TEwT

THE

Journal of Teaching English with Technology

UNIVERSITY *of*
NICOSIA

UMCS
MARIA CURIE-SKLODOWSKA UNIVERSITY

The Journal of

Teaching English with Technology *(TEwT)*

Publishers

UNIVERSITY *of* NICOSIA

UMCS
MARIA CURIE-SKLODOWSKA UNIVERSITY

IATEFL Poland Computer Special Interest Group

ISSN 1642-1027

Teaching English with Technology

Editors-in-Chief

Jarosław Krajka
Maria Curie-Sklodowska University, Poland (Journal Founder)

Chris Alexander
University of Nicosia, Cyprus (Thematic Issues' Editor)

Assistant Editors

Robert Oliwa
East European State Higher School in Przemyśl, Poland
(Assistant to the Editor)

Ferit Kilickaya
Mehmet Akif Ersoy University, Turkey
(Assistant Editor, Statistics Editor)

Hussein Meihami
Imam Khomeini International University, Iran
(Assistant Editor, Social Media Assistant)

Dmitry Apraksin
IT Editorial Support
(University of Nicosia Director of IT)

Honorary Reviewers

Board of Reviewers

ABSTRACTING AND INDEXING

ELSEVIER
Scopus

INDEX COPERNICUS
INTERNATIONAL

DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

EBSCOhost

BazHum

CEJSH

Central and Eastern European Online Library E3

Cabell's Directories
Since 1978

NSD ERIHPLUS
EUROPEAN REFERENCE INDEX FOR THE HUMANITIES AND SOCIAL SCIENCES

Australian Government
Australian Research Council

REVIEWING PROCEDURE

- Each publication is reviewed by at least two external reviewers.

- Since the language of publication is English, at least one reviewer is a native speaker of English.

- At least one reviewer has a different affiliation country than the author.

- The submissions are subject to the double-blind review process.

- Every care is taken so that there is no conflict of interest between the authors and the reviewers.

- The review is made in a written form with a clear conclusion on acceptance or rejection of the submission.

- The reviewing procedure and the reviewer file are published on the Journal's website at http://www.tewtjournal.org/reviewingprocedure.html

- The names of reviewers for particular issues are not revealed, instead, once a year, the aggregate list of reviewers for the entire volume is published.

ALL THE SUBMISSIONS SHOULD BE SENT TO

tewtjournal@unic.ac.cy

AND

Jarek Krajka*, jarek.krajka@wp.pl*

Chris Alexander, *alexander.c@unic.ac.cy*

VOLUME 21, ISSUE 4

FROM THE EDITORS

by **Chris Alexander and Jarosław Krajka**

University of Nicosia, Cyprus

alexander.c @ unic.ac.cy

&

Maria Curie-Skłodowska University, Poland

jarek.krajka @ gmail.pl

Did you know that TEwT in a few months' time will be commencing its twenty-second year of operation? In this period, TEwT has carved out a very specific research niche in the area of technology use in TESOL (Teaching English To Speakers of Other Languages). TEwT is therefore unique as a journal in that it focuses mainly on technologically innovative ways of teaching ESOL as opposed to foreign languages generically. Moreover, TEwT is also a very active internationalised journal. In the last five years alone, for instance, TEwT has published 135 papers (or approximately 2500 pages) by academics working in well-known Universities/higher-education Colleges from 27 countries (i.e. South Korea, Japan, Poland, Hungary, Iran, Indonesia, Malaysia, Saudi Arabia, Portugal, Cyprus, Thailand, Vietnam, Spain, Turkey, Ecuador, Bahrain, China, Ukraine, Australia, Jordan, Lebanon, USA, India, UK, Slovakia, Oman, New Zealand).

However, TEwT also has a very impressive and dedicated international Board of Reviewers — and it is precisely this unstinting community support over the years that has enabled TEwT to disseminate so much outstanding research worldwide. Nonetheless, as TEwT's ranking profiles have been improving dramatically (e.g. TEwT presently has a Scopus percentile of 87 in the category of Language and Linguistics), it has been being inundated with new papers to review; we sometimes, for instance, receive even up to three to four new papers on a single day! This growing interest to publish in TEwT is also in part due to the niche and trendy area on which TEwT focuses. Therefore, we are currently looking for additional experienced and suitably qualified reviewers, and a call has been placed on our webpage—so feel free to apply!

The links below, which are sorted according to Volumes and Issues for the last five years, indicate the mammoth amount of work that has been undertaken by our dedicated reviewer team. So, thank you to our reviewers!

Volume 2021 Issues
• *The Journal of Teaching English with Technology* 21.3 (2021): 1-131.
Online. https://tewtjournal.org/?wpdmact=process&did=NjY4LmhvdGxpbms
• *The Journal of Teaching English with Technology* 21.2 (2021): 1-136.
Online. https://tewtjournal.org/?wpdmact=process&did=NjYwLmhvdGxpbms
• *The Journal of Teaching English with Technology* 21.1 (2021): 1-153.
Online. https://tewtjournal.org/?wpdmact=process&did=NjQ5LmhvdGxpbms
Volume 2020 Issues
• *The Journal of Teaching English with Technology* 20.5 (2020): 1-156.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NjM5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 20.4 (2020): 1-121.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NjI5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 20.3 (2020): 1-138.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NjE5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 20.2 (2020): 1-140.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NjA4LmhvdGxpbms
• *The Journal of Teaching English with Technology* 20.1 (2020): 1-149.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NTk4LmhvdGxpbms
Volume 2019 Issues
• *The Journal of Teaching English with Technology* 19.4 (2019): 1-128.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NTg3LmhvdGxpbms
• *The Journal of Teaching English with Technology* 19.3 (2019): 1-114.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NTc5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 19.2 (2019): 1-116.
Online. https://www.tewtjournal.org/?wpdmact=process&did=NTY5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 19.1 (2019): 1-157.
Online. https://tewtjournal.org/?wpdmact=process&did=NTU3LmhvdGxpbms
Volume 2018 Issues
• *The Journal of Teaching English with Technology* 18.4 (2018): 1-99.
Online. https://tewtjournal.org/?wpdmact=process&did=NTQ5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 18.3 (2018): 1-161.
Online. https://tewtjournal.org/?wpdmact=process&did=NTM4LmhvdGxpbms
• *The Journal of Teaching English with Technology* 18.2 (2018): 1-137.
Online. https://tewtjournal.org/?wpdmact=process&did=NTI5LmhvdGxpbms
• *The Journal of Teaching English with Technology* 18.1 (2018): 1-124.
Online. https://tewtjournal.org/?wpdmact=process&did=NTI2LmhvdGxpbms
Volume 2017 Issues
• *The Journal of Teaching English with Technology* 17.4 (2017): 1-105.
Online. https://tewtjournal.org/?wpdmact=process&did=NTA0LmhvdGxpbms
• *The Journal of Teaching English with Technology* 17.3 (2017): 1-104.
Online. https://tewtjournal.org/?wpdmact=process&did=NDk2LmhvdGxpbms
• *The Journal of Teaching English with Technology* 17.2 (2017): 1-121.
Online. https://tewtjournal.org/?wpdmact=process&did=NDg3LmhvdGxpbms
• *The Journal of Teaching English with Technology* 17.1 (2017): 1-107.
Online. https://tewtjournal.org/?wpdmact=process&did=NDc3LmhvdGxpbms

AN EXPLORATORY CASE STUDY
TO INVESTIGATE PERCEIVED PRONUNCIATION ERRORS
IN THAI PRIMARY SCHOOL STUDENTS
USING AUDIO-VISUAL SPEECH RECOGNITION

by **Steven Graham**

American University of Phnom Penh

#278H Street 210R, Kroalkor Village

Sangkat Kilometer 6, Khan Russey Keo

Phnom Penh, Cambodia

shed_chelsea @ hotmail.com

Abstract

An explorative case study has been conducted at a small rural school in the north east of Thailand to investigate the pronunciation errors that primary school students make when reading English aloud. This paper illustrates the opportunities and challenges of employing speech recognition software in rural classrooms by using it with specifically designed audio-visual materials based on the Thai curriculum to identify English language reading and pronunciation difficulties. A comparison is made between this study and published literature.

Keywords: Speech recognition software; audio visual; English; computer assisted language learning

1. Introduction

As researchers understand the brain mechanisms in early language acquisition (Kuhl, 2010), the learning process itself as an infant, not just a period of time spent learning, affects an individual's ability to learn (Kuhl and Rivera-Gaxiola, 2008). In Thailand children learn English from the first grade. There are many theories as to the optimal age when a student should start to learn another language (Kennedy, 2006); however, government legislation dictates that students will learn English from Prathom 1 (Grade 1) in line with research which shows the benefits to a child's development of being bilingual (Barac and Bialystok, 2011). Researchers have discovered how multiple languages are stored in the memory (Riehl, 2010) and that bilinguals have cognitive (Spark, 2010) and job-related advantages over their

counterparts (S. D. Krashen, personal communication, October 1, 2010), so for the time being at least, English is taught from the first grade in Thailand.

English plays an important part in the development of individuals, communities and countries (Coleman, 2010) even though there are some academics that are worried by a perceived threat from Chinese, as Mandarin becomes more popular (Graddol, 2010). Closer to home, Techavijit (2010) advocates "setting" rather than "streaming" in his vision of the direction that education reform should take in the second decade (2009-2018) in Thailand. If this were to take place in conjunction with the sequencing of new critical thinking tasks (Beaumont, 2010) introduced in Curriculum 51 (The Ministry of Education, Thailand, 2008), then there could be a possible pathway out of our present educational demise. The problem is that after nearly 70 years since the first study into critical thinking took place, it is still a long way from being realised in some universities (Elder, 2010), let alone in the first grade.

Shenk (2010) explains that practice may not make perfect; however, ten thousand hours (three hours a day) will help you on your way to "raising the bar" and being successful at what you do. Snyder (1971) informed us forty years ago that we all know that those who learn most are those that use what they have learned. It is with this in mind that we as teachers and learners need to appreciate that learning is a slow and incremental process that can be achieved by anyone given the right opportunity. In order for this to happen, Thailand's schooling must move from a teacher-centred to a more learner-centred approach in line with its 1999 Education Act (Office of the National Education Commission, 2012) and Curriculum 51 (The Ministry of Education, Thailand, 2008) so that our students have a more realistic chance of success. By coaching them and allowing a certain amount of learner autonomy in what they do (Barber and Foord, 2010), students taking part in this study have been given the opportunity to practice speaking English on their own using videos and SpeaKIT voice recognition software which follow the Thai foreign language curriculum.

It is important to understand that the majority of Thailand's primary school teachers of English have majored in subjects other than English and have not had the required training to teach English in accordance with the directives of the 1999 Education Act (Office of the National Education Commission, 2012) and the subsequent Curriculum 51 (The Ministry of Education, Thailand, 2008) documentation. This has resulted in teachers in rural areas admitting continuing to teach in a teacher-centred way as they lack confidence in their own English language skills as well as the techniques needed to pass on knowledge in a student-centred way (Mackenzie, 2002). It was this dilemma that encouraged the development of a series of DVDs called *Smooth Transitions* as a stepping stone to communicative student-

centered English language teaching in Thailand's rural north east and the eventual synthesis with SpeaKIT voice recognition software.

This explorative study asks one question: To what extent does the use of audio-visual communicative activities and speech recognition software in Thailand's rural primary EFL classrooms identify and ameliorate problem areas in students' English language reading and pronunciation?

2. Background

2.1. *Smooth Transitions* DVDs

Graham (2007) proposed a project to train approximately 4,000 Thai teachers of English in a year by using a teacher training framework based on commercial pyramid selling techniques. Several years later, it became evident through constant research and feedback that if any educational project is to be accepted by Thailand's Ministry of Education, a smaller project would need to be piloted first and then undergo extensive scrutiny if it was to have any chance of being adopted on a larger scale.

In order for this to happen, efforts were concentrated on one school (Graham, 2009) in Ban Phue district in Udon Thani province. Bantatprachanukoon School was chosen as the school director was forward thinking and the English language coordinator at that time was very motivated and possessed outstanding English language skills. Together, all parties collaborated successfully resulting in a teacher training project that started with a CD and some flashcards and transformed into the development of six years of basic education learning and teaching materials based on the Thai curriculum and the implementation of SpeaKIT software at the school's ERIC (English Resources Instruction Center) center (Graham, 2010).

It is important to listen to what everyone has to say when there is a collaborative project such as this. Regular feedback sessions (Graham, 2013) motivated the involved teachers. As a result, one of them requested that DVDs be produced with English captions, so that the students had something to watch as well as listen to when they were conducting their dialogues. The central characters in the DVDs are two children dressed in their school uniforms which students can easily identify with. There is also the increased opportunity for students to improve their speech perception as they grow accustomed to the "known voices" (Rost and McMurray, 2010) and the context that the characters are in (Drager, 2010) throughout the series.

Audio visual equipment can be used in many ways. For the initial teacher training project at Bantatprachanukoon School as demonstrated in this study, there was a conscious

effort not to interfere too much with a teacher's existing teaching pedagogy; however, a suggested process was put forward for those teachers who were interested in using it after they had completed their usual method of instruction (Graham, 2010). Teachers would play one section of the DVD as many times as they wanted to so that the students could watch and listen and at the same time the teacher would pause the DVD in order to explain what was happening and confirm that the students understood what was taking place.

Once the teacher believed that the class was ready, they would have the boys repeat the dialogue of the boy on the DVD (Bank) and the girls would follow the girl (Noi). In addition, teachers would then have the students come to the front of the class in pairs (one boy and one girl) and have those students repeat dialogues from the DVD as the teachers paused the DVD at the end of small lexical chunks, ensuring that all students in the class took part in the activity.

