

**THE EFFECTS OF MICRO-LEARNING ON  
SPANISH LANGUAGE LEARNERS'  
VOCABULARY ACQUISITION  
IN A TECHNICAL UNIVERSITY  
IN MALAYSIA**

**KHONG HOU KEAT**

**UNIVERSITI SAINS MALAYSIA**

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by

**KHONG HOU KEAT**

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## LIST OF ABBREVIATIONS

CE	Cognitive Effort
CLT	Cognitive Load Theory
CTML	Cognitive Theory of Multimedia Learning
ECL	Extraneous Cognitive Load
FL	Foreign Language
ICL	Intrinsic Cognitive Load
ISLA	Instructed Second Language Acquisition
L2	Second Language
ML	Micro-Learning
MLMQ	Micro-Learning Model Questionnaire
MP	Multimedia Principle
SCL	Spanish Classroom Learning
SDT	Self-Determination Theory
SML	Spanish Micro-Learning
VK	Vocabulary Knowledge



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**KESAN PEMBELAJARAN MIKRO TERHADAP PEMEROLEHAN  
KOSA KATA DALAM KALANGAN PELAJAR BAHASA SEPANYOL DI  
SEBUAH UNIVERSITI TEKNIKAL DI MALAYSIA**

**ABSTRAK**

Kajian ini melaporkan sebuah kuasi eksperimen dengan reka bentuk kaedah campuran selama 11 minggu yang mengkaji kesan Pembelajaran Mikro (PM) terhadap pemerolehan empat aspek pengetahuan kosa kata (PKK) dalam kalangan pelajar Malaysia. Pelajar ( $N = 67$ ) yang mengikuti kursus bahasa Sepanyol universiti dibahagikan kepada tiga kumpulan: kumpulan eksperimen menerima pengajaran kosa kata eksplisit PM selama empat minggu; kumpulan perbandingan menerima pengajaran kosa kata eksplisit yang setara sekali sahaja secara dalam talian, dan kumpulan kawalan tidak menerima sebarang rawatan. Item bahasa sasaran melibatkan 140 patah perkataan bahasa Sepanyol dan PKK diukur dengan menggunakan ujian kosa kata berbilang komponen. Hasil ujian ini disokong oleh data kualitatif mengenai tiga aspek PM untuk memberikan pemahaman yang lebih mendalam terhadap hasil kuantitatif. Dapatan kajian menunjukkan bahawa kedua-dua pengajaran kosa kata eksplisit, PM dan pengajaran sekali sahaja, terbukti berkesan dalam memudahkan pemerolehan dan ingatan kosa kata berbilang komponen dalam kalangan pelajar bahasa Sepanyol Malaysia, dan bahawa rawatan PM adalah lebih baik dalam ingatan Bentuk dan Makna ( $d = 0.75$ ), dan Pertalian ( $d = 1.08$ ). Ketiga-tiga aspek PM (reka bentuk, afektif dan kelakuan) didapati mempengaruhi pemerolehan kosa kata bahasa Sepanyol apabila mereka berfungsi seiring seperti yang diterangkan dalam model teori. Ini membawa kepada kesimpulan meta bahawa apabila ketiga-tiga aspek dijangka secara optimum selari dengan matlamat pembelajaran, konteks

pembelajaran dan pelajar sasaran, PM boleh berfungsi sebagai pengajaran bertumpu kepada bentuk eksplisit yang dipercayai mampu melengkapkan pembelajaran kosa kata di dalam bilik darjah. Berdasarkan dapatan kajian ini, sebuah model pedagogi PM telah dirangka sebagai garis panduan amalan untuk masa depan dan hala tuju penyelidikan bagi para guru dan penyelidik bukan sahaja untuk bahasa Sepanyol tetapi juga untuk bahasa-bahasa lain dan keadaan persekitaran yang berbeza. Secara kesimpulannya, kajian ini telah membantu memajukan penyelidikan PM dengan memaklumkan perkembangan teori dan memperkayakan pengajaran kosa kata bahasa asing.

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LEARNERS' VOCABULARY ACQUISITION IN A TECHNICAL  
UNIVERSITY IN MALAYSIA**

**ABSTRACT**

This study reports an 11-week mixed-methods quasi-experiment investigating the effect of Micro-Learning (ML) on the acquisition of four vocabulary knowledge (VK) aspects among Malaysian students. Students ( $N = 67$ ) attending the university Spanish course were divided into three groups: the experimental group received a four-week ML explicit vocabulary instruction, the comparison group received a comparable one-off online explicit vocabulary instruction, and the control group received no treatment. The target language items involved 140 Spanish words and the VK was measured using multicomponent vocabulary tests. These test results were corroborated by qualitative data on the three aspects of ML to provide a deeper understanding of the quantitative results. The findings showed that both ML and one-off explicit vocabulary instructions proved effective in facilitating multicomponent vocabulary acquisition and retention among the Malaysian learners of Spanish, and that ML treatment was superior in the retention of Form and Meaning ( $d = 0.75$ ), and Associations ( $d = 1.08$ ). The three aspects of ML (design, affective, and behavioral) were found to affect the Spanish vocabulary acquisition when they worked in tandem as described in the theoretical model. This leads to the meta inference that when the three aspects are aligned optimally with the learning goals, learning contexts and target learners, ML can serve as a reliable explicit form-focused instruction to complement the classroom vocabulary learning. Drawing on the findings, a ML pedagogical model was framed to guide future practices and research directions for teachers and researchers not only

for Spanish but also across different languages and settings. In sum, the study has helped move the ML research forward by informing the theory development and enriching foreign language vocabulary instruction.

