specific theory of SLA. In addition, one might want to determine the significance of the availability of native speaker (NS) input, received via MTLL in the current study, by making NS input available to learners via channels other than MTLL, for example, having a NS teacher or tutor in the formal classroom or by providing

learners with audio recordings of NS discourse²³. However, one is immediately reminded of the effort this would require in contrast to how effortlessly this is available to learners via MTLL, at any time and place, and to an infinite extent.

Another recommendation for future studies relates to the fact that, in the current study, compared to the use of conventional teaching-and-learning methods and materials, the use of MTLL (with and without training) was found to only have a statistically significant effect on the learners' reading proficiency and not in the case of their listening proficiency (cf. Section 6.6). Additional research in this regard would also determine the extent to which this phenomenon can be generalized.

This leads to an important limitation of the current study, namely its use of a non-standardised test – the EPT – to measure the learners' EFL proficiency. Section 2.2 described a number of different standardised EFL and ESL tests, and Section 4.6.2 then explained why none of these was used in the current study, and why the EPT was designed on the basis of the TOEIC. A replication of the current study, making use of one of the standardised EFL / ESL tests would indicate the extent to which making use of the EPT might have affected the findings of the current study (may be also the phenomenon referred to in the previous paragraph, namely a differential effect of MTLL use on different types of proficiency).

To conclude, at the beginning of this dissertation it was noted that in the context of Africa, English is often one of the official languages of a country and/or its medium of instruction (MoI) despite the fact that the majority of the population does not know the language or only has a very low level of proficiency in the language (cf. Chapter 1, Section 1.1). This has far-reaching consequences, since having a low proficiency in the MoI significantly hinders learners' academic

²³ Note that the latter was in fact provided to EGB1, as part of the additional conventional learning materials, and that MTLL use following training was still found to have a significant advantage over the use of the conventional materials.

progress, especially if the teachers themselves have low levels of proficiency in the MoI, and almost no input is available to teachers or learners outside of the classroom, because the language is also an FL. The importance of helping learners and teachers to improve their proficiency in the MoI is thus self-evident: it will improve learners' academic progress at primary, secondary and tertiary level, which will in turn lead to more and better job opportunities and eventually to upward socio-economic mobility. Given that Rwanda is a case in point, and given that English is the MoI (and/or (one of) the official language(s)) in many other African countries, the findings of the current study are relevant to a wide audience.

In the introductory chapter of this dissertation, more specifically in Section 1.4, it was predicted that the contribution that the study reported here would make, would be three-fold. One prediction was that the study would offer practical suggestions regarding the incorporation of mobile technologies in the L2/FL classrooms, precisely which was done in Section 8.5 above. The other two predictions involved theoretical contributions, namely that the study would (i) contribute to our understanding of the role that modern mobile technologies can play in EFL learning in general; and (ii) contribute to our understanding of this phenomenon within the African context with its unique challenge that the majority of its population does not have mastery of its country's official language(s). I hope that the reader will agree that the findings of the current study, as reported in this dissertation, did indeed make these practical and theoretical contributions, and that it has opened up the avenue for further exploration into a promising means of promoting successful L2/FL learning.

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APPENDICES

Appendix A : Research Ethical Clearance



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jou kennisvenoot • your knowledge partner

Approved with Stipulations New Application

22-Aug-2016
Uwizeyimana, Valentin V

Proposal #: SU-HSD-002987

Title: An Investigation into the Effect of Mobile-Assisted Language Learning on Rwandan University Students' Proficiency in English as a Foreign Language

Dear Mr Valentin Uwizeyimana,

Your **New Application** received on **01-Aug-2016**, was reviewed
Please note the following information about your approved research proposal:

Proposal Approval Period: **22-Aug-2016 -21-Aug-2019**

The following stipulations are relevant to the approval of your project and must be adhered to:

1. PROTECTION OF DATA

This is not addressed by the researcher and there should be some indication how the researcher will store and protect the data and who would have access to such data.

2. INSTITUTIONAL PERMISSION

The researcher has applied for institutional permission but has not yet received said permission. The data collection cannot commence before the permission is granted. The researcher must submit the letter granting such permission as soon as this is received.

Please provide a letter of response to all the points raised IN ADDITION to HIGHLIGHTING or using the TRACK CHANGES function to indicate ALL the corrections/amendments of ALL DOCUMENTS clearly in order to allow rapid scrutiny and appraisal.

Please take note of the general Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

Please remember to use your **proposal number** (SU-HSD-002987) on any documents or correspondence with the REC concerning your research proposal.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Also note that a progress report should be submitted to the Committee before the approval period has expired if a continuation is required. The Committee will then consider the continuation of the project for a further year (if necessary).

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

If you have any questions or need further help, please contact the REC office at 218089183.