Vocabulary substitution is encouraged and highlighted in the written dialogues accompanying the DVDs and within the subtitles of the DVDs themselves allowing teachers the opportunity to use explicit vocabulary instruction to encourage more vocabulary learning after incidental exposure to the DVDs which focuses the learners' attention without straying too far from the specific dialogue (File and Adams, 2010). In addition, further opportunity to use the language closes the gap between what a student knows and what they can say (Cimons, 2010).

For this current study, all participants used pages 3, 17 and 26 from Smooth Transitions DVDs, Prathom 1 for the assessments (see Appendix 1).

2.2. *SpeaKIT* speech recognition software

Cawkell (1999) documents the progress of speech recognition software up until 1999. For those not familiar with this type of technology, it is extremely complex and its intricate workings are outside the scope of this paper; however, some specifications will be explained briefly. The algorithms used are data-driven (Marchand, Adsett and Damper, 2009) and state of the art, with a large vocabulary and a continuous speech recognition system (Lotto and Holt, 2010), more than capable of dealing with the different varieties of English (Franco, Bratt, Rossier, Gadde, Shriberg, Abrash et al., 2010) negating potential problems that can occur concerning the judgements of oral performance assessments conducted by native and non-native teachers (Kim, 2009).

SpeaKIT is beneficial for the project as it has independent automatic speech recognition (ASR) software as opposed to dependent (see Li and Topolewski, 2002, describing their process of designing language learning simulation). Independent ASR means that if the

speaker's speech deviates from the "norm" (that which is deemed acceptable) then it is rejected. In the case of *SpeaKIT*, the user has up to four attempts at self correction before the software moves on to the next word or phrase. Dependant ASR adapts to the user and their pronunciation which would not benefit the user in the same way (Pavlichev, 2002).

The level of proficiency of an English language student has traditionally always been compared to that of native speakers (Muñoz and Singleton, 2011). Amongst others, Richards (2006) points out that today this is not necessarily the case. To this end, *SpeaKIT* has various acceptance levels which were adjusted over time to reflect the required standard for the research project (Li and Topolewski, 2002). Initially, the level was at a low setting to encourage the whole school to use the software and gradually it was increased as the confidence and expectations of success (Dörnyei, 2001) of those using the equipment grew. Interestingly, Ginther, Dimova and Yang (2010) detail the reasons why automated systems are superior to humans at assessment as they possess greater internal consistency.

As in all projects of this kind, it takes a considerable amount of time at the beginning to set up the administration and management functions before it is possible to begin the actual research. Students' names and passwords needed to be input as well as those teachers who acted as managers and administrators. In addition, when students are using the *SpeaKIT* software, only ten active users can be logged in at any one time, causing considerable work for administrators when collecting data in the course of a normal classroom lesson.

Those using the *SpeaKIT* software used the practice, assessment or listening modes to complete their tasks. In the practice mode, students have the opportunity to listen to and repeat or use an advanced mode which allows the student to read and *SpeaKIT* will only interrupt if there is a mistake. As they are speaking, students see bars on the screen indicating whether they have spoken within the allowed boundaries (illustrated by green bars for correct and red for incorrect). They also see a report on the screen when they have finished showing where they have made errors and whether they were able to correct them themselves. The assessment mode allows students to read without interruption even if they make mistakes, with a report generated for the teacher when the activity has finished. The listening mode allows the student just to listen to the text being read. The report on the screen is particularly useful as it provides the teacher with an opportunity to give instant feedback to the students after they have completed the activity.

As *SpeaKIT* is content neutral, teachers are able to write their own content, i.e. lesson material. This can be completed by hand or by importing text or lesson material from elsewhere, which is normally the preferred method. Teachers are also able to use cut and paste

functionality. The software will highlight heteronyms and unknown words allowing the teacher to assign an IPA (International Phonetic Alphabet) designation from the dictionary that is contained in the software and also create unknown words using the IPA and appending these to the dictionary.

3. The study

A collaboration with Bantatprachanukoon School and Udon Thani Education Service Area Office 4 was initiated to integrate dialogues from *Smooth Transitions* with *SpeaKIT*'s speech recognition software. Research was required to investigate how speech recognition software could be used to increase the English language skills of primary school English language learners by identifying errors in reading and pronunciation. Teachers, administrators and managers connected to the project were also included in the planning and implementation process.

A server was set up with four client computers so that there is no need for the internet whilst students were using the computers. Even though these students were from a rural background where the majority would not have access to computers at home, there appeared to be no noticeable demonstration of anxiety (Mcinerney, Marsh and Mcinerney, 1999) since students had previously used computers at the school. Thus, the subject of anxiety was deemed outside the scope of this research and the main project.

3.1. Participants

Thirty-six students from Grades 1-9 (Prathom 1-6 and Mattayom 1-3) at Bantatprachanukoon School were selected as the sample group. The breakdown by classes is shown in Table 1.

Table 1. Sample by class

P1	P2	P3	P4	P5	P6	M1	M2	M3
n=3	n=5	n=5	n=5	n=5	n=5	n=3	n=2	n=3

The class teachers selected some high achievers, some low achievers and some ranked in the middle from the same socio-economic background, so as to attempt to give as true a representation of the makeup of a Thai classroom as possible (Brown, 1988).

3.2. Procedure

In order to maximise the potential of both *Smooth Transitions* and *SpeaKIT*, students taking part in this project at Bantatprachanukoon School continued to use *Smooth Transitions* in the classroom with their teacher over the school year so that they would have already been exposed to the dialogues and have an understanding of what the dialogues meant, the turn taking patterns required, intonation, facial expressions and body posture while speaking English (Goodwin, 2000).

To conform to the process of this investigation, all the students were then required to play the video on the computer as many times as they wanted before switching to the *SpeaKIT* software by using the Alt/Tab keys. Those students who comprised the sample group were required to start at Prathom 1 and to work their way through as many pages or years as they were able to. Students outside the sample group were required to use the Prathom year they were in or lower if it was too difficult for them to complete.

The sample group completed assessments using the existing *SpeaKIT* software in assessment mode which involved students reading three pre-selected pages from the Smooth Transitions DVDs, Prathom 1 (see Appendix 1). The assessment was standardised across the grades in order to be fair due to the low English language levels of the students taking part (Nunan, 1992). A second assessment was given three weeks later. This period of time was too short to be used for pre- and post-test purposes, so the data was collected and used as a whole.

The analysis of the errors was conducted using observations by Smythe (1987), who detailed the phonology problems experienced by Thai people when they try to speak English. His account predominantly concerns L1 interference and details how Thai people stress the final syllables of words, how they have difficulty in pronouncing certain final consonants and final consonant clusters, as well as speaking in a way that gives their English pronunciation a certain staccato effect.

4. Results and discussion

The speech recognition software was able to produce individual reports for each of the thirty-six students of the sample group. Two assessments were administered, three weeks apart and the information was collated in Table 2 to show which words were not pronounced correctly over the two assessments by the sample group.

The first number in brackets is the frequency that the word occurred in the three selected *Smooth Transitions* DVD pages and the second number is the frequency of errors committed by the sample group for that word. The last number is a classification of 100 most frequently used words (Fry, Kress, & Fountoukidis, 2000). The 100 most frequently used words

are split into four groups of twenty-five, where 1 designates the first twenty five and 4 the last. Category 5 is outside the 100 most frequently used words.

Table 2. Total errors made by students from the two assessments

1-5 Errors by Sample	6-10 Errors by Sample	11-14 Errors by Sample
hello (2, one, 5) /hələʊ/	those (1, six, 5) /ðəʊz/	byebye (1, eleven, 5) /baɪbaɪ/
name (3, one, 5) /neɪm/	too (2, six, 5) /tu:/	chair (1, eleven, 5) /ʧeə/
morning (2, two, 5) /mɔ:nɪŋ/	good (2, seven, 5) /gʊd/	dolls (1, eleven, 5) /dɒlz/
Noi (4, two, 5) /nɔɪ/	nice (1, seven, 5) /naɪs/	flower (1, eleven, 5) /flaʊə/
does (1, three, 2) /dʌz/	apple (1, nine, 5) /æpəl/	father (1, twelve, 5) /fa:ðə/
cat (1, four, 5) /kæt/	sofa (1, nine, 5) /səʊfə/	goodbye (3, twelve, 5) /gʊdbaɪ/
fish (1, four, 5) /fɪʃ/	somtam (2, nine, 5) /sɒmtæm/	monkey (1, twelve, 5) /mʌŋki/
mat (1, four, 5) /mæt/	above (1, ten, 5) /əbʌv/	table (1, twelve, 5) /teɪbəl/
meet (2, four, 5) /mi:t/	birds (1, ten, 5) /bɜ:dz/	tree (1, twelve, 5) /tri:/
15-20 Errors by Sample	**21-24 Errors by Sample**	**25+ Errors by Sample**
doll (1, fourteen, 5) /dɒl/	Bank (5, twenty-two, 5) /bæŋk/	vase (1, twenty-five, 5) /va:z/
box (1, fifteen, 5) /bɒks/		
cars (1, fifteen, 5) /ka:z/		
pleased (1, seventeen, 5) pli:zd/		
rubber (1,eighteen, 5) /rʌbə/		
likes (1,nineteen, 3) /laɪks/		

When looking at vowel sounds in particular, there were twelve words listed as errors that contained sounds that had been classified by Smythe (1987) as not having equivalent sounds in Thai and, thus, they posed a potential problem for Thai speakers of English. As can be seen in Table 3, the first five columns are diphthongs and the last is a triphthong.

Table 3. Word errors listed under phonetic vowel sounds

/eɪ/	/eə/	/aɪ/	/əʊ/	/ɔɪ/	/aʊə/
name table	chair	nice byebye goodbye likes	hello those sofa	Noi	flower

There were fourteen words listed as errors that contained five consonant sounds that Smythe (1987) considered problematic for Thai speakers of English. In Table 4, they are listed under their respective phonetic sounds.

Table 4. Word errors listed under phonetic consonant sounds

/z/	/ʃ/	/ð/	/g/	/v/
does	fish	those	good	above
those		father	goodbye	vase
birds				
dolls				
cars				
pleased				
vase				

In addition, consonant clusters at the end of words like *pleased* would also cause difficulties for Thais. This would also include *box* and *Bank*. Furthermore, the backward /l/ sounds of *apple* and *doll* would also prove difficult as well as the consonant cluster at the beginning of the word *tree*. Moreover, *mat* and *meet* can easily be confused due to the length of the vowel sound and *too* has a tendency to have the vowel sound shortened. The word *monkey* has a consonant cluster in the middle of the word and *rubber* tends to have too much stress on the second syllable, as does the word *monkey*. *Somtam* is a Thai word and the author believes that the way the word was given its phonetic transcription was wrong due to the stress put on the second syllable by Thai speakers. The name *Bank* in this dialogue when spoken by Thai speakers of English does not have the final consonant /k/ as a plosive resulting in such a high frequency. The long vowel sounds /ɔ:/ in *morning* and /u:/ in *too* have also historically caused Thais difficulty.

Special consideration has to be given to the word *vase* in this pilot project. The results show twenty five errors; however, on investigation it was found that the speech recognition software has an American pronunciation /veɪs/ and the *Smooth Transitions* DVDs has British /vɑ:z/. The students copied the DVD segment and produced a British pronunciation which was classified as an error by the software.

The words *likes* and *does* are the only words that have been shown as errors from the 100 frequently used words list (Fry, Kress, & Fountoukidis, 2000) used by the *SpeaKIT* program. This is considered somewhat unusual and is the subject of further investigation.

Through exposure to this form of computer supported learning which was in addition to the *Smooth Transitions* DVD classroom activities mentioned earlier, students would improve their higher order thinking skills, social interaction, critical reflection practices and creativity (Ma and Pendergast, 2010), whilst at the same time being allowed more opportunity to read and speak English than they would normally have in their classroom. Feedback at the end of every *SpeaKIT* activity ensured that students had the opportunity to repeat erroneous words correctly with the teacher in a timely manner.

This investigation satisfied the opportunities for second language learning conditions identified by Spolsky (1989), in that it gives the students more reading and speaking time than would be allowed under normal circumstances in the traditional classroom setting. The students who have comprised the sample population demonstrated a particularly good work ethic, as have the coordinating teachers, both internally and externally (Fox and Grams, 2007). This allowed this pilot project to continue even though there were extensive outside work commitments for all cooperating teachers and administrators (Stephenson, 1994).

There is some concern as to only two of the 100 frequently used words (*likes* and *does*) were identified as errors in this pilot project, which will be looked at by the software developers. Notwithstanding this, *SpeaKIT* has already demonstrated, though subject to limitations, that it has the ability to easily adapt any material or curriculum and be able to give students the opportunity to practise and improve their reading and pronunciation skills in a user friendly environment; whilst at the same time linking speech perception and production to acquire new vocabulary (Casserly and Pisoni, 2010). Apart from offering instant feedback on words that were pronounced incorrectly, teachers were also able to incorporate remedial training into the mainstream lessons to overcome the students' language difficulties.

Potcharapanpong and Thongthew (2010) suggest that future teacher training programme developers may consider a "multi-media toolkit or supported-kit" for Thai teachers of English. The use of *SpeaKIT* with the *Smooth Transitions* DVDs could go some way to reinforcing their idea, as teachers are in a position to benefit from the use of these materials in the same ways as their students. In addition, sociopragmatic competence is further enhanced by having the opportunity to see the body language that accompanies the various politeness strategies in the newly acquired L2 on the *Smooth Transitions* DVDs before having the opportunity to read it and speak it using the speech recognition software (Phillips, 1993).

As Aziz (2010) explains, there are five keys to educational technology, considered implementation of appropriate tools, techniques, or processes that facilitate the application of senses, memory, and cognition to enhance teaching practices and improve learning outcomes. Technology assists teachers in the classroom rather than replace them and has already proved to be a great motivator for both teachers and students (Quinn, 2007). By integrating *Smooth Transitions* and *SpeaKIT* with an existing course book that follows the Thai foreign languages curriculum, students and teachers have the opportunity to concentrate on all four language skills, implicitly and explicitly, with an increased focus on reading and speaking depending on their needs, so they become "capable, independent learners in an efficient manner" (Shen, 2003).