# CHAPTER 1

## INTRODUCTION

### 1.1 Overview of the Study

The significance of foreign language (FL) in the current global landscape of education continues to mount axiomatically amidst the constant flow of economic, political, academic as well as sociocultural interests across national boundaries (Reagan, 2019; Warner, 2017). From a national perspective, Tonkin (2003) claims that “language readiness is all” (p. 148) and according to Zubairi and Sarudin (2009), a nation with proficient citizens in FLs will have better economic advantages in the global marketplace. Lately, Bagiyan et al. (2021) highlight that FL helps shape students’ professional identity. Therefore, the mastery of FLs is crucial for developing competent human capital in the active pursuit of national interests. On top of that, the Malaysia Education Blueprint 2013-2025 has responded to the call by including multilingual proficiency in the nationwide educational reform agenda. With the aspiration to encourage every child to learn an additional language by 2025, this blueprint prompts more FL courses in the country to prepare and equip the citizens with necessary FL competencies to participate in future international ventures.

It is important to clarify a few related terms to provide adequate background knowledge and perspective about the entire study. With reference to Gass and Selinker (2008), Second Language Acquisition (SLA) is a complex discipline that intends to understand the underlying processes how Second Languages (L2) are learned after the learning of the First Language (L1). L2 can refer to any language other than one’s first. For the sake of convenience and general familiarity, the term ‘second’ is retained in SLA with the understanding that it may refer to the second, third, fourth, or even the tenth language. In terms of FL, it is usually associated with the environment in which

the language is learned. A language is considered foreign when it is in an environment of one's L1 and the Target Language (TL) is not spoken in everyday life in the larger society (Gass & Selinker, 2008). As an illustration, Spanish is a FL in the Malaysian environment as it is not widely spoken in the larger society, and most learners in the Spanish classes share the same L1 which is the Malay language.

In view of the fact that FL learning is mostly done “within the context of the classroom” (Gass & Selinker, 2008, p. 7), this leads us to another “burgeoning subdomain” (Ortega, 2013, p. 5) of SLA, the Instructed Second Language Acquisition (ISLA). According to Loewen (2015), ISLA is defined as “a theoretically and empirically based field of academic inquiry that aims to understand how the systematic manipulation of the mechanisms of learning and/or the conditions under which they occur enable or facilitate the development and acquisition of a language other than one's first” (p. 2). Loewen underlines the instructed nature of ISLA irrespective the location of instruction. Based on this definition, this study supports the fact that ISLA can occur *outside the classroom* and may involve the use of technology. In sum, ISLA assumes two vital prerequisites, ‘instruction’ and ‘acquisition’, whereby instruction refers to teachers’ effort to manipulate and enhance language learning while acquisition refers to the notion of an increase in language knowledge and/or proficiency. Despite some researchers, particularly (Krashen, 1982, 2003) have dogmatically maintained that learning and acquisition of a language are mutually exclusive, in compliant with current ISLA literature and usage, the terms ‘learning’ and ‘acquisition’ are used interchangeably in this study unless it is otherwise specified.

Learning a FL in a formal setting is not difficult, but mastering it requires good effort and right strategy or strategies (see Oxford, 2017; for comprehensive discussions

of language learning strategies) from students and teachers. For students, good effort implies their active participation in the entire learning process and right strategy implies effective use of learning strategies because the strategies make learning easier (Oxford, 1990). For teachers, good effort suggests good dedication and right strategy suggests identification of appropriate teaching approaches which are consistent with their students' needs and learning context. Research shows that the proper use of learning strategies and teaching approaches predicts language performance and learning outcomes (Guapacha Chamorro & Benavidez Paz, 2017; Habók & Magyar, 2018; Lin et al., 2017; Ma & Oxford, 2014; Seker, 2016; Taheri et al., 2020). In view of the fact that language teaching approaches, methods and procedures are always undergoing "reassessment" (Lopes & Ruiz Cecilia, 2018, p. 1), teachers should persistently assess their approaches in use to ensure successful learning in the dynamic language classrooms.

## **1.2 Background**

Vocabulary teaching and learning remains popular among other aspects in language learning research (Chiu, 2013; Elgort, 2018; Lin & Lin, 2019). This may be owing to vocabulary is a central component of fluency in a language and mastery of vocabulary is the key explanatory indicator of the four language skills (listening, speaking, reading, and writing). In other words, without sufficient vocabulary, it is impossible for language learners to properly develop any of the four skills as lexical deficiency can lead to communication breakdowns, comprehension difficulties, detrimental effects for academic progression and demotivation (Fareed et al., 2018; Szabo, 2018).



Table 1.1 shows the results of various Spanish language assessments in the university under study from 2017 to 2019. Results show that students ( $N = 437$ ) generally obtained grade C (Pass, 45-59%) in various Spanish language assessments based on the university grading system. They obtained the highest mean score in oral test (58%). A possible explanation for such a result in oral test may be related to the communicative approach adopted in the teaching practices and the appropriate scaffolding provided. For example, students are encouraged not only to practice speaking with their peers or lecturer throughout the academic semester, but also to refer to the good and poor speaking examples and exercises uploaded in the university Virtual Learning Environment (VLE). The second highest was listening test (53%), and this was followed by midterm test (50%), overall final examination (48%) and lastly essay writing in final examination (34%). To delve deeper into the performance of these Spanish language students, Table 1.2 shows the results of the Spanish language assessments according to the university grading scales.