Included Documents:

DESC Report

REC: Humanities New Application

Sincerely,

Clarissa Graham

REC Coordinator

Research Ethics Committee: Human Research (Humanities)

Investigator Responsibilities

Protection of Human Research Participants

Some of the general responsibilities investigators have when conducting research involving human participants are listed below:

1. Conducting the Research. You are responsible for making sure that the research is conducted according to the REC approved research protocol. You are also responsible for the actions of all your co-investigators and research staff involved with this research. You must also ensure that the research is conducted within the standards of your field of research.
2. Participant Enrollment. You may not recruit or enroll participants prior to the REC approval date or after the expiration date of REC approval. All recruitment materials for any form of media must be approved by the REC prior to their use. If you need to recruit more participants than was noted in your REC approval letter, you must submit an amendment requesting an increase in the number of participants.
3. Informed Consent. You are responsible for obtaining and documenting effective informed consent using **only** the REC-approved consent documents, and for ensuring that no human participants are involved in research prior to obtaining their informed consent. Please give all participants copies of the signed informed consent documents. Keep the originals in your secured research files for at least five (5) years.
4. Continuing Review. The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once per year. There is **no grace period**. Prior to the date on which the REC approval of the research expires, **it is your responsibility to submit the continuing review report in a timely fashion to ensure a lapse in REC approval does not occur**. If REC approval of your research lapses, you must stop new participant enrollment, and contact the REC office immediately.
5. Amendments and Changes. If you wish to amend or change any aspect of your research (such as research design, interventions or procedures, number of participants, participant population, informed consent document, instruments, surveys or recruiting material), you must submit the amendment to the REC for review using the current Amendment Form. You **may not initiate** any amendments or changes to your research without first obtaining written REC review and approval. The **only exception** is when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.
6. Adverse or Unanticipated Events. Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as well as any research related injuries, occurring at this institution or at other performance sites must be reported to Malene Fouch within **five (5) days** of discovery of the incident. You must also report any instances of serious or continuing problems, or non-compliance with the REC's requirements for protecting human research participants. The only exception to this policy is that the death of a research participant must be reported in accordance with the Stellenbosch University Research Ethics Committee Standard Operating Procedures. All reportable events should be submitted to the REC using the Serious Adverse Event Report Form.
7. Research Record Keeping. You must keep the following research related records, at a minimum, in a secure location for a minimum of five years: the REC approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and all correspondence from the REC.
8. Provision of Counselling or emergency support. When a dedicated counsellor or psychologist provides support to a participant without prior REC review and approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in the progress report or final report.
9. Final reports. When you have completed (no further participant enrollment, interactions, interventions or data analysis) or stopped work on your research, you must submit a Final Report to the REC.
10. On-Site Evaluations, Inspections, or Audits. If you are notified that your research will be reviewed or audited by the sponsor or any other external agency or any internal group, you must inform the REC immediately of the impending audit/evaluation.

Appendix B : Research Affiliation

REPUBLIC OF RWANDA

Kigali, 31/01/2017
N° 0488/12.00/2017



MINISTRY OF EDUCATION
P.O.BOX 622 KIGALI

Mr. Valentin Uwizeyimana
Ph.D. student
Stellenbosch University
Email: vuwizeyimana@outlook.com
SOUTH AFRICA

Dear Mr. Uwizeyimana,

RE: Approval to Conduct Research in Rwanda under the Project Title: “An Investigation into the Effect of Mobile-Assisted Language Learning on Rwandan University Student’ Proficiency in English as a Foreign Language”

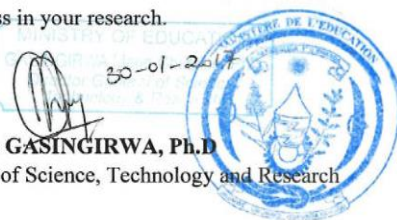
I am pleased to attach a copy of research clearance, which has been granted to you to conduct research on the above title.

I wish to remind you that the research clearance number should be cited in your final research report. The research will be carried out under affiliation of the University of Rwanda-UR under supervision of **Prof. Cyprien Niyomugabo**, School of Education, College of Education, UR.

You are requested to submit the progress report after six months and final report after completion of your research activities to the Ministry of Education of Rwanda.

I wish you success in your research.

Yours sincerely,



Marie-Christine GASINGIRWA, Ph.D
Director General of Science, Technology and Research

Cc.