Conducting a study like this in a rural area involved trying to overcome many problems; one of which is the availability of an internet connection. Many schools have an internet facility; however, this service at Bantatprachanukoon School seemed to be out of order frequently and for long periods of time which complicated some of the management and administrative tasks required to make the project work. Thailand is not alone in this problem. Nigeria experiences similar difficulties (Dala, 2009); however, with proper funding, well maintained equipment and dedicated staff, this project managed to function giving the children, teachers and staff of Bantatprachanukoon School the opportunity to practise their English in an autonomous and relaxed environment (Thanasoulas, 2000).

Further research is required into phonetic settings by L2 researchers (Mennen, Scobbie, Leeuw, Schaeffler and Schaeffler, 2010) to enable the academic community to truly understand articulation. The word *somtam* is a point in question as the way a Thai person pronounces the word is considerably different from how it was input into the *SpeaKIT* program. The same can be said for the name *Bank*.

In addition, investigation into the use of analogical mapping models to assist in understanding human cognition and improve education and training (Gentner and Forbus, 2010) would be beneficial as well as further research is needed into the effectiveness of computer assisted response analysis schemes (Chapelle and Chung, 2010) for the purpose of assessment.

5. Conclusion

As Pinter (2006) reminds us, Piaget (1923) explained how children of a similar age have similar characteristics. Vygotsky (1978) stated that social interaction between children and their parents and teachers offer unique valuable experiences. If we add Gardner (1993) and multiple

intelligences to the equation, it is apparent that audio visual speech recognition has the potential to have something for every child and that it is up to the teacher to identify the student's individual learning style and adapt the implementation of the program according to the needs of the students in their specific classroom. To this end, future studies should pay particular attention to learner preferences and conduct interviews and surveys with teachers and students to see exactly what students want to learn and how they want to learn it.

There is great potential for teachers to use the audio-visual speech recognition for their own English language skills development as well as for lesson preparation. This is another area for practise and future research.

This project has demonstrated that the integration of the curriculum-based *Smooth Transitions* and the openness of *SpeaKIT* allows schools to create content to identify reading and pronunciation errors, i.e. lesson material based on the national curriculum, whilst also addressing local cultural needs. What is required now is detailed research into the benefits of integrating video with speech recognition software (audio visual speech recognition) into Thailand's primary English language classrooms and to identify any additional requirements that may be needed by those using the facility.

References

Aziz, H. (2010). *The 5 keys to educational technology*. Retrieved from http://thejournal.com/articles/2010/09/16/the-5-keys-to-educational-technology.aspx

Barac, R., & Bialystok, E. (2011). Cognitive development of bilingual children. *Language Teaching, 44*(1), 36-54. DOI: 10.1017/S0261444810000339.

Barber, D., & Foord, D. (2010). Learning coach. *English Teaching Professional*, 71, 53-54.

Beaumont, J. (2010). A sequence of critical thinking tasks. *TESOL Journal, 1*(4), 427-448. DOI: 10.5054/tj2010.234763.

Brown, J. D. (1988). *Understanding research in second language learning*. Cambridge: Cambridge University Press.

Casserly, E. D., & Pisoni, D. B. (2010). Speech perception and production. *WIREs Cognitive Science, 1*(5), 629-647. DOI: 10.1002/wcs.63.

Cawkell, T. (1999). Tracking fast-moving technology: The progress of speech recognition. *Journal of Information Science, 25*(1), 79-84. DOI: 10.1177/016555159902500108.

Chapelle, C. A., & Chung, Y-R. (2010). The promise of NLP and speech processing technologies in language assessment. *Language Testing, 27*(3), 301-315. DOI: 10.1177/0265532210364405.

Cimons, M. (2010). *Understanding language development*. Retrieved from http://www.usnews.com/science/articles/2010/07/22/understanding-language-development?PageNr=1

Coleman, H. (2010). *The English language in development*. Retrieved from http://www.teachingenglish.org.uk/sites/teacheng/files/UK011-English-Language-Development.pdf

Dala, H. S. (2009). The role of information and communication technology in academic libraries and the achievement of the millennium development goals (MDG). *The Voice of Teachers, 1*(2), 141-144.

Dörnyei, Z. (2001). *Motivational strategies in the language classroom*. Cambridge: Cambridge University Press.

Drager, K. (2010). Sociophonetic variation in speech perception. *Language and Linguistics Compass 4(7)*. DOI: 10.1111/j.1749-818X.2010.00210.x. Retrieved from http://www.blackwell-compass.com/subject/linguistics/article_view?parent=section&last_results=section%3Dlnco-sociolinguistics&sortby=date&section=lnco-sociolinguistics&browse_id=lnco_articles_bpl210&article_id=lnco_articles_bpl210

Elder, L. (2010). *Achieving critical mass*. Retrieved from http://www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=414351

File, K. A., & Adams, R. (2010). Should vocabulary instruction be integrated or isolated? *TESOL Quarterly, 44*(2), 222-249. DOI: 10.5054/tq.2010.219943.

Fox, W. S., & Grams, C. L. (2007). Work ethic as school-based behaviours of adolescent students. *Family & Consumer Sciences Research Journal, 36*(1), 63-87. DOI: 10.1177/1077727X07303819.

Franco, H., Bratt, H., Rossier, R., Gadde, V. R., Shriberg, E., Abrash, V., et al. (2010). EduSpeak: A speech recognition and pronunciation scoring toolkit for computer-aided language learning applications. *Language Testing, 27*(3), 401-418. DOI: 10.1177/0265532210364408.

Fry, E. B., Kress, J. E., & Fountoukidis, D. L. (2000). *Reading teacher's book of lists.* San Franscisco: Jossey-Bass.

Gardner, H. (1993). *Multiple intelligences new horizons*. New York: Basic Books.

Gentner, D., & Forbus, K. D. (2010). Computational models of analogy. *WIREs Cognitive Science, 2*(3), 266-276. DOI: 10.1002/wcs.105.

Ginther, A., Dimova, S., & Yang, R. (2010). Conceptual and empirical relationships between temporal measures of fluency and oral English proficiency with implications for automated scoring. *Language Testing, 27*(3), 379-399. DOI: 10.1177/0265532210364407.

Goodwin, C. (2000). Action and embodiment within human situated interaction. *Journal of Pragmatics, 32*(10), 1489-1522. DOI: 10.1016/S0378-2166(99)00096-X.

Graddol, D. (2010). Will Chinese take over from English as the world's most important language? *English Today, 26*(4), 3-4.

Graham, S. (2007). *Proposed teacher training for primary school teachers of English in Thailand*. Retrieved from http://www.steves-english-zone.com/images/Papers/proposed-teacher-training-for-primary-school-teachers-of-english-in-thailand.pdf

Graham, S. (2009). From the bottom up: A case study of teacher training for primary school teachers of English in a Thai school in north eastern Thailand. *English Language Teacher Education and Development, 12*, 31-43.

Graham, S. (2010). EIL in the primary classroom: Exploration and innovation using DVDs for communication. *Journal of Asia Pacific Studies, 1*(3), 506-523.

Graham, S. (2013). Reflection and feedback: Primary school teachers of English take control. *Humanising Language Teaching 15*(5). Retrieved from http://www.hltmag.co.uk/oct13/mart01.htm

Kennedy, T. J. (2006). Language learning and its impact on the brain: Connecting language learning with the mind through content-based instruction. *Foreign Language Annals, 39*(3), 471-486. DOI: 10.1111/j.1944-9720.2006.tb02900.x.

Kim, Y-H. (2009). An investigation into native and non-native teachers' judgments of oral English performance: A mixed methods approach. *Language Testing, 26*(2), 187-217. DOI: 10.1177/0265532208101010.

Kuhl, P., & Rivera-Gaxiola, M. (2008). Neural substrates of language acquisition. *The Annual Review of Neuroscience, 31*, 511-534. DOI: 10.1146/annurev.neuro.30.051606.094321.

Kuhl, P. K. (2010). Brain mechanisms in early language acquisition. *Neuron, 67*(5), 713-727. DOI: 10.1016/j.neuron.2010.08.038.

Li, R-C., & Topolewski, D. (2002). Zip & Terry: A new attempt at designing language learning simulations. *Simulation & Gaming, 33*(2), 181-186. DOI: 10.1177/1046878102332006.

Lotto, A., & Holt, L. (2010). Psychology of auditory perception. *WIREs Cognitive Science, 2*(5), 479-489. DOI: 10.1002/wcs.123.

Ma, A., & Pendergast, D. (2010). Innovative pedagogies for family and consumer science/home economics education - Utilising computer-based collaborative learning to foster lifelong learning attributes. *Family & Consumer Sciences Research Journal, 38*(3), 273-288. DOI: 10.1111/j.1552-3934.2009.00018.x.

Mackenzie, A. S. (2002). EFL curriculum reform in Thailand. Paper presented at the Curriculum Innovation, Testing and Evaluation: Proceedings of the 1st Annual KALT Pan-Sig Conference, Kyoto, Japan.

Marchand, Y., Adsett, C. R., & Damper, R. I. (2009). Automatic syllabification in English: A comparison of different algorithms. *Language and Speech, 52*(1), 1-27. DOI: 10.1177/0023830908099881.

Mcinerney, V., Marsh, H. W., & Mcinerney, D. M. (1999). The designing of the computer anxiety and learning measure (Calm): Validating of scores on a multidimensional measure of anxiety and cognitions relating to adult learning of computing skills using structural equation modeling. *Educational and Psychological Measurement, 59*(3), 451-470. DOI: 10.1177/00131649921969974.

Mennen, I., Scobbie, J. M., de Leeuw, E., Shaeffler, S., & Schaeffler, F. (2010). Measuring language-specific phonetic settings. *Second Language Research, 26*(1), 13-41. DOI: 10.1177/0267658309337617.

Muñoz, C., & Singleton, D. (2011). A critical review of age-related research on L2 ultimate attainment. *Language Teaching, 44*(1), 1-35. DOI: 10.1017/S0261444810000327.

Nunan, D. (1992). *Research methods in language learning*. Cambridge: Cambridge University Press.

Office of the National Education Commission. (2012). *National Education Act 1999.* Retrieved April 12, 2015, from Office for National Education Standards and Quality Assessment: http://www.onesqa.or.th/en/publication/nation_edbook.pdf

Pavlichev, A. (2002). Software review. *Social Science Computer Review, 20*(1), 93-98. DOI: 10.1177/089443930202000109.

Phillips, E. M. (1993). Polite requests: Second language textbooks and learners of French. *Foreign Language Annals, 26*(3), 372-381. DOI: 10.1111/j.1944-9720.1993.tb02293.x.

Piaget, J. (1923). *The language and the thought of the child*. New York: Harcourt Brace and World.

Pinter, A. (2006). *Teaching young language learners*. Oxford: Oxford University Press.

Potcharapanpong, S., & Thongthew, S. (2010). TEFL training program for local and cultural-based instruction: Case studies in Thai primary schools. *Asian Social Science, 6*(9), 39-48.

Quinn, Q. (2007). *Technology and motivation: Can computers motivate students to read?* Retrieved from http://www.compasslearning.com/CompassFileUpload/60Technology_Motivation.pdf

Richards, J. C. (2006). Materials development and research—making the connection. *RELC Journal*, *37*(1), 5-26. DOI: 10.1177/0033688206063470.

Riehl, C. M. (2010). The mental representation of bilingualism. *WIREs Cognitive Science, 1*(5), 750-758. DOI: 10.1002/wcs.74.

Rost, G. C., & McMurray, B. (2010). Finding the signal by adding noise: The role of noncontrastive phonetic variability in early word learning. *Infancy, 15*(6), 608-635. DOI: 10.1111/j.1532-7078.2010.00033.x.

Shen, H-J. (2003). The role of explicit instruction in ESL/EFL reading. *Foreign Language Annals, 36*(3), 424-433. DOI: 10.1111/j.1944-9720.2003.tb02124.x.

Shenk, D. (2010). *The genius in all of us*. New York: Doubleday.

Smythe, D. (1987). Thai speakers. In M. Swan, & B. Smith (Eds.), *Learner English: A teacher's guide to interference and other problems* (pp. 252-263). Cambridge: Cambridge University Press.

Snyder, J. W. (1971). Who learns most? *Foreign Language Annals, 4*(4), 379-384. DOI: 10.1111/j.1944-9720.1971.tb02054.x.

Spark, S. (2010). *Science grows on acquiring new language.* Retrieved from http://www.edweek.org/ew/articles/2010/10/22/09window_ep.h30.html?tkn=NSOF+.com

Spolsky, B. (1989). *Conditions for second language learning*. Oxford: Oxford University Press.

Stephenson, H. (1994). Management and participation in ELT projects. *ELT Journal, 48*(3), 225-232. DOI: 10.1093/elt/48.3.225.

Techavijit, V. (2010, December 10). Only happy schools produce well rounded leaders. *Bangkok Post.* Retrieved from http://www.bangkokpost.com/learning/education-features/210701/only-happy-schools-produce-well-rounded-leaders

Thanasoulas, D. (2000). What is learner autonomy and how can it be fostered? *The Internet TESL Journal, 6(11)*. Retrieved from http://iteslj.org/Articles/Thanasoulas-Autonomy.html

The Ministry of Education, Thailand. (2008, July 11). *Assumption College Thonburi.* Retrieved March 5, 2017, from http://www.act.ac.th/document/1741.pdf

Vygotsky, L. (1978). *Mind and society, the development of higher mental processes*. Cambridge: Harvard University Press.