With reference to the results in Table 1.2, the highest failure rate was reported in essay writing during final examination (55.8%) with 5.9% of the students did not attempt to answer the question at all. While the oral test indicated the highest mean score (58%) among other assessments (see Table 1.1), in fact, almost 40% of the students failed the test. Both written assessments (midterm test and overall final examination) were consistent with each other with about 30% of failure. Listening test indicated the least failure rate (22.9%). A possible justification for such a result in listening may be related to the course assignments. Students were provided ample opportunities to practice their listening skills as all the course assignments contained various thematic listening practices. In view of the distinction category, only less than 10% of students were good at listening and about 5% were good at reading and writing.

**Table 1.1**  
**Spanish Language Assessments from 2017 to 2019**

Academic session (Number of students, n)	Assessment mean score (%)				
	OT	MT	LT	FA (O)	FA (E)
January 2017 ( <i>n</i> = 165)	65	50	49	49	31
July 2017 ( <i>n</i> = 110)	59	53	61	52	39
January 2018 ( <i>n</i> = 46)	52	43	48	44	34
July 2018 ( <i>n</i> = 46)	60	53	57	46	24
January 2019 ( <i>n</i> = 41)	56	50	51	50	44
July 2019 ( <i>n</i> = 29)	58	51	54	48	34
<b>Mean</b>	<b>58</b>	<b>50</b>	<b>53</b>	<b>48</b>	<b>34</b>

*Note.* *N* = 437. OT = oral test; MT = midterm test; LT = listening test; FA (O) = overall final assessment; FA (E) = essay writing in final assessment.

**Table 1.2**  
**Spanish Assessments Based on the Grading Scales from 2017 to 2019**

Grading scale	Number of students (%)				
	OT	MT	LT	FA (O)	FA (E)
Distinction (80-100%)	4.1	5.5	9.6	4.3	4.8
Pass (40-79%)	57.0	65.4	65.9	65.9	37.8
Fail (1-39%)	<b>35.5</b>	<b>28.4</b>	<b>22.9</b>	<b>27.9</b>	<b>49.9</b>
Zero (0%)	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.9</b>
Absent	3.4	0.7	1.6	1.8	1.6
Total	100	100	100	100	100

*Note.* OT = oral test; MT = midterm test; LT = listening test; FA (O) = overall final assessment; FA (E) = essay writing in final assessment.

The results show that only 4.1% of the students excelled in speaking (the lowest among other assessments despite the highest mean score) and it is imperative to note that 3.4% of the students did not appear during the speaking test.

The results in Table 1.1 and Table 1.2 indicate that most Spanish students were unable to either process the input or produce the output effectively, consequently, they could be categorized between ‘limited users’ and ‘very limited users’ based on the Malaysian University English Test (MUET) band description. These findings not only redirect our attention to the *lexical deficiency* as highlighted by Szabo (2018), but also are found to resonate with Mansor et al. (2022) who find that one of the difficulties

which hinders the Malaysian students from achieving adequate competence in Spanish is “the lack of lexis” (p. 1024).

Moreover, literature also reveals that teaching and learning vocabulary continues to be a universal challenge for all language teachers and learners, be it the first, second or foreign language (Webb, 2020). This challenge lies in the complexity of “knowing a word” (Nation & Hunston, 2013, p. 44) including the various aspects of vocabulary knowledge (VK). In contrast to single component of VK, there has been an increased emphasis on investigating multiple VK components to render a more accurate picture of one’s vocabulary level (González-Fernández & Schmitt, 2020). Concurring with Kremmel (2018) who rightfully points out that a balanced measure of breadth and depth would move the field forward, studies which explore different learning techniques for different VK components can complement one another as each of them contributes different strengths and, in unison, they can provide a more balanced support for effective vocabulary acquisition as well as retention. Thus, the present study is consistent with this line of inquiry wherein a “components approach” (Yanagisawa & Webb, 2020, p. 375) is adopted to measure four VK aspects: (a) written form; (b) form and meaning, (c) concept and referents, and (d) associations, which are consistent with the level and needs of the target population. See Chapter 2 for more comprehensive information on these VK aspects.

Among the effective language teaching and learning approaches, the use of technology prevails in the last decade (Burston, 2015; Duman et al., 2015; Fu, 2018; Golonka et al., 2014; Hwang & Fu, 2019; Kukulska-Hulme & Viberg, 2018; Macaro et al., 2012; Persson & Nouri, 2018; Plonsky & Ziegler, 2016; Shadiev et al., 2017; Sung et al., 2015; Viberg & Grönlund, 2013). Congruent with Reynolds (2018),

innovative technologies including digital mobile devices have indeed provided us unprecedented insights into more effective vocabulary teaching and learning. For instance, in the university under study, online learning via Microsoft Teams, blended learning with smart classrooms, university mobile app, Massive Open Online Course (MOOC) among others are implemented with the assumption that these educational technologies can lead to higher quality and successful FL teaching and learning.

However, it is suggested that innovative technologies should not be constantly considered the most effective panaceas for support of all vocabulary teaching and learning activities. A systematic review and meta-analysis by Lin and Lin (2019) points out that the “effectiveness of mobile L2 vocabulary learning still remained inconclusive” and “little research synthesis has been conducted to investigate the effect of mobile-assisted L2 vocabulary learning” (p. 878). These inconclusive results in terms of learning outcomes clearly signal a need for greater critical evaluations of any technology in use as well as a more systematic theoretical, methodological, and research-practice engagement. Hence, language teachers should be cautious against focusing too narrowly on the impressionistic power of state-of-the-art technology and be eclectic in making informed choices of any approaches to afford optimized learning conditions that can engage learners with the target vocabulary.