- Hon. Minister of Education
- Hon. Minister of State in Charge of TVET
- Hon. Minister of State in Charge of Primary and Secondary Education
- Permanent Secretary, Ministry of Education
- Prof. Cyprien Niyomugabo, School of Education, College of Education, UR

Appendix C : Research Permit

REPUBLIC OF RWANDA



MINISTRY OF EDUCATION
P.O.BOX 622 KIGALI

Kigali, 31/01/2017
N° 0296/12.00/2017



Re: Permission to Carry out Research in Rwanda - No: MINEDUC/S&T/417/2017

The Permission is hereby granted to **Mr. Valentin Uwizeyimana**, Ph.D. student at Stellenbosch University, South Africa, to carry out research on: **“An Investigation into the Effect of Mobile-Assisted Language Learning on Rwandan University Student' Proficiency in English as a Foreign Language”**

The research will be carried out at the College of Education, University of Rwanda. The researcher will need to interview the undergraduate students of the College of Education, University of Rwanda.

The period of research is from **2nd February, 2017 to 1st February, 2018**. It may be renewed if necessary, in which case a new permission will be sought by the researcher.

Please allow the **above mentioned researcher**, any help and support he might require to conduct this research.

Yours sincerely,

Marie-Christine GASINGIRWA, Ph.D
Director General of Science, Technology and Research

Appendix D : Informed Consent Form



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STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

An Investigation into the Effect of Mobile-Assisted Language Learning on Rwandan University Students' Proficiency in English as a Foreign Language

You are asked to participate in a research study conducted by *Valentin Uwizeyimana*, a PhD student from the *Department of General Linguistics* at Stellenbosch University, the research of which results will be contributed to research papers, book chapters, thesis or dissertation. You were selected as a possible participant in this study because you are studying Applied/Natural Sciences as an undergraduate student at University of Rwanda, College of Education, who has to study English as an additional compulsory module in the first year of his/her studies.

1. PURPOSE OF THE STUDY

The purpose of this research is to determine the extent to which mobile technologies in language learning (MTLL) training and usage can contribute to the learners' proficiency in English as a foreign language (EFL) in Rwanda.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things within the period of three months:

- ✓ To attend the introductory meeting and/or workshops about the use of MTLL.
- ✓ To use your own mobile device(s) and/or other materials such as books and academic articles for EFL learning purposes according to the guidelines and recommendations provided by the researcher.
- ✓ Sit for both EFL pre-test and post-test, to participate in a semi-structured interview with the researcher, and to respond to the research questionnaire at the end of the research data collection period.

3. POTENTIAL RISKS AND DISCOMFORTS

This study is a no-risk research. No sensitive information will be requested, no laboratory experiments will be carried, and no physical or psychological tests will be administered. With its interference-and-conflict-free status, it will only concern the EFL learning process in the context of a formal classroom at University of Rwanda.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

In addition to contributing to one's academic knowledge in linguistics, especially in technology for language learning and in second language acquisition, this study has the following benefits:

- ✓ The research subjects and any other interested member of University of Rwanda will get the free training, guidance and assistance on the use of MTLL.
- ✓ The subjects will get exposed to more EFL input which can contribute to their English proficiency, and therefore to the success in their academic and professional life.

5. PAYMENT FOR PARTICIPATION

This is not a money-oriented research. It is the academic research that was not funded by any institution as a business-oriented project. Neither the researcher, nor the subject/participant will receive payment for participating in it.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. In addition to the thesis or dissertation, the results of our analysis will be used within other formats such as research papers and book chapters, but we will spare no effort to keep your identity confidential by using letters, numbers, and pseudonyms instead of actual names. No one will ever be able to identify you from anything you say.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Mr. Valentin Uwizeyimana, Principal Investigator [E-mail: vuwizeyimana@outlook.com or telephone: +250 78 844 3638 (Rwanda) / +27 60 620 4005 (South Africa)].

Also, feel free to contact Dr. Simone Conradie, Supervisor [E-mail: sconra@sun.ac.za or telephone: +27 21 808 2052 (South Africa)].

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Clarissa Graham [E-mail: cgraham@sun.ac.za or telephone: +27 21 808 9183], Administrative Officer: Human Ethics.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was appropriately described to me by *Mr. Valentin Uwizeyimana* in [*Kinyarwanda/English/French/other*] and I am in command of this language. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study, and I have been given a copy of this consent form.

Name of Subject/Participant

Signature of Subject/Participant

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the subject/participant*]. [*He/she*] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Kinyarwanda/English/French/other*] and no translator was used.