Appendix 1. Pre-selected pages from *Smooth Transitions*

Prathom 1 Page 3

<u>Good morning</u>.   My name is <u>Bank</u>.   What is your name?

<u>Good morning</u>.   My name is <u>Noi</u>.   <u>Nice</u> to meet you.

<u>Pleased</u> to meet you too.   What is this?

This is a <u>rubber</u>.   What is that?

That is a <u>chair</u>.   Goodbye <u>Noi</u>.

Goodbye <u>Bank</u>.

Prathom 1 Page 17

Hello <u>Bank</u>.

Hello <u>Noi</u>.   What is it?

It is an <u>apple</u>.   What are those?

They are <u>fish</u>.   What are these?

They are <u>dolls</u>.   What do <u>you</u> like?

<u>I</u> like <u>somtam</u>.   What do you like?

I like <u>somtam</u> too.   What does your <u>father</u> like?

<u>He</u> likes <u>cars</u>.   <u>Goodbye</u> <u>Noi</u>.

<u>Bye-bye</u> <u>Bank</u>.

Prathom 1 Page 26

The <u>monkey</u> is <u>on</u> the <u>table</u>.

The <u>cat</u> is <u>in</u> the <u>box</u>.

The <u>doll</u> is <u>on</u> the <u>sofa</u>.

The <u>flower</u> is <u>in</u> the <u>vase</u>.

<u>Bank</u> is <u>on</u> the <u>mat</u>.

The <u>birds</u> are <u>above</u> the <u>tree</u>.

UNDERSTANDING IN-SERVICE TEACHERS' LEARNING EXPERIENCE WHILE DEVELOPING AN ELECTRONIC PORTFOLIO

by **Angie Quintanilla Espinoza**

Universidad de Concepción, Víctor Lamas 1290 Concepción, Chile

anquinta @ udec.cl

and **Steffanie Kloss Medina**

Universidad Católica de la Santísima Concepción, Alonso de Ribera 2850 Concepción, Chile

skloss @ ucsc.cl

Abstract

Electronic portfolios have become popular in teacher education programs as they allow learners to document and reflect upon their work and learning process. This cross-sectional study examines data gathered from 19 primary and secondary EFL teachers enrolled in a postgraduate program. The study aims at understanding these teachers' learning experiences while developing an electronic portfolio. A survey questionnaire with Likert-type, checkboxes-type and open-ended questions were used to collect data. The results indicated that teachers valued e-portfolios as an authentic and process-oriented assessment tool that involves reflection, documentation, and dissemination of their work.

Keywords: assessment; e-portfolio; reflective practice; teaching

1. Introduction

Nowadays, studies on e-portfolios in teacher education programs have focused on the way portfolios have been implemented to provide pre-service teachers with the technical competence required in the current information age. Thereby, much of this work has aimed at describing e-portfolios and their use in teacher education (Wolf & Dietz, 1998; Barrett & Knezek, 2003; Lind, 2007; Strudler & Wetzel, 2011; Boulton, 2014, Barberà, Gewerc & Rodríguez, 2016).

Concerning pre-service teacher education, literature (Karsenti, Dumouchel, & Collin, 2014) has highlighted four main purposes: exposure, reflective, social and assessment. Likewise, a study conducted by Forawi, Almekhlafi and Al-Mekhlafy (2012) showed that pre-service teachers perceived documentation of work, improvement of creative thinking skills, improvement of information technology skills, assessment of own progress, and understanding of future classroom technology, as the main benefits of e-portfolios.

On the other hand, regarding teachers' knowledge of technology, literature shows "that most current teachers were not prepared in their teaching education programs to integrate technology into their teaching" (Shwu-Meei, 2005, p. 1). Notwithstanding, little research concerning in-service teachers has been carried out (Beka & Gllareva, 2016). In this context, the purpose of the present study is to understand in-service teachers' learning experience while developing an electronic portfolio in a Teaching English with Technology module in a postgraduate program. Besides, it also intends to explore the advantages and disadvantages of e-portfolios, as well as the impact this experience might have on their future practice. Subsequently, this study seeks to find answers to the following three questions:

1. What are teachers' perceptions of developing an e-portfolio?
2. What did the teachers learn from developing their e-portfolios?
3. How would developing an e-portfolio contribute to their future teaching?

2. Literature review

An electronic portfolio (EP) is a collection of works, which, according to the Joint Information Systems Committee of the United Kingdom (JISC), corresponds to "a production created by the apprentice, a collection of digital artifacts that articulate their experiences, performances and learning" (Joyes, Gray & Hartnell-Young, 2010, p. 16). The purpose of this procedure is to save a series of the learner´s activities on the web, a mobile device or to the cloud, from which he/she can demonstrate some skills in a particular context.

The EP allows the generation of a collection of students' works (evidence) that can account for their development over time, and which is supported on the web or other types of digital devices. According to Bryant and Chittum, "the use of web interfaces makes the electronic portfolio more flexible and dynamic, allowing learners to make changes in their portfolios that are immediately accessible to the instructor" (2013, p. 189).

Another favorable aspect of the use of EP is interaction since learners can not only show their work to an audience but also interact with it. Barrett (2011) argues that interactive portfolios have the following characteristics: they reflect learning through various formats, they display work online for multiple audiences, they allow dialogue and reflection regarding learning artifacts, and they support the provision of feedback to improve learning.

2.1. Types of electronic portfolios

An EP must have a clear objective. The type of portfolio used is directly related to the said purpose, as it is presented in the literature with four main types of EP (Fernsten, 2009):

a) Development or process (developmental): this type of portfolio aims to demonstrate the progress of an activity, including self-evaluation and reflection, and to approach the portfolio as a process that emphasizes reflection.

b) Presentation (showcase): the purpose of this type of portfolio is to show exemplary work based on the selection of the best that has been done. This portfolio illustrates the student's experience and achievement and focuses on the portfolio as a product.

c) Evaluation (evaluation – assessment): this portfolio is used by teachers to evaluate students' work in a developmental or presentation portfolio format. It consists of the systematic collection of their work in which they are expected to demonstrate achievement of certain competencies or standards.

d) Hybrid: this kind of portfolio combines the process portfolio and the presentation portfolio. The objective is to include the process and the product of achieved learning. Students include evidence of both the process and the product of learning. In this type of portfolio there is some reflection regarding their learning and about the selection of the best work carried out by the student.

In general, the use of the hybrid electronic portfolio is recommended as it is expected to combine both process and product. This is what Barret (2011) calls "balance", referring to the need to calibrate the different possibilities that EP offers between the process (learning and reflection) and the product, which is mediated by the interaction (student-tutor or student-student). Another point to consider is evaluation, which can be formative, through feedback processes (to achieve learning), and summative evaluation that corresponds to learning.

Now, the constituent elements of the electronic portfolio can be varied, however, Benito and Cruz (2005, p. 118) state that there are six basic elements in the creation of an EP:

1. Students' presentation, which can include a welcome message, their photo, academic and professional curriculum, an explanation of what the portfolio means, etc.

2. Formative objectives, which make up the learning map that students take on and which are the basis of their evaluation.

3. Products, which are the documents of the different activities developed in the subject.

4. Reproductions, which include any type of information that has been used by the student for the realization of the products (teacher's email, web page links, etc.).

5. Field diary, where the students write down reflections on their learning process and carry out their self-evaluation of the products and the usefulness of the portfolio.

6. Teacher's comments, which include both the instructions for developing the products and comments that have guided the student's learning process.

2.2. The electronic portfolio as a learning experience

The portfolio is considered a method to help students access learning because it enables them to systematize information, reflect on what they are learning and evaluate the whole process. Benito and Cruz (2005) and Barberá (2005) claim that the reflection process is central in EP. Concerning reflection, Zubizarreta posits that this method "provides a structure for students to systematically reflect on the learning process and develop aptitudes, abilities and habits that come from critical reflection" (2004, p. 15).

Armengol et al. (2009) argue that EP favors students' self-regulation because through reflection they can take charge of the way they do their work, can organize their time and articulate activities in relation to contents, activities, readings, and assessment processes. Therefore, this procedure is a useful mechanism to favor students' learning experiences, whether at the basic, intermediate, undergraduate, or graduate level.

Finally, the potential that EP has in relation to the learning process refers to the management and distribution of materials as well as to feedback (Gathercoal et al., 2002). Likewise, Monereo (2005) proposes that this procedure enables the development of basic socio-cognitive skills in the digital environment through the interaction between teachers and students since it is possible to work with feedback mediated by technology. Another favorable aspect refers to the continuous and detailed monitoring of the student's work (Area, Gros & Marzal, 2008).

Following these characteristics, we can add that the EP has its base on the interaction and communication between student and tutor in technological contexts, resulting in the development of digital competencies that can facilitate students' successful insertion in academic contexts mediated by technology, especially in current contexts where classes have moved on to online platforms in the new era of virtuality (Rubio et al., 2020).

3. Method

This study is quantitative and inductive in nature. First, the quantitative method was used to count the percentages of the established categories. Then, the content analysis technique was applied using an inductive approach. This method allows us to advance in knowledge by obtaining more information than the initial data provided, which enables finding relationships between the CALL module, technological skills, integration of technology in future teaching, evaluation tool, sharing of learning, appropriation and reflection with learning, contribution to teaching and future plans to implement ICT.

3.1. The aim of the study

This study aims at answering these research questions:

1. What are teachers' perceptions of developing an e-portfolio?
2. What did the teachers learn from developing their e-portfolios?
3. How would developing an e-portfolio contribute to their future teaching?

To do this a cross-sectional survey research design was used in this study. This design can examine subjects' current attitudes, beliefs, or opinions (Creswell, 2012).

3.2. Participants and the context

19 primary and secondary EFL teachers enrolled in a postgraduate program at a university in Chile participated in the study. All participants were part of a 46-hour Teaching English with Technology (CALL) module, and they were required to create an e-portfolio in Google Sites to evidence their work during the course.

3.3. Module organization and portfolio characteristics

The objective of the module was to provide teachers with technological tools and strategies that allow them to plan thematic units based on the fundamental principles of the use of technologies in the second language teaching-learning process.

The module lasted 50 hours and took 5 weeks. Table 1 shows the module organization, the contents and some of the tools used.

Table 1. Module organization

Week	Contents	Tools used
1	Introduction to ICT tools (5 hours)	Mindomo
	Teaching vocabulary with technology (5 hours)	Quizlet- Vocabulary games
2	Teaching grammar with technology (5 hours)	Screencasting- Wordprocessors
	Teaching pronunciation with technology (5 hours)	Speech recognition software
3	Teaching reading with technology (5 hours)	Storyboardthat- Word it out- Storyjumper
	Teaching listening with technology (5 hours)	Videos- Podcast- Digital storytelling
4	Teaching speaking with technology (5 hours)	Voki- Blabberize- Powtoon
	Teaching writing with technology (5 hours)	Storybird- Storyjumper- Wikis
5	Using games in the EFL classroom (5 hours)	Kahoot- Flipquiz- Memrise
	Assessing students with technology (5 hours)	Google forms- Socrative- Quizizz- Zipgrade

This CALL module included the following elements (see Figure 1).

- The participant's introduction

- Activities for teaching vocabulary, grammar, pronunciation, listening, reading, writing, speaking, games and assessment
- A PowerPoint presentation of an oral report
- The design of a didactic unit using technology
- A reflection on the work carried out during the module

Figure 1. Evidence of students' e-portfolios

3.4. Instrument

The instrument that was used in this study was a survey adapted from Shwu-Meei Chen (2005). It included a brief description of the purpose of the study at the beginning of the questionnaire and 3 sections (see appendix A):

    a) 15 Likert-type scale questions that ranged from strongly disagree to 6 strongly agree);

    b) 5 checkboxes question type;

    c) 3 open-ended questions.

Sections A and B asked participants about their perceptions on the use of e-portfolios in the module and its pedagogical value; while Section C asked them to reflect on the contribution of e-portfolios to their professional development.

3.5. Data collection

Data were collected during the last class of the CALL module. The researcher administered the survey after explaining the purpose of the study to the participants and inviting them to participate on a voluntary basis. Students were assured that there would not be any negative repercussions to their grades or otherwise if they chose not to participate.

3.6. Data analysis

The data were analyzed as follows:

Question from Sections A and B were analyzed using a quantitative method involving the use of percentages. In addition, questions from Section A were grouped into 7 categories: CALL module, technological skills, integration of technology in future teaching, assessment tool, sharing learning, ownership, and reflection.

Questions from Section C were analyzed through a general inductive process with a content analysis technique (Creswell, 2012). For this analysis 3 categories were used: learning, contribution to teaching, future plans to implement ICTs.

4. Findings and discussion

4.1. Likert-type scale questions

Based on the 7 categories established (see Table 2), results show that teachers, in general, felt that the e-portfolio was an important aspect of the CALL module (84% strongly agree) and that they enjoyed the process of developing the portfolio (53% strongly agree and 37% agree).

In terms of technological skills, the participants reported they acquired sufficient technical skills to develop an e-portfolio both during and after the module (100% strongly agree and agree). Considering the integration of the technology learned in future teaching, the participants reported having learned how to use technology to enhance their teaching (68% strongly agree and 32% agree).

Teachers also indicated that they value the e-portfolio as an assessment tool, which is due to the fact that it is authentic (74% strongly agree) and process-oriented (84% strongly agree). As one of the purposes of portfolios is to share experiences, participants, in general, declared they felt comfortable uploading their work (53% strongly agree) and sharing it with others (63% strongly agree). In addition, teachers felt ownership of their portfolios (74% strongly agree) and were proud of their work (53% strongly agree and 37% agree). Finally,

participants expressed that the e-portfolio helped them to reflect on the learning process (68% strongly agree) and their teacher identity (47% strongly agree).