In recent years, the notion of Micro-Learning (ML) has been repeatedly accented as a successful learning approach in different learning phenomena. ML is a technology-mediated learning approach whereby learners are directly exposed to short-term learning activities formally or informally. These activities are created based on well-planned microcontent by means of real-time micromedia environments to construct microknowledge whereby these 3Ms (microcontent, micromedia and

microknowledge) embody the uniqueness of ML (Hug et al., 2006b, 2006a; Lindner & Bruck, 2007). According to Lindner (2007), micromedia refers to digital atomized media including mobile networked devices that delivers reusable small and self-contained pieces of digital microcontent to facilitate the construction of single focus microknowledge. This short-term learning approach has gained in popularity initially as a reaction to the failure of macro-sized e-learning (Lindner, 2007) and currently to support modern information-seeking/consuming behavior in a more flexible manner (Taylor & Hung, 2022).

At this juncture, it is important to note that ML is chosen among other technology-mediated vocabulary learning approaches because the conceptual characteristics and empirical observations of ML (including its unique features of decontextualized tasks, deliberate learning, repeated encounters, and ecology validity on beginner learners) are found to correspond well with FL vocabulary acquisition and this learning approach is also consistent with the contextual problems identified in Section 1.3. It is also the intention of this study to provide deeper insight into the basic tenets of ML that supports learning as well as the effect of ML in the mastery of different VK aspects within a FL classroom in the Malaysian context.

Before delving into the problem statement, it is opportune to justify why Spanish is chosen and its significance to the target population of the study. Among the many thriving foreign languages in Malaysia, Spanish is one of the very first to be introduced to the country through the door of Universiti Malaya in 1972 (Martínez Vellón, 2006). This marked the commencement of Hispanicism in the country. At the time of writing, Martínez Vellón reported ten universities, three private institutes, four international schools and five other academies offered Spanish courses throughout

Malaysia with around 2683 students. Among other universities, Universiti Malaya is the only one that offers degree in Spanish Language and Linguistics while the university under study has a unique program that prepares engineering students to further their study in Spain. Other universities offer Spanish-as-a-foreign-language courses typically for beginners. In most Malaysian universities, teaching and learning of the Spanish language is based on the requirements of the Common European Framework of Reference for Languages (CEFR). In other private academies, the contents are usually adapted to the specific needs of the target group (adults, children, or private classes) that may not be based on the CEFR.

To date, García Paredes et al. (2022) report a total number of fifteen public and private universities, fifteen international schools, Aula Cervantes of Kuala Lumpur, the Institute of Diplomacy and Foreign Relations (IDFR) under the Ministry of Foreign Affairs and various private academies that offer Spanish courses. Based on the information obtained from the Embassy of Spain, the number of Spanish learners has soared to 12,000 in the entire country. This increase in number corresponds well with the growth of Spanish learners worldwide. From 2013 to 2018, Spanish remains the second most spoken language in the world, the third most widely used language online, and the fourth most studied second language in the world (Instituto Cervantes, 2013, 2018). During these five years, the number of Spanish language users (both natives and learners) has soared from 500 to 577 million across 107 countries worldwide. These numbers not only validate the status of Spanish in the Power Language Index ranking (Chan, 2016), but also reflect the huge demand for the Spanish language in the market, reaffirming therefore the importance of FL learning in general, and Spanish language learning in particular.

The university under study is chosen among the various local universities because it manifests the commitment to the educational reform of the country. FLs include Arabic, French, Italian, Korean, Mandarin, Russian and Spanish are offered in the university to resonate with the upsurge of globalization and as a means toward “global mindedness” (Warner, 2017, p. 169). Moreover, to strengthen the engagement between Malaysia and the world, the university has become a partner of the Erasmus Mundus Grant under the Academic Relations between Europe and Asia (AREAS) Project. This international connection not only intensifies the research efforts among member countries, but also affirms the importance of FL learning.

Students of the Spanish courses in the university under study are required to accomplish various linguistic activities to acquire different language skills as instructed in the course syllabi. It is important to note that the students are technical majors because the university under study is a technical university. Overall, the students are new to Spanish language learning and have limited exposure to fundamental aspects of Hispanic language and culture. Besides, they have very few opportunities to practice Spanish outside the classroom as the Spanish-speaking community in the country is very small. Based on these accounts, it is hypothesized that these students may not know how to expend good effort nor employ right strategy in learning a new FL like Spanish. Therefore, this study constitutes part of the researcher’s effort in the pursuit of viable approaches to facilitate more effective Spanish language learning in general, and Spanish vocabulary acquisition in particular among the novice Spanish learners in the Malaysian technical context to ensure their successful participation in future international ventures, especially in the acquisition and transfer of foreign technology, in which the expertise of the technical (science and engineering) professionals is concerned (Zubairi & Sarudin, 2009).

### 1.3 Problem Statement

At the initial stages of Spanish language learning, students' low proficiency may stem from multiple factors. One of the result-based factors direct our attention to *lexical deficiency* (see Section 1.2). This phenomenon is also evident in other languages in Malaysia, for instance, Yunus et al. (2016) reveal that Malaysian freshmen possess insufficient English vocabulary knowledge which is crucial for survival. Besides, Asaad (2019) observes that Malaysian postgraduate students lack English vocabulary and have difficulties in their academic writing, suggesting therefore it can be challenging for Malaysian students to recall the unfamiliar words in various contexts when they attempt to elaborate their ideas in the target language. Moreover, studies outside Malaysia (e.g., Hu, 2011; Huang, 2015) attest that technical students usually have low level of FL vocabulary. Considering the level of the target population and the components approach adopted in the present study, four VK components (written form, form and meaning, concept and referents, and associations) are measured to reflect a more comprehensive picture of students' VK level.