Signature of Investigator

Date

Appendix E : The Researcher's Verified eSurvey Creator Account

Surveys
My account
Products & Prices
+ Create new survey

Student Account, Customer ID 209504
 Sign out (16518411@sun.ac.za)

Products & Prices

Whether you are just trying us out or you plan to launch a comprehensive survey, we have all the right offers at reasonable prices. You can start with a free survey and upgrade to a higher product at any time. It's always up to you whether you want to extend a survey or not - there's no automatic renewal and you don't have to cancel subscriptions whatsoever. It's all transparent: **No obligations and no hidden costs.**

	Products for single surveys				Flat rate products	
Products	Basic	Personal	Pro	Business	Enterprise	Student
	For simple and small surveys or just to try us out.	For professional surveys with short to medium term.	For professional surveys with a long duration and/or large return.	The flat rate offer for companies who want to conduct any number of surveys and be unrestricted in use.	This is our unlimited high-end solution for usage without any reference to eSurvey Creator (white label).	Benefit from a free flat rate product!
<i>Main differences to previous product</i>		+ Custom layout + Add images + Ad-free	+ Annual survey + Unlimited number of responses	+ Any number of surveys + Multiple accounts included	+ White label solution + Your own domain + We create your questionnaire design	Create any number of surveys and collect as many answers as you want. Corresponds to the product "Business" (with a few restrictions)
Duration	1 month ⓘ <input type="button" value="choose »"/>	1 month ⓘ ⓘ <input type="button" value="choose »"/>	1 year ⓘ ⓘ <input type="button" value="choose »"/>	1 year ⓘ ⓘ <input type="button" value="choose »"/>	1 year ⓘ ⓘ <input type="button" value="choose »"/>	This offer is available as long as your student email address is valid. Check my student email address for admission »
Price ⓘ	For free!	USD 19.00 monthly, per survey	USD 169.00 annually, per survey	USD 279.00 annually, for any number of surveys	USD 599.00 annually, for any number of surveys	For free!
Number of user accounts ⓘ	1	1	1	5	10	1
Number of questions	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited
Number of participants	limited ⓘ	limited ⓘ	unlimited	unlimited	unlimited	unlimited
Number of answers *	max. 350 ** ⓘ	5,000 per month *** ⓘ	unlimited	unlimited	unlimited	unlimited
Free support	✓	✓	✓	✓	✓	✓
No contract obligations, no automatic renewal	✓	✓	✓	✓	✓	✓
Enhanced security (SSL/HTTPS)	✓	✓	✓	✓	✓	✓

Appendix F : Background Questionnaire Template

An Investigation into the Effect of MALL on Rwandan University Students' Proficiency in EFL

0 %

You are kindly invited to take part in my PhD research project, of which the title is provided above, by voluntarily responding to the following questions aiming at collecting the background information about participants, English as a foreign language and the access to mobile technologies. Please note that any information that is obtained in connection with this study and that can be identified with you will remain confidential in all documents that make reference to the information you have supplied.

Next

An Investigation into the Effect of MALL on Rwandan University Students' Proficiency in EFL

20 %

1. Please provide your name and contact details: *

First and last name

Telephone number(s)

E-mail address(es)

2. How old are you? *

Age: years old.

3. Please specify your gender: *

- Female
- Male

4. What is your first language? *

- English
- French
- Kinyarwanda
- Swahili
- Other, please specify:

5. What language do you use most frequently in your everyday life? *

- English
- French
- Kinyarwanda
- Swahili
- Other, please specify:

6. How many years have you been studying and/or using English? *

years.

7. In which context did you receive your first significant exposure to English? *

- At a family member's house
- At a friend's house
- At church
- At home
- At school
- In another country
- Other, please specify:

8. In the following environments, whom do you speak English to? Please mark all the relevant options.

	English native speakers	Friends	Classmates	Parents	Siblings	New people	Others
Outside the classroom (physical environment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mobile device (online, offline and on-air environment (normal phone calls and short messages))	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inside the EFL classroom (physical environment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inside other classrooms at university (physical environment)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. How often do you use English in the following settings? *

	Most of the time	A lot of the time	Some of the time	Almost none of the time	None of the time
The formal EFL classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other classrooms at university	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outside the classroom, face-to-face	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outside the classroom with your mobile device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Which types of English language learning materials are available at your university library? Please mark all the relevant options. *

- Books
- Compact discs (CDs)
- Journals
- Newspapers
- Tapes
- Others, please specify:

11. How motivated are you to increase your proficiency in English? *

- Highly motivated (100%)
- Very motivated (75%)
- Motivated (50%)
- A little motivated (25%)
- Not motivated at all (0%)

12. Please explain why your motivation to increase EFL proficiency is high/low: *

13. Please rate the way you feel about EFL learning: *

- I LOVE EFL learning (100%)
- I really like EFL learning (75%)
- I like EFL learning (50%)
- I don't like EFL learning (25%)
- I hate EFL learning (0%)

14. Please provide the reasons for the way you feel about EFL learning: *

15. Do you own a mobile technological device (for example, a phone, tablet, etc.)? *

- Yes
- No

An Investigation into the Effect of MALL on Rwandan University Students' Proficiency in EFL