Table 2. Percentage of teachers' perception of e-portfolios

	SD N (%)	D N (%)	U N (%)	A N (%)	SA N (%)
CALL Module					
The e-portfolio was an important aspect of the CALL module.	0	0	3(16)	0	16(84)
I was interested in developing my e-portfolio in the beginning.	1(5)	0	2(10)	3(16)	13(68)
I enjoyed the process of developing my electronic portfolio.	2(10)	0	0	7(37)	10(53)
Technological skills					
I learned sufficient technical skills to develop my e-portfolio in the technology module	0	0	0	5(26)	14(74)
I know how to create an e-portfolio in the future.	0	0	0	2(10)	17(89)
Integration of technology in future teaching					
I acquired sufficient technical skills to help my teaching.	0	0	0	7(37)	12(63)
I learned how to use technology to enhance my teaching and learning.	0	0	0	6(32)	13(68)
Assessment tool					
I understood e-portfolio is a tool for process assessment.	0	0	0	3(16)	16(84)
I value the e-portfolio as an authentic assessment.	0	0	1(5)	4(21)	14(74)
Sharing learning					
I was comfortable to upload my work in my e-portfolio.	0	1(5)	1(5)	7(37)	10(53)
The e-portfolio helped me be open-minded to share my learning experience with others.	0	0	2(10)	5(26)	12(63)
Ownership					
I feel ownership of my e-portfolio.	0	0	0	5(26)	14(74)
I was proud of my work of e-portfolio.	0	0	2(10)	7(37)	10(53)
Reflection					
The e-portfolio helped me to reflect on my learning process.	0	0	1(5)	5(26)	13(68)
The e-portfolio helped me to be aware of who I am as a teacher.	0	0	2(10)	8(42)	9(47)

4.2. Checkboxes question type

Teachers stated the three most important purposes for developing e-portfolios (see Figure 2) were documenting/collecting their learning experience (100%), self-reflecting upon my teaching and learning (68.4%) and completing the CALL module requirements (57.9%).
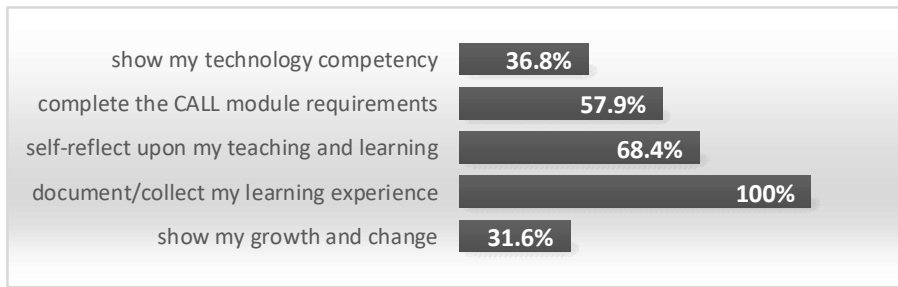
Figure 2. The most important purposes for developing e-portfolios

Teachers pointed out the three most important things learned from developing the e-portfolio (see Figure 3) are the acquisition of specific technological skills (100%), knowledge of technology integration (84.2%) and knowledge of e-portfolio (63.2%).
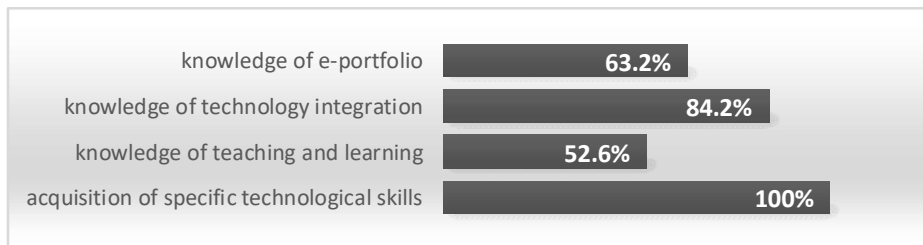
Figure 3. The most important things learned from developing the e-portfolio

As Figure 4 shows, the most important advantages of developing the e-portfolio, according to participants, were learning about technology (63.2%), useful tool/assessment approach in my future teaching (52.6%) and portable and easy to access and update (47.4%).
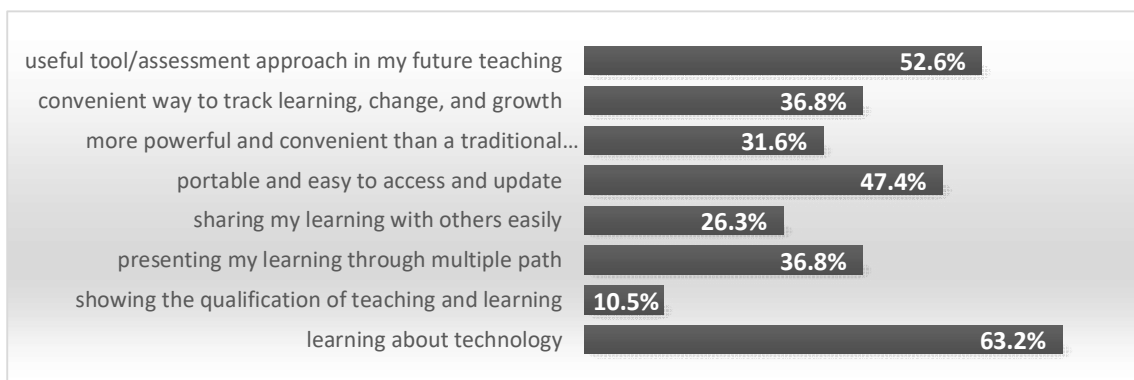
Figure 4. The most important advantages of developing the e-portfolio

Figure 5 presents the most important disadvantages of developing the e-portfolio, which, according to participants, were time demand (94.7%), lack of technology skills (63.2%) and server space limitations (52.6%).
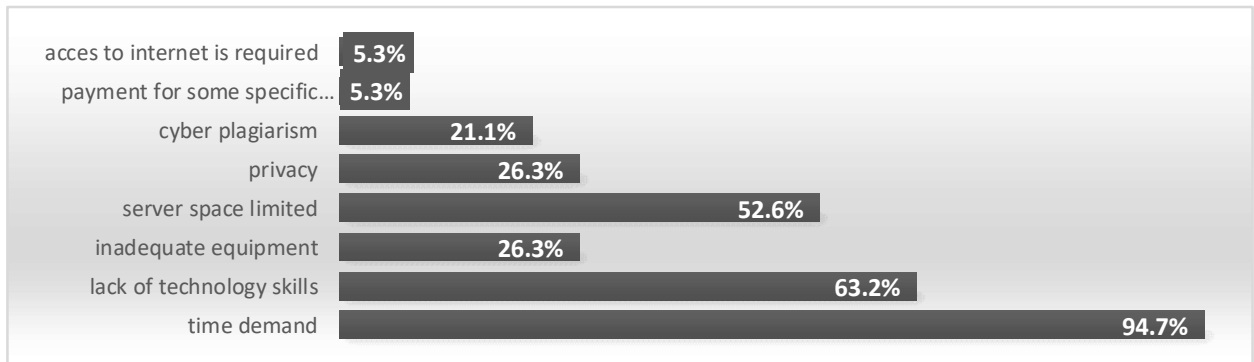
Figure 5. The most important disadvantages of developing the e-portfolio

Interestingly, when asked about the people they shared e-portfolios with, teachers reported having shared them with the instructor (100%), peers (78.9%), family (26.3%), and friends (26.3) most.
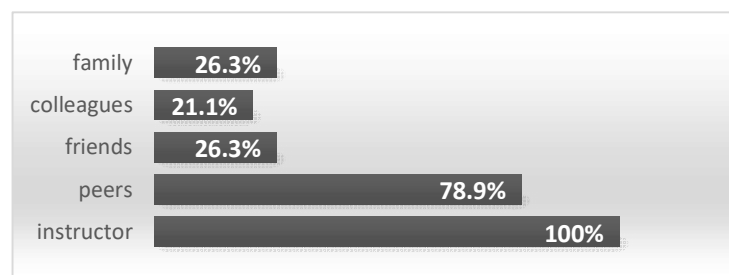
Figure 6. The people teachers shared e-portfolio with

4.3 Open-ended questions

Results from the open-ended questions will be organized into 3 categories: learning, contribution to teaching, future plans to implement ICTs.

a. Learning

When asked about what they learned from developing an e-portfolio, teachers indicated that they learned new technological tools for teaching (14), how to integrate technology into the language learning process (9), how to use the e-portfolio to reflect and keep track of the learning process (4), as exemplified by the excerpts below.

> I learned a wide variety of tools and activities which I could effectively apply with my students. In addition, it made me reflect on what way I could integrate this knowledge into my classes, in order to benefit from technology and its educational tools. (Participant 7)
>
> I improved my knowledge of technology for teaching. I was able to explore different webpages and a wide range of different activities. Uploading those activities to my portfolio helped to track my learning and to have a bank of ideas. (Participant 11)

b. Contribution to teaching

When asked about how the experience of developing an e-portfolio will contribute to their teaching and learning, teachers mentioned that it would help them incorporate more technology into their teaching practices (8), improve their technology competency and be updated with the use of technology (5), incorporate new ways to assess students' learning (5) and promote their professional development (4), as exemplified by the excerpts below.

> It makes me a more integral professional, since I am capable of managing technology being updated with nowadays educational needs. (Participant 5)
>
> Before this module, I didn't know what an e-portfolio was. Thus, through this experience I realize how important is to manage ICT and that you can use it not only for academic purposes, but to save and promote your own professional development as a teacher too. (Participant 16)

c. Future plans to implement ICTs

When asked about how they plan to apply the knowledge and skills learned from developing e-portfolios into their future teaching, teachers expressed the hopes to integrate technological tools in their classes as much as possible (10), create a webpage with activities for students (7), implement students' portfolio as an assessment tool (5) and keep using the portfolio to upload their work (4), as exemplified by the excerpts below.

> I'm planning on using my portfolio so my students would visit and find materials that could help them reinforce their knowledge. (Participant 1)
>
> I am planning to use an e-portfolio as an evaluation of process during a semester. Thus, students will have to upload certain activities on it per month and by the end of the semester they will get a mark for it. (Participant 16)

In general, these results show that most teachers enjoyed the process of developing an e-portfolio (Wenzlaff & Cummings, 1996; Borko et al., 1997). Also, teachers were proud of their e-portfolios and demonstrated their growth to themselves and others, for example, colleagues, family, and friends (McKinney, 1998). However, they believed this activity was time-consuming (Cunningham, 2002; Pecheone, Pigg, Chung, & Souviney, 2005; Lind, 2007).

Regarding technological skills, teachers expressed having improved their technological competence (Milman, 1999; Gatlin & Jacob, 2002; Sherry & Bartlett, 2005) and being ready to develop a new portfolio on their own in the future and to integrate what they have learned in their future teaching (Barrett & Knezek, 2003; Berg & Lind, 2003; Forawi, Almekhlafi & Al-Mekhlafy, 2012).

One of the advantages teachers mention when using e-portfolio was the fact that they are portable and easy to access and update (Quinlan, 2002; Garrett, 2011). In addition, with respect to reflection, teachers mentioned that the e-portfolio helped them reflect on their learning process (Orland-Barak, 2005; Ma & Rada, 2006) and promoted their professional growth (Wolf & Dietz, 1998; Zeichner & Wray, 2001; Lam, 2015). Finally, in relation to teaching practices, teachers referred to the potential e-portfolios have as an alternative assessment when evaluating students' work (Boulton, 2014).

5. Conclusion

The aim of this study was to understand teachers' learning experience while developing an electronic portfolio in the Teaching English with Technology module of a postgraduate program. Based on the findings, it was possible to arrive at some conclusions. Firstly, using an e-portfolio provided teachers with new tools that allowed them to improve their technical skills and enhance their language teaching practices. Next, teachers valued e-portfolios as a tool to document learning experiences, reflect and keep track of learning processes. Finally, teachers felt ownership of their e-portfolios and were proud of their work. This led them not just to share their e-portfolios with the instructor but also with colleagues, family, and friends.

Understanding how teachers experience the use of e-portfolios is important to keep on implementing this tool in teacher education programs and exploring new ways to enhance reflection and professional growth in future teachers. Despite this, before generalizing these findings, it is necessary to pinpoint two limitations of this study. First, given the fact that participants were taking part in a postgraduate program, the sample size was small and not representative. Second, the instrument used in the study collected mostly quantitative data through a structured questionnaire, which limited options of responses and might not fully represent teachers' views.

References

Armengol, J., Hernández, J., Mora, J., Rubio, J., Sánchez, F., & Valero, M. (2009). Experiencias sobre el uso del portafolio del estudiante en la UPC. *Revista de Educación a Distancia*, *7*, 1-17.

Area, M., Gros, B., & Marzal, M. A. (2008). *Alfabetizaciones y tecnologías de la información y comunicación.* Madrid: Síntesis.

Barberà, E., Gewerc, A., & Rodríguez, J. (2016). Portafolios electrónicos y educación superior en España: Situación y tendencias *RED. Revista de Educación a Distancia, 50*, 1-12.

Barberá, E. (2005). La Evaluación de Competencias Complejas: La Práctica del Portafolio. *Revista Educere, 3*(1), 497-503.

Barrett, H. C. (2011). Balancing the two faces of ePortfolio. In S. Hirtz & K. Kelly (Eds.), *Education for a digital world 2.0* (pp. 291–310). Vancouver: British Columbia Ministry of Education and Open School British Columbia.

Barrett, H., & Knezek, D. (2003). E-portfolios: Issues in assessment, accountability and pre-service teacher preparation. Paper presented at the American Educational Research Association Conference, Chicago, IL.

Benito, A. y Cruz, A. (2005). Introducción. In A. Benito & A. Cruz (eds.), *Nuevas claves para la docencia universitaria en el Espacio Europeo de Educación Superior* (pp. 11-20). Madrid: Narcea.