The target population of the study faces several personal and contextual problems in learning Spanish vocabulary and three key obstacles were identified based on facts and figures: Time factor, instructional approach, and motivation. The main obstacle is the time factor. Most technical students have a very packed schedule throughout the academic journey (cf., Zakaria et al., 2020). Figure 1.1 shows a weekly timetable of a randomly selected student who opted for the Spanish subject in January 2019. Usually, these students have long-hour workshops in which they have to produce tangible products using complex machinery. With reference to an informal interview with some of these students, the workshops are often being dragged until midnight due to either the big number of students using the same machine, or the machine is out of



**Figure 1.1**  
**Weekly Class Schedule of a Technical Student**

Timetable for January 2019															
Version		Released Date 01/02/2019													
Week		12													
	08:00 AM	09:00 AM	10:00 AM	11:00 AM	12:00 PM	01:00 PM	02:00 PM	03:00 PM	04:00 PM	05:00 PM	06:00 PM	07:00 PM	08:00 PM	09:00 PM	10:00 PM
MON				WEB20902 S1415-5 (Lect) AD 214 FN ZURAIDA			STB36203 S15-4 (Lect) WSR 14.0 EN HARIS	STB36203 S15-4 (Lect) WSR 14.0 EN HARIS	STB36803 S12-5 (Lect) WSR 18.0 EN AMIR	STB36803 S12-5 (Lect) WSR 18.0 EN AMIR					
TUE				SCB36603 BETA-4A (Lect) AD-213 EN SHUKRI	SCB36603 BETA-4A (Lect) AD-213 EN SHUKRI	STB47503 G1 (Lect) AD-111 PROF AZMI	STB47503 G1 (Lect) AD-111 PROF AZMI	STB47503 G1 (Lect) AD-111 PROF AZMI							
WED	STB36803 S12-5 (Lab) WSR 18.0 EN AMIR	STB36803 S12-5 (Lab) WSR 18.0 EN AMIR						SCB36603 BETA-4A (Workshop) CB-001 EN SHUKRI	SCB36603 BETA-4A (Workshop) CB-001 EN SHUKRI				WSD10101 G2 (Lect) AD -117 MR KEAT	WSD10101 G2 (Tut) AD -117 MR KEAT	
THU	STB36803 S1216-4 (Lect) WSR 18.0 EN FAUZI H	STB36803 S1216-4 (Lect) WSR 18.0 EN FAUZI H		STB47503 G1 (Lab) AD-111 PROF AZMI	STB47503 G1 (Lab) AD-111 PROF AZMI		STB36203 S15-4 (Lab) WSR 14.0 EN HARIS	STB36203 S15-4 (Lab) WSR 14.0 EN HARIS	WEB20902 S1416-5 (Tut) AD-204 FN ZURAIDA	WEB20902 S1416-5 (Tut) AD-204 FN ZURAIDA			SFB36102 BETA-9 (Lect) AD -114 EN ZAIMI	SFB36102 BETA-9 (Lect) AD -114 EN ZAIMI	
FRI								STB36803 S1216-4 (Lab) WSR 18.0 EN FAUZI H	STB36803 S1216-4 (Lab) WSR 18.0 EN FAUZI H						

*Note.* Source of figure: Academic Department of the university under study

order or under maintenance. Secondly, poor time management among undergraduate students has had a long history in the literature (Macan et al., 1990). Concurring with Misran et al. (2016), the time management skills of the target population are also “marginally moderate” (p. 67). For example, it is evident that students would miss their Spanish classes to meet the deadline for coursework submission of other technically related subjects. Other evidence including poor attendance, constant requests for deadline extension and last-minute inquiries regarding any coursework submission further exacerbate the problem of time management among these technical students. Similar issues are also observed in local (e.g., Ahmad et al., 2020; Hashim et al., 2020) as well as international studies (e.g., Agrawal & Chahar, 2007; Hasan et al., 2020). Hence, small step learning approach like ML may help alleviate this problem (time factor) among the technical students in a more flexible manner.

Besides the time factor, another impediment for successful Spanish language learning in the university is the instructional approach adopted which does not fully coincide with the learning conditions. As shown in Figure 1.1 (boxed area), there are only two hours allocated for Spanish learning weekly. These limited contact hours press the lecturer to rely on the blended learning approach to cover the course syllabus. In other words, students ought to carry out much independent learning using the teaching manual and VLE. Moreover, due to shortage of manpower, Spanish language classes in this campus are usually big (more than 20 students). The short class time and large class size in fact debilitate the effectiveness of the communicative approach adopted. On the one hand, these two factors are inclined to trigger some potential inhibitions in massive Spanish language learning environment such as fear of failure and anxiety as highlighted in the study of Harfitt (2012), and on the other hand, they tend to affect lecturers' "rhetorical move structures" (Lee, 2009, p. 42), which may in turn hamper effective Spanish language instructions.