40 %

16. Please provide details about your mobile device(s)? * 

	How many do you have (for example, 1, 2, 3, etc.)?	Brand and model (for example, Samsung Galaxy 7, Apple iPhone 7, Tecno Y6, Nokia 3310, etc.)	Operating system (for example, Android, Apple IOS, Windows, Symbian, etc.)	W
Classic mobile phone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Smartphone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Tablet	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Laptop	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Others, please specify:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>

17. What do you use your mobile device(s) for in general? Please mark all the relevant options. *

- Camera
- Facebook
- Instagram
- Internet browsing
- Normal phone calls
- Short message services (SMSs)
- Twitter
- Viber
- WhatsApp
- Others, please specify:

18. Do you use your mobile device(s) for English language learning purposes? *

- Yes
- No

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60 %

19. Which types of language learning materials do you access by using your mobile device? Please mark all the relevant options. *

- Blogs
- Books
- English language applications (apps)
- English language chatrooms
- English language learning websites
- Journals
- Newspapers
- Podcasts
- Others, please specify:

20. How often do you use each of these language learning applications inside the EFL classroom? *

	Once an hour	Once every 2 to 3 hours	4 times a day	At least once daily	Once every 2 days	Once a week	Only when I have a piece of homework or a task that I need to complete	Never
Blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
English language applications (apps)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
English language chatrooms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
English language learning websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Journals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Podcasts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others, please specify:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

↓ +1

21. Do you use language learning applications outside the classroom? *

- Yes
- No

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80%

22. Which language learning applications do you use outside the classroom? Please mark all the relevant options. *

- Dictionaries
- Language learning websites
- Social networks
- Translator
- eBooks
- Others, please specify:

23. Specifically, when do you use language learning applications outside the classroom? *

- At night, before bedtime
- During lunch time
- During the class break
- In the evening, after class
- In the morning, before class
- Others, please specify:

24. Where do you use language learning applications outside the classroom? Please mark all the relevant options. *

- At church
- At home
- At the restaurant
- In the bus
- Outside the classroom on campus
- Others, please specify:

Prev

Done

Appendix G : English Proficiency Test (EPT)

English Proficiency Test

Class : Level I MPE

Student Reg. N° :

This proficiency test does not have any relation with your studies at University of Rwanda, College of Education. It forms part of a research study conducted by Valentin Uwizeyimana, a PhD student from the Department of General Linguistics at Stellenbosch University in South Africa, the research of which results will be contributed to research papers, book chapters, and a dissertation.

GENERAL INSTRUCTIONS

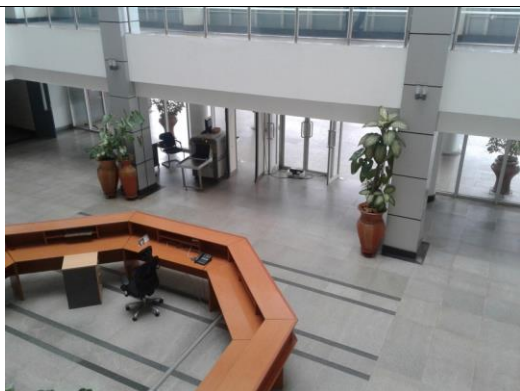
This test is designed to measure your English language abilities. It consists of 50 multiple-choice questions divided into two sections, namely listening and reading sections. For each question, you should select the best answer from the answer choices given, then encircle "True" or "False", or the letter that corresponds to the answer you have selected.

SECTION I: LISTENING

Part 1: Photographs (10)

For each question in this part, you will hear one statement about a picture on your test paper. Look at the picture and hear the statement, then on your test paper, encircle "True" or "False" depending on what the statement says about the picture. The statements will not be printed and will be spoken only one time.

1. True / False






2. True / False	
3. True / False	
4. True / False	

5. True / False



6. True / False



7. True / False	
8. True / False	
9. True / False	

10. True / False



Part 2: Talk (15)

You will hear the talk entitled "The future of English", which is given by a single speaker. You will be given 15 statements about what the speaker says in the talk. On your test paper, encircle "True" or "False" depending on the content of the statements versus what the speaker says. The talk will not be printed and will be spoken only one time.

1. If you do not know English you can be at a disadvantage.	True / False
2. English will soon be spoken by everybody in the World.	True / False
3. By 2010 half the World's population will speak English.	True / False
4. Competitors at the Eurovision Song Contest will never be unanimous in choosing to sing in English.	True / False
5. Native English and Majority English will become the two predominant types of English.	True / False
6. Very soon English will be the second language of all the people in the world.	True / False
7. In Eurovision Song Contest, countries cannot opt to sing in English.	True / False
8. In ten years time, the two most important Englishes will be British and American.	True / False
9. As more people read English, they will become more competent.	True / False
10. English will not be taught at any school throughout the world.	True / False
11. In ten years time, English native speakers will be the only people in the world who speak just one language.	True / False
12. There is much of a reason for native English speakers to learn a second language.	True / False
13. Sweden music exports account for more than 30% of their export	True / False
14. Swedish exported English is bound to have an effect on English in general.	True / False
15. English native speakers who travel abroad won't have to worry about the language.	True / False

SECTION II: READING

Part 3: Incomplete Sentences (10)

A word or phrase is missing in each of the following sentences. Four answer choices are given below each sentence. Select the best answer to complete the sentence, then encircle the corresponding letter on your test paper.