Beka A., & Gllareva D. (2016). The importance of using electronic portfolios in teachers work. *Applied Technologies and Innovations,* 12(1), 32-42.

Berg, M., & Lind, V. (2003). Preservice music teacher electronic portfolios integrating reflection and technology. *Journal of Music Teacher Education, 12*(2), 1-6.

Borko, H., Michalec, P., Timmons, M., & Siddle, J. (1997). Student teaching portfolios: A tool for promoting reflective practice. *Journal of Teacher Education, 48*(5), 345-57.

Boulton, H. (2014). ePortfolios beyond pre-service teacher education: a new dawn? *European Journal of Teacher Education, 37*(3), 374-389.

Bryant, L. H., & Chittum, J. R. (2013). ePortfolio effectiveness: A(n ill-fated) search for empirical support. *International Journal of ePortfolio, 3*(2), 189-198.

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Boston: Pearson Education, Inc.

Cunningham, A. (2002). Using digital video tools to promote reflective practice. *Society for Information Technology and Teacher Education International Conference*, 2002(1), 551–553.

Fernsten, L. (2009) Portfolio assessment. Education.com. Retrieved from http://www.education.com/reference/article/portfolio-assessment/

Forawi, S. A., Almekhlafi, A. G., & Al-Mekhlafy, M. H. (2012). Development and validation of e-portfolios: The UAE pre-service teachers' experiences. *US-China Education Review, A*(1), 99-105.

Gathercoal, P., Bryde, B., Mahler, J., Love, D., & McKean, G. (2002). Preservice teacher standards and the Magnetic Connections electronic portfolio. Paper presented at *the American Educational Research Association (AERA),* New Orleans, LA.

Gatlin, L., & Jacob, S. (2002). Standards-based digital portfolios: A component of authentic assessment for preservice teachers. *Action in Teacher Education*, *23*(4), 35-42.

Garrett, N. (2011). An e-portfolio design supporting ownership, social learning, and ease of use. *Educational Technology & Society, 14*(1), 187-202.

Joyes, G., Gray, L. & Hartnell-Young, E. (2010). Effective practice with e-portfolios: How can the UK experience inform implementation? *Australasian Journal of Educational Technology*, *26*(1), 15-27.

Karsenti, T., Dumouchel, G., & Collin, S. (2014). The eportfolio as support for the professional development of preservice teachers: A theoretical and practical overview. *International Journal of Computers & Technology, 12*(5), 3486-3495.

Lam, R. (2016). Assessment as learning: examining a cycle of teaching, learning, and assessment of writing in the portfolio-based classroom. *Studies in Higher Education*, *41*(11), 1900-1917.

Lind, V. (2007). e-Portfolios in music teacher education. *Innovate,* 3(3).

McKinney, M. (1998). Preservice teachers' electronic portfolios: Integrating technology, self-assessment, and reflection. *Teacher Education Quarterly, 25*(1), 85-103.

Ma, X., & Rada, R. (2006). Individual effects of a web-based accountability system in a teacher education program. *Journal of Computing in Teacher Education, 22*(3), 111-119.

Milman, N. (1999). Web-based electronic teaching portfolios for preservice teachers. In J. Price et al. (eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 1999* (pp. 1174-1179). Chesapeake, VA: AACE.

Monereo, C. (2005). *Internet y competencias básicas. Aprender a colaborar, a comunicarse, a participar, a aprender*. Barcelona: Graó.

Orland-Barak, L. (2005). Portfolios as evidence of reflective practice: What remains 'untold.' *Educational Researcher*, *47*(1), 25-44.

Pecheone, R. L., Pigg, M. J., Chung, R. R., & Souviney, R. J. (2005). Performance assess and electronic portfolios: Their effect on teacher learning and education. *The Clearing House, 78*(4), 164-176.

Quinlan, KM. (2002). Inside the peer review process: how academics review a colleague's teaching portfolio. *Teaching and Teacher Education, 18*(8), 1035-1049.

Rubio, A., Rodríguez, R., Hernández, B. M., Guanche M., & Suárez, L. (2020). El portafolio electrónico como herramienta para el aprendizaje en red. *Panorama Cuba y Salud*, *15*(2), 39-44. Retrieved from http://www.revpanorama.sld.cu/index.php/rpan/article/view/

Sherry, A., & Bartlett, A. (2005). Worth of two electronic portfolios to education majors: A "two by four" perspective. *Journal of Educational Technology Systems*, *33*(4), 399-419.

Shwu-Meei, C. (2005). *A study to understand preservice teachers' learning experiences while developing electronic portfolio in a teacher education program.* Columbus, OH: Ohio State University.

Strudler, N., & Wetzel, K. (2011). Electronic portfolios in teacher education: forging a middle ground. *Journal of Research on Technology in Education, 44*(2), 161-173.

Wenzlaff, T. L., & Cummings, K. E. (1996). The portfolio as a metaphor for teacher reflection. *Contemporary Education*, *67*, 109-12.

Wolf, K., & Dietz, M. (1998). Teaching portfolios: Purposes and possibilities. *Teacher Education Quarterly, 25*(1), 9-22.

Zeichner, K., & Wray, S. (2001). The teaching portfolio in U.S. teacher education programs: What we know and what we need to know. *Teaching and Teacher Education*, *17*, 613-621.

Zubizarreta, J. (2004). *The Learning Portfolio: Reflective practice for improving student learning.* San Francisco: Jossey-Bass.

Appendix A. **Electronic Portfolio Survey**
Adapted from Shwu-Meei Chen (2005)

The purpose of this study is to collect evidence regarding your overall learning experience and perception of electronic portfolio as a postgraduate student. The comments are voluntary. Your effort in providing as much as detail insight as you can, will be greatly appreciated.

Section 1.
Please respond to the following statements based on whether you: Strongly Agree (SA)- Agree (A) - Undecided (U) - Disagree (D) - Strongly Disagree (SD)

As a student who developed the electronic portfolio in the post graduate program:

Statement	SD	D	U	A	SA
The e-portfolio was an important aspect of the CALL module.					
I was interested in developing my e-portfolio in the beginning.					
I acquired sufficient technical skills to help my teaching.					
The e-portfolio helped me be open-minded to share my learning experience with others.					
I learned how to use technology to enhance my teaching and learning.					
I was comfortable to upload my work in my e-portfolio.					
I know how to create an e-portfolio in the future.					
I understood e-portfolio is a tool for process assessment.					
I learned sufficient technical skills to develop my e-portfolio in the technology module.					
The e-portfolio helped me to reflect on my learning process.					
I feel ownership of my e-portfolio.					
I value the e-portfolio as an authentic assessment.					
The e-portfolio helped me to be aware of who I am a teacher.					
I enjoyed the process of developing my electronic portfolio.					
I was proud of my work of e-portfolio.					

Section 2.
Please select according to what you think.

a. The 3 most important purposes for developing my e-portfolio were:

	show my growth and change.
	document/collect my learning experience.
	self-reflect upon my teaching and learning.
	complete the CALL module requirements.
	show my technology competency.
other	

b. The 3 most important things I learned from developing my e-portfolio were:

	acquisition of specific technological skills.
	knowledge of teaching and learning.
	knowledge of technology integration.
	knowledge of e-portfolio.
other	

c. The 3 most important advantages of developing an e-portfolio were:

	learning about technology.
	showing the qualification of teaching and learning.
	presenting my learning through multiple paths.
	sharing my learning with others easily.
	portable and easy to access and update.
	more powerful and convenient than a traditional portfolio (paper-based).
	convenient way to track learning, change, and growth.
	useful tool/assessment approach in my future teaching.

other	

d. The 3 most important disadvantages of developing an e-portfolio were:

	time demand.
	lack of technology skills.
	inadequate equipment.
	server space limited.
	privacy.
	cyber plagiarism.
other	

e. I shared my e-portfolios with:

	instructor.
	peers.
	friends.
	colleagues.
	family.
other	

Section 3.
In the following questions, please give your comments as detailed as you can.

a. What did you learn from developing your e-portfolio (in terms of technology skills, multimedia, knowledge of integration, and reflection)?

b. How will the experience of developing your e-portfolio contribute to your teaching and learning (in terms of technology integration and professional competency)?

c. How do you plan to apply the knowledge and skills that you learned from developing e-portfolios into your future teaching?

STUDENTS' PERCEPTION OF PAPERLESS ENGLISH CLASSROOM: A CASE STUDY OF A JAPANESE IT UNIVERSITY CAMPUS

by **Kentaro Ochi**

Keisen University, Tokyo, Japan

k-ochi @ keisen.ac.jp

Abstract

This exploratory study analyzed students' perception of a paperless English classroom to identify participants who successfully used the paperless environment. The participants ($n = 179$) were tasked to answer a questionnaire. Results only showed a significant difference in the amount of time the participants used their PCs to work on their assignments; however, PCs' prior use was not a factor. The transition from a traditional paper-based classroom to a paperless one cannot be taken for granted. Sufficient instruction on how the digital materials can be accessed is necessary for some learners to embrace a paperless classroom.

Keywords: paperless classroom; technology; student learning

1. Introduction

Going paperless has been a growing global trend. More specifically in Japan, the government has been promoting a paperless society in the form of offering cashless payments (Ministry of Economy, Trade and Industry, 2018) and online tax filing (National Tax Agency, n.d.; Nikkei, 2014). In education, 2020 brought a sudden change in the way classes are taught all over the world. What was still considered relatively uncommon when the data was collected for the current paper in early January 2020 suddenly became the norm, with most universities being held online in Japan (eLearning Strategy Research Institute, 2020). Class materials inevitably became digital, at least in terms of distribution. Currently, schools and teachers are delivering digital materials in many forms. Whether this will continue in the future is still unclear, but the delivery of online classes will most likely accelerate. Therefore, it is essential to understand how learners perceive the use of digital materials in the classroom.

The shift from using textbooks, worksheets, and notebooks in the paper format to having everything done digitally is a significant change. Even though computers have been around since current university students were born, many Japanese students claim that they are not confident in their computer skills (NEC Personal Computers, Ltd., 2017). In this study, responses to a questionnaire were analyzed to explore if the students' lack of confidence in

computer skills affected the perception of those who participated in an in-person English class utilizing only digital materials. The following research questions were formulated for this study:

1. What are the underlying dimensions of 'students' perception of the paperless classroom?

2. What homogeneous groups can be identified from the factors derived in Research Question 1?

3. If demographic differences between the two groups can be identified, what are they?

2. Literature review

2.1. Paperless Classroom

Several studies have explored the academic outcomes of digitalizing classroom materials. Chuang (2014) explored student motivation in a paperless classroom in a Taiwanese science and engineering class in high school by implementing a technology-supported class to enhance students' collaboration and found that students experienced motivation to learn and became more active in class.

Juhaňák, Zounek, Záleská, Bárta, and Vlčková (2019) studied the relationship between the age children first used a computer at and their perceived competence and autonomy in using information and communication technology (ICT). Their findings showed that the earlier a child started using a PC, the higher was their level of ICT competence and autonomy. However, the relationship was not linear, and the authors suggested the pre-school period as a critical period for digital technology acquisition. Moreover, the use of ICT for school purposes did not result in ICT competence or autonomy.

In a large-scale study on 18,344 college students, Kuh and Hu (2001) found that computers and other information technologies benefit students. Specifically, they were "associated with greater levels of educational effort with the effects of C&IT [computers and other information technologies] on gains being largely mediated through the other educational efforts students put forth" (p. 230).

Arney, Jones and Wolf (2012) conducted an entirely paperless software course that was traditionally paper-intensive by having students submit assignments electronically and found that students' satisfaction was higher when using the electronic system. Students reported that their work was more manageable than in paper submissions. Furthermore, it was found that 86% of students preferred to receive feedback electronically.

Enriquez (2010) found that using a tablet computer to create an environment in which technology enhances the interaction between instructors and learners and among learners

improved learning outcomes for the learners. There was a statistical difference in homework and test scores between the classes that used tablet computers and those that did not. The student survey also showed an "overwhelmingly positive student perception of the effects of this classroom environment on their learning experience" (p. 2).

Meishar-Tal and Shonfeld (2019) examined learner preferences for using electronic materials for reading and writing. They found that the reading preference depended on the context of the activities performed. Students preferred to read shorter texts on computers and longer ones on paper. For writing, students responded that they preferred typing over writing in most contexts. Moreover, they reported a gender gap where "boys prefer to read and write on the computer significantly more than girls" (p. 9). They also found a difference between academically weak and strong students; stronger students seemed to prefer computers, although the result does not seem causal.

Hulse (2019) found that using a learning management system (LSM) called *Google Classroom* was well received by the participants studying English in Japan. They found that the LMS assisted their learning by making submissions easier and answered they had few problems despite using the platform for the first time.

Not all studies were in favor of using digital materials. A meta-analysis of 48 studies found that "the impact of digital technologies on learning consistently identifies positive benefits" (Higgins et al., 2012, p. 3). However, the educational outcome was insignificant, and the causal link could not be determined. It was more likely that innovative and effective teachers used digital materials. Their findings showed that what is essential is not what materials were used but how they were implemented.

Runnels and Rutson-Griffiths (2013) caution that the materials need to be modified for a paperless classroom so that they are not merely an electronic version of the paper material. Students need to be able to edit the content on the electronic device to take advantage of electronic material fully.

Finally, in a survey conducted by Ji, Michaels and Waterman (2014), it was found that half of the participants read materials distributed electronically online, whereas one-third printed the document. However, over 80% of the students reported that they could study and learn more if the materials were provided on paper, consistent with previous studies (Daniel & Woody, 2013; Precel et al., 2009; Spencer, 2006). There was a divergence between the students' actions versus their perceived notion of learning advantage. The authors suggest that for the students the low cost of digital materials outweighs the paper's learning advantage.