Although the technical students show a good degree of appreciation for the famous blended learning, an informal survey shows that they indeed prefer a smaller size of face-to-face scheduled learning environment (see Table 1.3). This survey indicates that these students are not ready for full-fledged non-face-to-face self-paced massive online learning. Consistent with the view of Kaur (2013) that "Malaysian learners, as the protagonists in the learning process, shun responsibility in learning" and "they lack the drive to be self-directed - within and beyond formal learning" (p. 10), the survey also implies that these students are less capable to carry out independent learning required. Furthermore, the amount of information available from the teaching manual and VLE may overwhelm these technical students, the majority of whom are deemed to experience more troubles, higher pressure and lower

**Table 1.3**  
**Student Preferences for Spanish Language Instructional Methods**

Preference	Learning Condition (%)			Class Size (%)			Scheduled (%)	
	F2F	B	N-F2F	1-to-1	<10	>20	FT	SP
Yes	96	1	4	69	94	45	90	31
No	4	9	6	31	6	55	10	69
Total	100	100	100	100	100	100	100	100

*Note.* This survey was conducted during academic semester July 2018 and January 2019 ( $N = 51$ ). F2F = fully face-to-face; B = blended (online plus face-to-face); N-F2F = fully online; 1-to-1 = personalized one-on-one; <10 = less than 10 persons; >20 = more than 20 persons; FT = fixed timetable; SP = self-paced (unscheduled); Yes = Likert Scale 4, 5 and 6 (slightly agree to strongly agree); No = Likert Scale 1, 2 and 3 (strongly disagree to slightly disagree); Sample item of the questionnaire (I prefer fully face-to-face classroom learning.)

motivation in language learning if compared with those in other majors (Apple et al., 2013).

While contextual or implicit vocabulary instruction has been proven to be a useful language-focused learning (e.g., Elgort & Warren, 2014; Koval, 2019; Nakata & Elgort, 2021; Sánchez Gutiérrez et al., 2019; Serrano & Huang, 2018), it is in fact less suitable for the target population who is required to learn a considerably large number of words in a relatively short period of time. Consequently, a compromise between explicit and implicit vocabulary instructional approach (e.g., Gallardo, 2020; Heidari-Shahreza & Tavakoli, 2012; Hirsh, 2018; Nation & Hunston, 2013; Schmitt, 2008; Webb, 2020) is suggested for the present study wherein beginner learners are involved. Hence, explicit instruction like ML may help alleviate this problem (misaligned instructional approach) that could be responsible for the undesirable Spanish language performance among the technical students.

The last pronounced barrier that impedes effective Spanish language learning among the technical students is the lack of motivation in language learning in their immediate environment. Although the technical students manifested a high level of motivation toward learning Spanish (Khong et al., 2017), in reality the actual

performance results show the contrary and their proficiency remains low (see Table 1.1 and Table 1.2). Therefore, it would be interesting to investigate if the findings by Khong et al. (2017) could be due to the susceptibility of the self-report measures (questionnaires and interviews) to potential sources of common method biases, for example, the social desirability tendencies (Podsakoff et al., 2003, 2012), or learner demotivation could actually be one of the underlying factors which is responsible for the poor learning outcomes in the university under study.

In terms of demotivating factors in learning Spanish, Khong et al. (2017) reveal that subject difficulty and packed class schedule are prominent among these Spanish learners. Another informal survey done by the researcher in 2018 witnesses the persistence of these personal, environmental, and technical factors that demotivate students to learn Spanish in the same context. From the qualitative data gathered, some students pointed out that peer influence, less motivating learning environment, priority for other more important subjects and short learning time may have contributed to the poor performance in the Spanish subject. These findings correspond with a recent review by Gao and Liu (2022) in which subject-related demotivating factors prevail in FL learning.

Taking all these obstacles into account, it is hence intended to investigate the practicality of ML: Could the convenient, smaller chunk size, and autonomous ML help improve the time-related problems, misaligned instructional approach, and learner motivation in Spanish vocabulary acquisition among the technical students? While ML has repeatedly been corroborated as a successful learning strategy in different learning phenomena, it is a relatively new field of study, particularly in the FL learning domain, where pertinent literature mostly comes from conference

proceedings with a serious lack of definitional consensus and theoretical grounding. There are very few explicit attempts by language researchers worldwide to investigate this seemingly promising ML. Therefore, this study sets out to address the lack of documented information of ML within a foreign language domain in a Malaysian technical setting.

#### **1.4 Rationale of the Study**

The compelling rationale of the study originates from the optimistic emphases that ML can promote successful learning across a wide range of learning domains. For instance, convenient small-step ML leverages “the ubiquity, intimacy and usability of mobile devices” (Bruck et al., 2012, p. 539) to support timely learning routine. Moreover, single-topic and autonomous ML empowers self-directed lifelong learning (Buchem & Hamelmann, 2010), supports the development of learner autonomy (Nikou & Economides, 2018) and improves learners’ motivation, engagement, and performance (De Vries et al., 2019; Kovacs, 2015; Leela et al., 2019; Mohammed et al., 2018; Ohkawa et al., 2019). Nonetheless, published studies which have reported the prominence of ML, in majority of cases, lack a theoretical grounding in adoption of ML, thus missing a shared perspective of the education community (e.g., Göschlberger & Bruck, 2017; Mohammed et al., 2018; Park & Kim, 2018; Skalka & Drlík, 2018). The scarce theoretical justification for understanding the nuanced dynamics of ML restricts the practical use of this pedagogical approach especially in FL instruction. Therefore, this study seeks to fill the gap by proposing a theoretical foundation for ML to address contradictions and challenges that ML has had to contend with and help better inform this new concept from a theoretical perspective.