1. The manager of the group was a brilliant man _____ only weakness was that he hated to accept defeat.
 - A. whose
 - B. who
 - C. whom
 - D. who's
2. The girl looked _____ of the small window in the school.
 - A. into
 - B. back
 - C. out
 - D. in
3. The men stopped near a river to observe the _____ birds flying nearby.
 - A. color
 - B. colored
 - C. colorful
 - D. coloring
4. Those people are _____ dependable and trustworthy as the sunrise.
 - A. like
 - B. as
 - C. so
 - D. too
5. The production manager did everything he _____ to avoid a deterioration in quality.
 - A. can
 - B. would
 - C. should
 - D. could
6. The drink's _____ formula has been patented in 120 countries.
 - A. special
 - B. especial
 - C. specially
 - D. especially
7. You should modernize your IT systems for greater _____.
 - A. efficient
 - B. efficiency
 - C. efficacious
 - D. efficiently
8. Last week, he _____ a strict warning from his father.
 - A. receives
 - B. received
 - C. was receiving
 - D. had to receive

9. His self-confidence, values _____ sense of responsibility enabled him to achieve success.

- A. or
- B. and
- C. also
- D. but

10. The weather forecast stated that it would _____ s now in the evening.

- A. may
- B. probably
- C. can
- D. could

Part 4: Text Completion (5)

Read the following text. A word or phrase is missing in some of the sentences. Four answer choices are given below each of the sentences. Encircle the letter corresponding to the best answer to complete the text.

Dear team,

I am happy to announce that the planning _____ (1) have been granted by the

- A. Times
- B. Acceptance
- C. Access
- D. Permissions

local council and _____ (2) will commence from August 12th. This of course

- A. Changes
- B. Equipment
- C. Construction
- D. Moving

means that we are likely to _____ (3) some interruptions to our normal working

- A. Know
- B. Experience
- C. Suggest
- D. Overcome

conditions. I ask you all to be _____ (4) while construction takes place and try

- A. Slow
- B. Vacation
- C. Worried
- D. Patient

to be _____ (5) with any requests or changes that may take place while

- A. Out of the way
- B. Correct
- C. Flexible
- D. Relaxed

the construction is underway.

Regards,

Trent Newcombe

Part 5: Reading Comprehension (10)

In this part, you will read a text that is followed by ten questions. Encircle the letter corresponding to the best answer for each question.

The Alaska pipeline starts at the frozen edge of the Arctic Ocean. It stretches southward across the largest and northernmost state in the United States, ending at a remote ice-free seaport village nearly 800 miles from where it begins. It is massive in size and extremely complicated to operate. The steel pipe crosses windswept plains and endless miles of delicate tundra that tops the frozen ground. It weaves through crooked canyons, climbs sheer mountains, plunges over rocky crags, makes its way through thick forests, and passes over or under hundreds of rivers and streams.

The pipe is 4 feet in diameter, and up to 2 million barrels (or 84 million gallons) of crude oil can be pumped through it daily. Resting on H-shaped steel racks called 'bents', long sections of the pipeline follow a zigzag course high above the frozen earth. Other long sections drop out of sight beneath spongy or rocky ground and return to the surface later on. The pattern of the pipeline's up-and-down route is determined by the often-harsh demands of the arctic and subarctic climate, the tortuous lay of the land, and the varied compositions of soil, rock, or permafrost (permanently frozen ground).

A little more than half of the pipeline is elevated above the ground. The remainder is buried anywhere from 3 to 12 feet, depending largely upon the type of terrain and the properties of the soil. One of the largest in the world, the pipeline cost approximately \$8 billion and is by far the biggest and most expensive construction project ever undertaken by private industry.

In fact, no single business could raise that much money, so 8 major oil companies formed a consortium in order to share the costs. Each company controlled oil rights to particular shares of land in the oil fields and paid into the pipeline-construction fund according to the size of its holdings. Today, despite enormous problems of climate, supply shortages, equipment breakdowns, labor disagreements, treacherous terrain, a certain amount of mismanagement, and even theft, the Alaska pipeline has been completed and is operating.