2.2. Learning Management Systems

Digital materials can be distributed in many ways, including email and other communication platforms. An LMS is among the most popular. An LMS is "a server-based software program that interfaces with a database containing information about users, courses and content" (Pina, 2010, p. 1). These systems can distribute class materials, assess learners' work, and facilitate communication with and among learners online. Other terms are used to describe similar applications, such as course management systems and learning content management systems. Watson and Watson (2007) argue that three terms describe different systems, and a distinction needs to be made. However, according to Pina (2010), these terms are often used interchangeably in journals; thus, this paper will also use the term 'LMS' for the online learning platform. Below is an introduction of the LMS that the researcher used for the study.

2.2.1. *Google Classroom*

Google Classroom is a free LMS service provided by Alphabet Inc.'s Google with G Suite for Education. According to Google (n.d.), it "makes teaching more productive and meaningful by streamlining assignments, boosting collaboration, and fostering communication" (para. 1). The program is designed to integrate well with other Google online products such as *Google Docs, Google Slides, Google Forms,* and *Google Drive*. Assignments and quizzes can be composed, distributed, and assessed on one platform. Student grades can also be kept with functions to set grading categories. It also includes grading features that allow teachers to use matrix grading and a plagiarism checking function called originality reports. The shared setting for materials using Google products distributed through *Google Classroom* is set so that the teacher and the learners can access the same content, enabling users to see the work being done in real-time. Therefore, it is possible to provide feedback while the learners are working on various tasks in class. It is one of the more popular platforms, with more than 100 million active users as of March 2020 (De Vynck & Bergen, 2020).

3. Methodology

3.1. Participants

The participants (*n* = 179) were students in the six classes taught by the researcher. They were first-year students majoring in information technology at a private university located in Tokyo who completed two semesters of paperless classrooms. A random sampling of participants did not take place because of practical limitations. The current research is a case study, which

provides context-dependent knowledge. Although a particular finding may not easily be generalized, it provides a "nuanced view of reality" (Flyvbjerg, 2006, p. 223), and in mass, results in expert knowledge.

One thing to note relating to the participants is that the department makes it compulsory for all students to learn to program and bring a laptop to school every day. The department policy states that paperless lessons should be administered. Thus, for English lessons, *Google Classroom* is used to manage, distribute, and grade student work. Compared to the average university student in Japan, it is expected that the amount of computer usage would be significantly higher.

3.2. Questionnaire

The questionnaire was administered in late January 2020, which is the end of the school year. The instrument was in Japanese and consisted of 26 questions about the participants' perceptions of the paperless classroom and nine demographic questions (see Appendix A for the translated material). The researcher designed a new questionnaire to ask questions concerning the specific environment the participants were in (i.e., Japanese university students, digital material in every class, learning English). The 25 questions asking the participants' perception used a five-point Likert-scale with one open-ended question, and the nine demographic questions were open-response items. The five-point Likert-scale ranged from 1 "strongly disagree" to 5 "strongly agree." The questionnaire appears to have good internal consistency, a = .89. Exploratory factor analysis (EFA) was used to identify the underlying construct of the participants' perceptions. EFA is used to identify the minimum number of common factors when the researcher does not have a clear hypothesis (Ferguson & Cox, 1993).

4. Results

4.1. Demographic data

The demographic data showed (see Appendix B Demographic Data) an imbalance in the male-female ratio. Of the 179 participants, 148 identified themselves as male, and 30 identified themselves as female (one chose not to answer this question). The imbalance may have contributed to the outcome of the questionnaire.

The average number of years participants had used computers before starting university was 3.62. However, the range was extensive, with some having never used a computer before entering university, while others had 15 years of experience. Also, the amount

of time for which participants used their computer outside the school for their university assignments varied from 10 to 300 minutes per day, with an average of 74.43 minutes (see Figure 1). Similar results were found with the computer usage for non-assignment reasons (e.g., watching *YouTube*, talking to friends, playing games) with an average of 81.31 minutes per day (See Figure 1) with a range of 0 to 420 minutes.

The participants reported having used smartphones on average for 5.74 years. There was high variance in the amount of time smartphones were used, with an average of 81.31 minutes per day for working on an assignment. A notable difference was that participants used smartphones predominantly for non-assignment reasons, averaging 199.11 minutes, as shown in Figure 1.
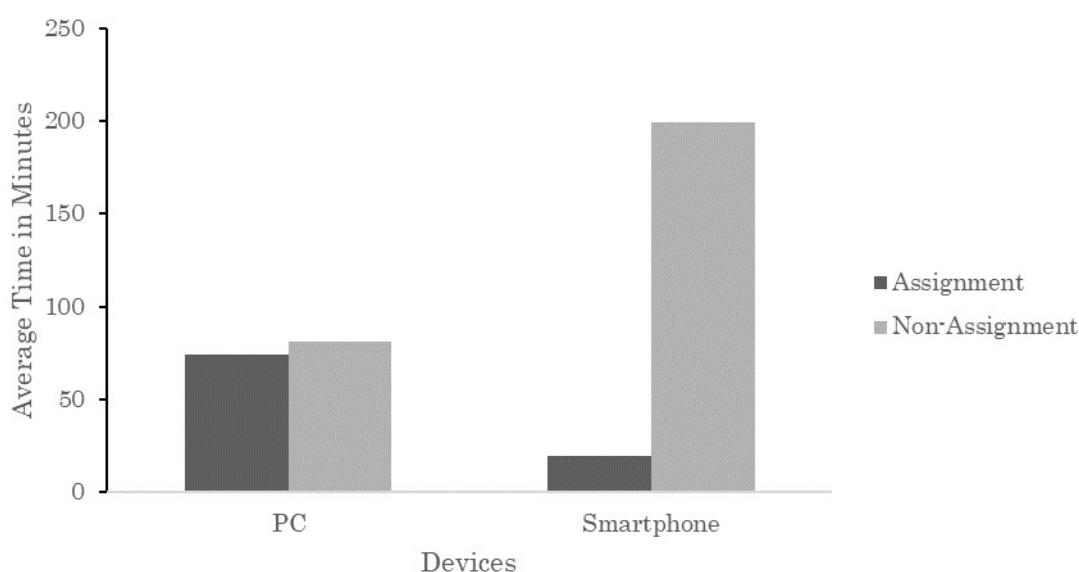
Figure 1. Average time participants spent on their devices

4.2. Perception questions

The 25-item student perception questionnaire item was subjected to exploratory factor analysis. The Kaiser-Meyer-Olkin value was .856, which indicates that the sample is adequate for analysis. Bartlett's test of sphericity was significant (χ^2 (231)= 1884.763, $p < .01$), indicating that the variables were related and adequate for analysis. Three items were omitted due to low factor loading. Table 1 presents the results of the factor analysis. Four factors were identified, which explained 58.61% of the variance.

Table 1. *Rotated Factor Loading*

Items	Factor				Construct
	1	2	3	4	
Q6.	**0.84**	-0.05	0.11	-0.24	
Q8.	**0.79**	-0.18	0.14	0.07	
Q3.	**0.78**	-0.06	0.05	-0.14	
Q7.	**0.70**	0.02	-0.21	0.23	
Q9.	**0.70**	-0.12	-0.03	0.30	
Q1.	**0.64**	0.03	0.02	0.01	Skills
Q4.	**0.63**	0.06	0.03	-0.21	
Q5.	**0.63**	0.23	-0.05	-0.15	
Q11.	**0.63**	-0.13	0.29	0.00	
Q2.	**0.49**	0.23	0.00	-0.02	
Q12.	**0.46**	0.06	-0.26	0.39	
Q22.	-0.12	**0.69**	-0.04	0.00	
Q24.	0.14	**0.62**	0.08	0.11	
Q25.	0.22	**0.59**	-0.04	-0.02	
Q19.	-0.14	**0.58**	-0.10	-0.02	Tools
Q21.	-0.04	**0.57**	0.17	0.03	
Q23.	0.10	**0.55**	0.19	0.07	
Q20	-0.01	**0.43**	-0.02	-0.06	
Q14.	0.07	0.01	**0.74**	0.13	
Q13.	0.10	0.07	**0.72**	0.07	Vocabulary
Q16.	-0.19	0.08	0.06	**0.72**	
Q15.	-0.12	-0.10	0.28	**0.67**	Notes

Notes. Extraction method; maximum likelihood; Rotation method; Promax with Kaiser Normalization

Factor 1 comprised 11 items reported on a 5-point Likert scale that explained 33.5% of the variance with factor loadings from .84 to .46. The questions consisting of mainly items that dealt with reading and writing skills were labeled "Skills." Factor 2 comprised seven items that explained 11.3% of the variance with factor loadings from .69 to .43. Questions associated with Factor 2 focused on the use and function of digital tools and were thus labeled "Tools." The third factor comprised two items that explained 7.6% of the variance with factor loadings of .74 and .72. These two items concerned vocabulary learning and were thus labeled "Vocabulary." The final factor was also comprised of two items, which explained 6.2% of the variance with factor loadings of .72 and .67. Factor 4 was labeled "Notes" as it comprised two questions

asking students' perceptions of how they took notes digitally.

Based on the factor analysis, factor scores were estimated for skills ($M = 3.06$, $SD = 0.83$), tools ($M = 4.27$, $SD = 0.52$), vocabulary ($M = 2.77$, $SD = 1.00$), and notes ($M = 2.25$, $SD = 1.06$). These scores were used to conduct Ward's clustering method for analysis, which resulted in two clusters. The first cluster and second cluster consisted of 116 and 63 participants, respectively. The Kolmogorov-Smirnov test of normality showed that the data were not normally distributed. The Mann-Whitney test was conducted using the two clusters as the independent variable and the four factors as a dependent variable to compare the median. There was a significant difference in the participants' perception of all four factors (Skills: $U = 1077$, $p < .001$; Tools: $U = 1020$, $p < .001$; Vocabulary: $U = 1193$, $p < .001$; Notes: $U = 2965$, $p = .037$). The mean rank and the sum of ranks for each factor are listed in

Table 2. The first cluster had a higher mean rank for all four factors. Compared to the second cluster, these participants rated their use of digital materials in the paperless classroom higher. This cluster was named the "No Struggle" group. The second cluster, which had a lower mean rank, was classified as the "Struggle" group. These were participants who felt less comfortable using digital tools for learning.

Table 2. Mean rank and sum of ranks for each factor

	Cluster	*n*	Mean Rank	Sum of Ranks
Skills	No Struggle	116	112.22	13017
	Struggle	63	49.10	3093
Tools	No Struggle	116	112.71	13074
	Struggle	63	48.19	3036
Vocabulary	No Struggle	116	111.22	12901
	Struggle	63	50.94	3209
Notes	No Struggle	116	95.94	11129
	Struggle	63	79.06	4981

The Mann-Whitney test was conducted using the two clusters as the independent variable and the demographic questionnaire item as the dependent variable to compare the median. The mean rank and sum of ranks for each question are listed in Table 3. Only the question "PC for assignment use" differed significantly ($U = 2717$, $p = .017$). The mean rank indicates that the No Struggle group used the computer more for assignments than the Struggle group.

Table 3. Mean rank and sum of ranks for the demographic data

	Cluster	*n*	Mean Rank	Sum of Ranks
Gender	No Struggle	116	88.43	10169.5
	Struggle	63	91.45	5761.5
Age	No Struggle	116	87.35	9783
	Struggle	63	87.77	5442
PC use history	No Struggle	116	88.55	9918
	Struggle	63	84.15	5133
PC for Assignment use	No Struggle	116	93.96	10617
	Struggle	63	75.54	4608
PC for non-assignment use	No Struggle	116	87.76	9829.5
	Struggle	63	85.6	5221.5
Smartphone use history	No Struggle	116	89.57	10032
	Struggle	63	85.21	5368
Smartphone for assignment use	No Struggle	116	85.95	9712
	Struggle	63	90.38	5513
Smartphone for non-assignment use	No Struggle	116	87.3	9864.5
	Struggle	63	87.88	5360.5

The open-ended question which asked the participants to comment on anything relevant to the paperless classroom yielded 47 responses. They were coded into three categories: (a) positive, (b) negative, or (c) other. Twenty-five responses were positive, 17 were negative, and five were other. A chi-square test was performed to examine the relationship between the cluster and their answers. The relationship between these variables was not significant. The majority of positive responses dealt with convenience, such as not carrying around textbooks, writing by hand, and organizing materials. Negative responses varied. There were remarks on learning style preference, such as writing by hand and writing notes in the margin. Others included inconvenience, such as the need for a computer for all aspects of the class.

5. Discussion

The main objective of this study was to understand the students' perceptions of the paperless classroom. In response to Research Question one, the data from 179 participants suggest four factors as the paperless classroom's underlying perceptual dimensions: skills, tools, vocabulary, and notes. The participants differentiated the use of digital materials for vocabulary learning and note-taking from other English skills such as reading and writing.

The first factor involved the use of digital materials for language skills. The questionnaire result showed that participants, in general, viewed the use of digital materials to be positive. However, similar to the concerns raised by Runnels and Rutson-Griffiths (2013) and Ji, Michaels, and Waterman (2014), responses in the open-ended questionnaire included mentions of preference for paper, especially for reading materials. Some commented that it was easier to read using paper and prefer to use paper and pencil to write.

The second factor concerned the use and function of tools such as computers and smartphones. Participants saw digital materials as a tool to facilitate more collaboration among students and teachers, and it also made it logistically more convenient, as was seen in previous findings (Arney et al., 2012; Enriquez, 2010; Ji et al., 2014). The positive feedback in the open-ended questionnaire echoes this notion with mentions of convenience.

The third and fourth factors had fewer related items on the survey, and the responses to the questionnaire scored lower on the Likert-scale than the other two factors. This suggests that participants' overall perception was not as favorable when using paperless materials for these two factors as the first two factors. The third factor was vocabulary and was categorized independently from other language learning skills. One participant's response in the open-ended questionnaire stated that the lack of handwriting made it more challenging to retain the vocabulary words they learned.