Secondly, in the modern conceptualization of ML, keywords like nuggets, coherent, self-contained, well-planned, spaced, interactive, immediate feedback, ubiquitous, just-in-time, personalized, adaptive, autonomous, motivational, self-regulated, among others, are widely used (e.g., Baldauf et al., 2017; Göschlberger & Bruck, 2017; Park & Kim, 2018; Sun et al., 2018). These keywords are found to be consonant with the problems (time factor, instructional approach, and motivation) identified in Section 1.3. As an illustration, definitional keywords like ‘personalized’, ‘adaptive’, ‘autonomous’ and ‘self-regulated’ highlight the importance of the affective aspect of ML. Therefore, it would be worthwhile to investigate the practical use of ML as a technology-mediated instructional approach in Spanish vocabulary acquisition to offer an alternative to the problems identified and support effective learning in a more flexible manner. On the one hand, careful and deliberate vocabulary ML opportunities may reduce students’ “learning burden” (Nation & Hunston, 2013, p. 44), and on the other hand, they may help FL teachers understand which aspects of ML are effective for their contexts, hence encouraging them to creatively design their learner-focused micro-instructions in a more principled way.

Since multiple perspectives are mostly needed to account for the complexity of vocabulary acquisition, it is the intention of this study to encourage more realistic and contextual studies to investigate the potentiality of ML not only in the Spanish language domain but also across diverse languages and different VK aspects. Consistent with Elgort (2018), “developmental trajectories of the different aspects of VK are not identical and may vary depending on the learning conditions and individual learner characteristics” (p. 3). This dynamism in turn suggests that “different instructional and learning approaches may be more appropriate at different proficiencies” (p. 19). Therefore, this study is expected to contribute to the productive

lines of FL vocabulary research in a different learning context with a different group of learners to offer more enriching views on different theory-practice approaches like ML, as Elgort suggests that more research is needed to document the patterns of L2 vocabulary acquisition in diverse learning contexts.

### **1.5 Objectives of the Study**

The aim of this study is to investigate the effects of ML on Spanish language learners' vocabulary acquisition in a technical university in Malaysia. To achieve this aim, here are the main objectives of the study:

- 1) To propose a theoretical model for ML based on a careful examination of the existing conceptual characteristics and empirical observations of ML
- 2) To develop two ML-based treatments (one for the experimental group and another for the comparison group) for Spanish vocabulary acquisition based on the theoretical model
- 3) To measure the effects of the ML-based treatments on overall Spanish vocabulary knowledge among learners a week after the treatments
- 4) To measure the effects of the ML-based treatments on overall Spanish vocabulary knowledge among learners a month after the treatments
- 5) To measure the effects of the ML-based treatments on different Spanish vocabulary knowledge aspects (a) orthography, (b) form and meaning, (c) concept and referents, and (d) associations, among learners a week after the treatments
- 6) To measure the effects of the ML-based treatments on different Spanish vocabulary knowledge aspects (a) orthography, (b) form and meaning, (c)

concept and referents, and (d) associations, among learners a month after the treatments

- 7) To investigate the determining aspects (design, affective, and/or behavioral) of the ML-based treatments that affect the vocabulary acquisition among the Spanish language learners

## **1.6 Research Questions**

To achieve the objectives of this study, the following research questions (RQs) are addressed:

- 1) What accounts for the theoretical model of ML?
- 2) How would the constructs of the theoretical model support the development of the ML-based treatments?
- 3) Is there any significant difference in the acquisition of the overall vocabulary knowledge between groups before and a week after the treatments?
- 4) Is there any significant difference in the retention of the overall vocabulary knowledge between groups before and a month after the treatments?
- 5) Is there any significant difference in the acquisition of the vocabulary knowledge aspects: (a) orthography, (b) form and meaning, (c) concept and referents, and (d) associations between groups before and a week after the treatments?
- 6) Is there any significant difference in the retention of the vocabulary knowledge aspects: (a) orthography, (b) form and meaning, (c) concept and referents, and (d) associations between groups before and a month after the treatments?
- 7) Which aspect (design, affective, and/or behavioral) of the ML-based treatments affects the vocabulary acquisition among the Spanish language learners?



## **1.7 Research Hypotheses**

Based on the RQ3 to RQ7, seven null hypotheses have been formulated for this study as follows:

*H<sub>01</sub>* – There is no significant difference in the acquisition of the overall vocabulary knowledge between groups before and a week after the treatments.

*H<sub>02</sub>* – There is no significant difference in the retention of the overall vocabulary knowledge between groups before and a month after the treatments.

*H<sub>03</sub>* – There is no significant difference in the acquisition of the vocabulary knowledge aspects: (a) orthography, (b) form-meaning, (c) concept and referents, and (d) associations between groups before and a week after the treatments.

*H<sub>04</sub>* – There is no significant difference in the retention of the vocabulary knowledge aspects: (a) orthography, (b) form-meaning, (c) concept and referents, and (d) associations between groups before and a month after the treatments.

*H<sub>05a</sub>* – There is no significant effect of the design aspect of the treatments on the vocabulary acquisition among the Spanish language learners.

*H<sub>05b</sub>* – There is no significant effect of the affective aspect of the treatments on the vocabulary acquisition among the Spanish language learners.

*H<sub>05c</sub>* – There is no significant effect of the behavioral aspect of the treatments on the vocabulary acquisition among the Spanish language learners.