Comprehension Questions:

1. The passage primarily discusses the pipeline's
 - A. *operating costs*
 - B. *employees*
 - C. *consumers*
 - D. *construction*
2. In the extract "It is massive in size and extremely complicated to operate", the word "it" refers to
 - A. *pipeline*
 - B. *ocean*
 - C. *state*
 - D. *village*
3. According to the passage, 84 million gallons of oil can travel through the pipeline each
 - A. *day*
 - B. *week*
 - C. *month*
 - D. *year*

4. In the extract “Resting on H-shaped steel racks”, the phrase “resting on” is closest in meaning to
- A. *Consisting of*
 - B. *Supported by*
 - C. *Passing under*
 - D. *Protected with*
5. The author mentions all of the following as important in determining the pipeline’s route EXCEPT the
- A. *climate*
 - B. *lay of the land itself*
 - C. *local vegetation*
 - D. *kind of soil and rock*
6. In the extract “the biggest and most expensive construction project ever undertaken by private industry”, the word “undertaken” is closest in meaning to
- A. *removed*
 - B. *selected*
 - C. *transported*
 - D. *attempted*
7. How many companies shared the costs of constructing the pipeline?
- A. 3
 - B. 4
 - C. 8
 - D. 12
8. In the extract “Each company controlled oil rights to particular shares of land in the oil fields”, the word “particular” is closest in meaning to
- A. *peculiar*
 - B. *specific*
 - C. *exceptional*
 - D. *equal*
9. Which of the following determined what percentage of the construction costs each member of the consortium would pay?
- A. *How much oil field land each company owned*
 - B. *How long each company had owned land in the oil fields*
 - C. *How many people worked for each company*
 - D. *How many oil wells were located on the company's land*
10. Where in the following extracts does the author provide a term for an earth covering that always remains frozen?
- A. *Ending at a remote ice-free seaport village*
 - B. *Resting on H-shaped steel racks called “bents”*
 - C. *Land, and the varied compositions of soil, rock, or permafrost*
 - D. *Shortages, equipment breakdowns, labour disagreements*

---END---

Appendix H : Discussion Group Protocol

<i>Topics</i>	<i>Questions to participants</i>
1. MTLL usability	<ul style="list-style-type: none"> • How easy to use are mobile technological devices in general? • Do you use your mobile devices on a regular uninterrupted basis? Please explain your answer. • Some of you use their mobile technologies in language learning (MTLL). How easy to use are MTLL? • Do you think the integration of MTLL use and training into the formal EFL teaching-and-learning process is possible at University of Rwanda?
2. MTLL effectiveness	<ul style="list-style-type: none"> • Do you think that MTLL training and/or use is useful in EFL learning? • How does MTLL training and/or use contribute to EFL learning?
3. MTLL user satisfaction	<ul style="list-style-type: none"> • How do you feel about MTLL use and training? Do you like it? • Are you motivated to use mobile technologies in EFL learning? Please explain your answer.
4. Participants' experience with MTLL	<ul style="list-style-type: none"> • Did you enjoy participating in this MTLL research? • What did you benefit /lose from your participation in this research? • Can you volunteer to participate in another MTLL research?

<p>5. MTLL and language learning environment</p>	<ul style="list-style-type: none"> • Compared to your formal EFL classroom, how do you rate the learning environment on MTLL? <ul style="list-style-type: none"> a. Social b. Formal c. Academic d. Others, specify. • Among social, academic, formal and other environments, which environment do you feel most comfortable in? Please explain your answer.
<p>6. MTLL and learners' autonomy</p>	<p>By using your mobile technological device, can you teach yourself another language? Please explain your answer.</p>
<p>7. MTLL and the availability of language data</p>	<ul style="list-style-type: none"> • Compared to using your university library, how easy is it to find language learning materials online/offline by using your mobile device? <ul style="list-style-type: none"> a. Extremely easy (100%) b. Very easy (75%) c. Easy (50%) d. Not very easy (25%) e. Difficult (0%) • In matters of quantity, how rich are the EFL learning materials found online by using your mobile devices compared to the materials available from your university library? <ul style="list-style-type: none"> a. Extremely rich (100%) b. Very rich (75%) c. Rich (50%) d. Not very rich (25%) e. Poor (0%)

8. Quality of MTLT input	<p>In matters of quality, how do you rate the EFL learning materials found online by using your mobile device compared to the materials available from your university library?</p> <ul style="list-style-type: none">a. Excellent (100%)b. Very good (75%)c. Good (50%)d. Not very good (25%)e. Bad (0%)
9. MTLT and learner's interactions with English speakers	<ul style="list-style-type: none">a. Does your mobile device help you to interact with more proficient EFL speakers, and to participate in the conversations which are beyond your level of EFL proficiency? Please explain your answer.b. Does your mobile device create different contexts in which you must use EFL to express your own personal opinions? Please explain your answer.