## **1.8 Significance of the Study**

This study contributes to the current literature in three ways. Firstly, the study contributes to the field of ISLA, Computer Assisted Language Learning (CALL) and

Mobile Assisted Language Learning (MALL) considering that ML is relatively new in the existing literature, particularly in the FL learning domain, whereby most available publications come primarily from conference proceedings. Therefore, this study would contribute to the growing body of ML literature, especially in the Malaysian setting. Moreover, from the theoretical perspective, the study deliberately redirects the attention to FL and practice-relevant theories that will ultimately inform a new concept like ML and open the possibility for more theoretical rigor in relevant research. It is the intention of this study to move the concept of ML beyond a superficial understanding to avoid overpromising on its potential and provide a better understanding of ML and its current state-of-the-art in FL instruction for novice and experienced language teachers alike. By explicitly engaging ML with relevant theories, language planners, researchers and practitioners would be able to link “abstract categories and connections underlying familiar phenomena” (Widdowson, 1990, p. 56) in order to facilitate meaningful FL teaching and learning.

Secondly, integrating ML into the Spanish language learning can be a novel instructional methodology to enhance learners’ vocabulary acquisition. From the research methodological perspective, new research instruments were designed, developed, and validated in a rigorous manner to uphold and promote principled mixed methods research. It has always been a great challenge to promote principled research as according to Memon et al. (2017) “many lecturers and supervisors in Malaysia remain unfamiliar with the current methodological advances” hence “disregarding what is right, current, documented and more appropriate to specific needs and situations” (p. ii). Therefore, another significance of this study is that it would create awareness among teachers and researchers of the latest development and requirement of research methodology. This in turn would, one way or another, encourage more

rigor in research methodology among Malaysian language researchers and reduce the chances of getting inconclusive results.

Thirdly, with regards to significance for practice, the study would help language teachers and practitioners understand the nuanced dynamics of ML, hence encouraging the practical and creative use of ML in FL instruction and may be across different learning domains. By the same token, this study signifies the problems identified in the research context which are evidently not uncommon in other FL classrooms. Therefore, this study is significant because, on the one hand, it would encourage FL teachers to reflect on their teaching practices simultaneously from different perspectives of language learning, and on the other hand, it urges them to be eclectic in making informed choices of any teaching approaches like ML to foster principled pragmatism (Kumaravadivelu, 1994). In sum, the key strength of this study is the use of technology in ML, which responds to the call for increased attention to “different dimensions of actual educational technology use” (Pynoo & van Braak, 2014, p. 315) and more attention on the “holistic integration of technology and active learning strategies” (Hung, 2015, p. 94).

In a nutshell, the study provides evidence with regards to the initiative taken by the researcher as a response to the call for the nationwide educational reform to produce competent multilingual human capital for the country. The findings from this study may suggest to the Ministry of Education (MOE) Malaysia that technology-mediated learning approaches like ML would serve as another viable pedagogical tool to complement the formal FL instruction in Malaysia.

## 1.9 Limitations and Delimitations of the Study

While this study contributes to educational practice in FL instruction, there are several limitations and delimitations in the study, hence cautions should be taken with respect to their application. First, the study focuses on a setting where the participants are university technical majors. Although the research procedures and data analyses may yield useful results in similar settings, it is beyond the study to generalize its findings to other Spanish language learners worldwide. Moreover, the study focuses on Spanish vocabulary acquisition via a novel technology-mediated learning approach. A successful integration of the approach into one's repertoire for teaching Spanish or other FLs may not be directly transferable, it requires a proper adaptation and application; therefore, the findings should be interpreted primarily within the scope of this study.

Second, purposive sampling, a non-probability sampling technique, may have introduced participant bias into the study whereby students who volunteered to take part in the study might have certain attributes and higher interest in the research topic. Furthermore, the small sample size obtained for this study reflects merely the learning experiences of these volunteers in relation to Spanish vocabulary ML. According to Creswell (2014), these two traits may compromise the representativeness of the sample to the larger population. As an attempt to minimize the potential delimitation and bias, researchers should attempt to replicate the study in a similar way using a larger sample size to strengthen the reliability and validity of the findings.

Third, one of the goals of this study is to investigate the effect of ML in an *ecologically valid* manner, including the learning context and instructional procedure. This study was hence conducted in authentic learning contexts via Microsoft Teams

and Instagram where learners would normally engage in. While this design was advantageous in terms of ecological validity, the desired experimental control might have been compromised and other confounding contextual variables might have been introduced into the study. Therefore, other qualitative methods like interview and observation were employed to aid in the interpretation of the experimental results. Concurring with Rogers and Cheung (2020) and Sato and Loewen (2019), it is argued that any confounding variables that might have influenced the results reflect the realities of the authentic learning settings to which the larger body of research on ISLA and ML seeks to generalize.

Despite the research instruments have been designed, developed and validated in a rigorous manner, the use of self-report questionnaires in this study may be susceptible to the common method variance (Podsakoff et al., 2012) and may not be always reliable to reflect true information from the respondents. For instance, the respondents might not be able to recall what they had exactly experienced during the Spanish vocabulary learning treatments hence, they might not be able to correctly report their actual vocabulary learning experiences. Additionally, it is common to encounter respondents who find it difficult to self-evaluate their learning experiences during any self-report survey. Therefore, the responses obtained might not be reliable. In this regard, the researcher has employed other qualitative data collection methods, such as semi-structured interview and non-participant observation to triangulate the use of self-report questionnaires.

Lastly, while the same Spanish teacher participant was employed as a tutor to coordinate both the comparison and experimental groups as a measure to increase the internal validity, it is important to note that the teacher participant only possessed