Appendix I : Semi-structured Interview Protocol

<i>Topics</i>	<i>Questions to interviewee</i>
1. Conventional EFL learning materials	Which EFL learning materials do students have access to here on campus?
2. EFL teaching, learning and assessment process, challenges and difficulties	<ul style="list-style-type: none"> • Specifically, how do you teach EFL oral, writing, and reading and listening skills here at University of Rwanda? • Do you train the students to teach themselves EFL skills? • How do you assess EFL skills? • Is there any challenge or difficulty in EFL teaching at University of Rwanda?
3. Access to technology and infrastructures	Which technologies do students have access to on University of Rwanda, College of Education, Kigali campus?
4. Attitudes towards technology usability, effectiveness and user satisfaction	For the purpose of EFL learning, do you think modern mobile technologies are usable and can be effective at University of Rwanda? Do you think that students can be satisfied with using them?

Appendix J : EPT Marking Scheme

SECTION I: LISTENING

PART 1: PHOTOGRAPHS (10)

Statements about photographs	Verdicts on the statements
1. The flower vases are near the counter.	True
2. Two sets of paper trays are on the table.	False
3. They are walking in the parking rot.	True
4. They are walking towards the photographer.	False
5. Most of the cars are packed on the street.	True
6. The men are standing in front of the statue.	False
7. The fries are flying over the leaves.	False
8. A big tree blocked the road.	False
9. A small boat is sinking in the lake.	False
10. Fear is permanent, and regret is temporary.	False

PART 2: TALK (15)

The transcript of the audio piece "The future of English":

For many years now, we have been referring to English as a global language, as the language of communication and technology. Everybody seems to be learning English and it isn't uncommon to see English being used as a means of communication between, let's see, a German scientist and an Italian politician. These days, if you don't know English, you are in danger of being excluded from what's going on in education, at work and especially in the world of technological advances.

Very soon English will be the second language of all the people in the world. This is happening while I am speaking to you. We can't be certain of how long the process will take but there is no doubt that it will happen, and my bet is that it will happen sooner rather than later.

First of all, English will be an obligatory subject on every school curriculum throughout the world. By the year 2010 around two billion people that's about a third of the World's

population will speak English as their second language. This isn't my prediction by the way. This is what the experts say.

We can see evidence of these changes all the time. Let's take the Eurovision Song Contest as an example. Whatever we might think of the contest itself, one thing that has changed recently is that now countries can opt to sing in English. In the last festival, fourteen of the twenty-five competing countries asked for the rules to be changed to allow them to sing in English. They argued that singing in their own language would put them at a disadvantage. I suspect that in a few years time, all twenty-five countries will be singing in English.

And what exactly does all of this mean for native speakers of English? Well, we are already in a minority. If the calculations are correct, then in ten years time, majority speakers that is nonnative English speakers will outnumber native English speakers by four to one. The two most important Englishes won't be British English and American English. They'll be Native English and Majority English. So native English speakers will be handicapped. We will be the only people in the world who speak just one language. Because, let's face it, there won't be much of a reason for native English speakers to learn a second language. We, and not the majority English speakers, will be the disadvantaged.

As more and more people speak English, it makes sense that they will become more competent. They will start to control more of the English resources being produced and to have a say in what should or shouldn't be included in dictionaries and language books. This might seem farfetched, but it is already starting to happen. Let's use Sweden as an example. Their music exports predominantly English account for more than thirty per cent of their export income. This exported English is bound to have an effect on English in general. And this is just one small example.

So, all of you native English speakers out there, get ready to throw away your phrase books. Whether you're planning to visit Eastern Europe or the Himalayas, one thing you won't have to worry about is the language.

Verdicts on the statements:

- | | | |
|----------|-----------|-----------|
| 1. True | 6. True | 11. True |
| 2. True | 7. False | 12. False |
| 3. False | 8. False | 13. True |
| 4. False | 9. False | 14. True |
| 5. True | 10. False | 15. True |

SECTION II: READING

Part 3: Incomplete sentences (10)

- | | | | |
|---|-------------|----|---------------|
| 1 | A. whose | 6 | A. special |
| 2 | C. out | 7 | B. efficiency |
| 3 | C. colorful | 8 | B. received |
| 4 | B. as | 9 | B. and |
| 5 | D. could | 10 | B. probably |

Part 4: Text completion (5)

- 1 D. Permissions
- 2 C. Construction
- 3 B. Experience
- 4 D. Patient
- 5 C. Flexible

Part 5: Reading comprehension (10)

- 1 D. construction
- 2 A. pipeline
- 3 A. day
- 4 B. supported by
- 5 C. local vegetation
- 6 D. attempted
- 7 C. 8
- 8 B. specific
- 9 A. How much oil field land each company owned
- 10 C. Land, and the varied compositions of soil, rock, or permafrost

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