The fourth factor was notes. Like the third factor, some participants raised concerns about not taking notes during class and when reading. In terms of reading material, they wished to make notes in the margins and mark off chunks of sentences using slashes in the text. These actions can be performed on a computer with different applications, but it is unclear whether the participants knew but preferred paper or did not know that it was possible.

Research Question Two asked if there were homogeneous groups that could be identified from the data. Two distinct groups were identified from the four factors. The transition to paperless was not as seamless as was hoped for some participants. Based on the cluster analysis using the factor score, there was a clear divide among participants, with those who reported favorably on the paperless classroom and those who did not. There was a significant difference in the mean rank between the two clusters for all four factors. So the problem was not the particular way digital materials were used, but digital materials in general.

Finally, to answer research question three, demographic data were used to compare the two groups. Unlike the findings by Meishar-Tal and Shonfeld (2019), gender did not play a role in digital materials' preference. Findings by Juhaňák et al. (2019) also did not apply to these participants because computer usage history was not a factor. Prior engagement with a

computer would suggest more familiarity with computers, but that did not translate to a preference for a paperless classroom. Likewise, having a smartphone was not a factor. Time spent on smartphones for non-assignment purposes far exceeded the time participants spent completing assignments on other electronic devices. This is in line with the general trend of young Japanese shifting away from computers to smartphones (Maita, 2020; Ministry of Internal Affairs and Communications, n.d.).

The only demographic data that showed a significant difference between the Struggle and No Struggle groups was the amount of time they spent on a computer for assignment purposes. This could be interpreted to mean that the learners would feel more comfortable by increasing their time working on assignments on a computer. However, Juhaňák et al. (2019) suggested ICT for school purposes did not result in ICT competence or autonomy. Hence, a more likely explanation is that learners who prefer digital materials are those who can work on assignments on computers longer.

6. Conclusion

The current research showed that four factors can be associated with a paperless classroom for this set of learners. The participants viewed learning how to read and write using digital materials as different from learning vocabulary and taking notes. The Clustering analysis revealed that the amount of time spent on assignments using a computer was a factor that differentiated the learners who were struggling with digital materials from those who were not. Namely, those who spent more time on assignments using their computer were often classified as non-strugglers. Other factors, such as a prior history of PC usage or PC usage for non-assignment reasons, did not show a significant difference between the two groups. This suggests that the ease of using digital materials was not a product of familiarity with the use of a computer in general.

The results suggest that, in terms of the practical application of using digital materials to implement a paperless classroom, we cannot assume a smooth transition from paper to paperless simply because the students are familiar with the use of computers, especially for vocabulary learning and note-taking. Instead, we need to show learners how to use digital materials to enhance their learning (i.e., using annotation on a pdf, flashcard apps for vocabulary learning, and podcasts for listening). Introducing how they can use different applications and web resources may be essential even for those who have been using computers for a long time.

The limitations of the study need to be discussed. First, the scale of the study was

small; it only included students from one university, which is by no means a representative sample of learners in general. Second, the data used in the study were obtained from a self-report questionnaire. The data do not necessarily reflect the actual actions of the participants. Finally, the data do not answer what can be done to make the paperless classroom experience better for the students.

Future research should explore ways adept users of digital materials are using computers and other electronic devices. It is also essential to find empirical evidence of the learning advantages of going paperless. As Ji, Michaels, and Waterman (2014) pointed out, lowering the cost, both socially and financially, should not be the only reason for implementing paperless classrooms. A comparison study of using paper versus paperless is warranted.

Even before the COVID-19 pandemic, going paperless has been the trend in our societies, including schools. It is both financially and ecologically cost-effective. However, we need to keep in mind that the shift from paper to paperless is not smooth even for the 'digital natives' (Prensky, 2001).

References

Arney, J., Jones, I., & Wolf, A. (2012). Going green: Paperless technology and feedback from the classroom. *Journal of Sustainability and Green Business*, *1*, 1-9.

Chuang, Y.-T. (2014). Increasing learning motivation and student engagement through the technology-supported learning environment. *Creative Education*, *5*(23), 1969.

Daniel, D. B., & Woody, W. D. (2013). E-textbooks at what cost? Performance and use of electronic v. print texts. *Computers & Education*, *62*, 18-23. https://doi.org/10.1016/j.compedu.2012.10.016

De Vynck, G., & Bergen, M. (2020, April 9). *Google Classroom users doubled as quarantines spread*. Bloomberg Quint. Retrieved July 19, 2020, from https://www.bloombergquint.com/business/google-widens-lead-in-education-market-as-students-rush-online

eLearning Strategy Research Institute (2020). *Daigaku ni okeru online jyugyou no kinkyuu dounyu ni kansuru cyousa houkoku syo [Report concerning the emergency introduction of online classes in university]*. eLearning Strategy Research Institute. Retrieved July 19, 2020, from https://www.digital-knowledge.co.jp/report_downloads/

Enriquez, A. G. (2010). Enhancing student performance using tablet computers. *College Teaching*, *58*(3), 77-84. https://doi.org/10.1080/87567550903263859

Ferguson, E., & Cox, T. (1993). Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment*, *1*(2), 84-94.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, *12*(2), 219-245.

Google (n.d.). *About Classroom—Classroom Help*. Classroom Help. Retrieved July 19, 2020, from https://support.google.com/edu/classroom/answer/6020279?hl=en

Higgins, S., Xiao, Z., & Katsipataki, M. (2012). *The impact of digital technology on learning: A summary for the education endowment foundation*. Durham, UK: Education Endowment Foundation and Durham University.

Hulse, R. (2019). The use and implementation of Google Classroom in a Japanese university. *The Centre for the Study of English Language Teaching Journal*, *7,* 71-105.

Ji, S. W., Michaels, S., & Waterman, D. (2014). Print vs. electronic readings in college courses: Cost-efficiency and perceived learning. *The Internet and Higher Education*, *21*, 17-24. https://doi.org/10.1016/j.iheduc.2013.10.004

Juhaňák, L., Zounek, J., Záleská, K., Bárta, O., & Vlčková, K. (2019). The relationship between the age at first computer use and students' perceived competence and autonomy in ICT usage: A mediation analysis. *Computers & Education*, *141*, 1-14.

Kuh, G. D., & Hu, S. (2001). The relationships between computer and information technology use, selected learning and personal development outcomes, and other college experiences. *Journal of College Student Development*, *42*(3), 217-232.

Maita, T. (2020, January 8). *Sekai de yuiitu Nihon nokodomo no pasokon siyouritu ga teika siteiru [Japan, the only country in the world where computer usage among children is declining]*. *Newsweek Japan*. Retrieved July 19, 2020, from https://www.newsweekjapan.jp/stories/world/2020/01/post-92085.php

Meishar-Tal, H., & Shonfeld, M. (2019). Students' writing and reading preferences in a paperless classroom. *Interactive Learning Environments*, *27*(7), 908-918.

Ministry of Economy, Trade and Industry. (2018, July 3). *Commission for promotion of cashless settlement established as new industry-academia-government organization*. Ministry of Economy, Trade and Industry. Retrieved July 19, 2020, from https://www.meti.go.jp/english/press/2018/0703_001.html

Ministry of Internal Affairs and Communications (n.d.). *Information and Communications in Japan 2018*. 2019 White Paper. Retrieved July 27, 2020, from https://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2019/2019-index.html

National Tax Agency (n.d.). *4 Electronic Tax Payment Procedure | e-Tax*. Easier to Use Online National Tax Return, Tax Payment System. Retrieved July 27, 2020, from https://www.e-tax.nta.go.jp/en/index.html

NEC Personal Computers, Ltd. (2017, February 7). *Wakamono = degital native ha hontou? [Young people = digital natives, is this true?]*. NEC LAVIE Official Site. Retrieved July 19, 2020, from https://www.nec-lavie.jp/common/release/ja/1702/0704.html

Nikkei. (2014, November 5). *Japan to let companies store tax documents digitally*. Nikkei Asian Review. Retrieved July 19, 2020, from https://asia.nikkei.com/Economy/Japan-to-let-companies-store-tax-documents-digitally

Pina, A. A. (2010). An overview of learning management systems. In Y. Kats (Ed.), *Learning Management System Technologies and Software Solutions for Online Teaching: Tools and Applications* (pp. 1-19). Hershey, PA: IGI Global. https://doi.org/10.4018/978-1-61520-853-1

Precel, K., Eshet-Alkalai, Y., & Alberton, Y. (2009). Pedagogical and design aspects of a blended learning course. *The International Review of Research in Open and Distributed Learning*, *10*(2), 1-16. https://doi.org/10.19173/irrodl.v10i2.618

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, *9*(5).

Runnels, J., & Rutson-Griffiths, A. (2013). Tablet PCs in a paperless classroom: Student and teacher perceptions on screen size. *JALT CALL Journal*, *9*(3), 275-285.

Spencer, C. (2006). Research on learners' preferences for reading from a printed text or from a computer screen. *Journal of Distance Education, 21*, 33-50.

Watson, W. R., & Watson, S. L. (2007). An argument for clarity: What are learning management systems, what are they not, and what should they become? *TechTrends*, *51*(2), 28-34. https://doi.org/10.1007/s11528-007-0023-y

Appendix A. Questionnaire Items

Perception Questions

	M	SD
1. My motivation towards the learning materials improved because it was distributed digitally.	3.34	1.07
2. My motivation toward class/homework improved by being able to submit it digitally.	3.63	1.21
3. I had more opportunities to be in contact with English because the classwork was given digitally.	3.16	1.12
4. I had more opportunities to be in contact with English because the homework was given digitally.	3.07	1.20
5. I was able to be in contact with more English because it was dealt with digitally.	3.82	1.08
6. I had more opportunity to read English because I read it digitally.	3.12	1.21
7. I had more opportunities to write English because I wrote it digitally.	3.03	1.36
8. I was able to read English more because it was given to me digitally.	2.87	1.14
9. I was able to write more by writing digitally.	2.89	1.29
10. I became faster at reading because I read digitally.	3.35	1.15
11. My reading comprehension improved because I read digitally.	2.67	0.95
12. My English writing speed improved because I wrote digitally.	2.86	1.25
13. I learned more vocabulary by studying them digitally.	2.82	1.14
14. my vocabulary learning speed improved by learning them digitally.	2.72	1.10
15. I think the amount of note I take increased by taking them digitally.	1.98	1.12
16. my note-taking speed increased by taking them digitally.	2.53	1.31
17. I was able to ask questions easier by doing the work digitally.	3.39	1.20
18. it made it easier for me to get feedback from teachers by doing the work digitally.	4.41	0.91
19. It made it easier to use online tools like the dictionary by doing the work digitally.	4.69	0.72
20. It made it easier to submit work because it was digital.	4.18	1.15
21. It made it easier to manage submitted work because it was done digitally.	4.37	1.01
22. It made it easier to collaborate by doing the work digitally.	4.75	0.72
23. I was able to answer more questions by collaborating digitally.	4.08	1.06
24. My productivity increased by taking the class digitally.	3.92	0.96
25. My efficiency improved by taking the class digitally.	4.18	0.91

Appendix B. Demographic Data

	M	*SD*	Min	Max
Age	19.21	1.67	18	23
PC use history in years	3.62	3.79	0	15
PC use outside school a day in minutes (for assignments)	74.43	47.84	10	300
PC use outside school a day in minutes (non-assignments)	81.31	95.00	0	420
Smartphone use in years	5.74	1.71	1	10
Smartphone use outside school a day in minutes (for assignments)	19.61	28.52	0	180
Smartphone use outside school a day in minutes (non-assignments)	199.11	120.75	5	720

ENHANCING EAP LEARNERS' ACADEMIC VOCABULARY LEARNING: AN INVESTIGATION OF *WHATSAPP*-BASED REPORTING AND RECEIVING ACTIVITIES

by **Yudhi Arifani**

Universitas Muhammadiyah Gresik, Indonesia

yudhi_arif@umg.ac.id

and **Jumadi**

Universitas Lambung Mangkurat, Indonesia

jumadi@ulm.ac.id

Abstract

Previous studies have indicated inconsistencies in utilizing the mobile application known as *WhatsApp* in academic vocabulary learning. This study attempts to overcome those inconsistencies by addressing three research aims, namely a) to examine any significant difference of employing vocabulary learning between using *WhatsApp*-based reporting and receiving on the one hand, and traditional-based reporting and receiving strategies on the other; (b) to determine the best predictor of vocabulary learning, and (c) to draw learners' attitudes among the four types of strategies. A mixed randomized experimental type of research with pre-test and post-test design as well as survey design has been consecutively applied for these purposes. The results of the study reveal that English Academic Purposes (EAP) learners who expand their academic vocabulary using *WhatsApp*-based reporting activities achieve better having been exposed to these three different treatments. Learners' endeavours to find out the mixed Indonesian-English vocabulary definitions by themselves, followed by reporting these to their teacher using *WhatsApp* turn out to be the best vocabulary learning predictor. Learners' attitudes observed in this cohort also show positive responses. Since the aspect of familiarity with academic vocabulary learning is not incorporated into this study, future researchers may find filling up this lacuna worth pursuing

Keywords: *WhatsApp*-based reporting; receiving activities; academic vocabulary; EAP learner

1. Introduction

The rapid and massive adoption of text messages by teens, young and adult learners as one of essential means of written communication has invited English Foreign/Second Language (EFL/ESL) researchers and practitioners to integrate texting strategies into second language (L2) teaching and learning, both in formal and informal settings (Anderson & Rainie, 2012;

Arifani, 2020; Li & Cummins, 2019). In the formal setting, the main objectives of integrating texting strategies into EFL/ESL teaching and learning aims at helping L2 learners learn a different aspect of the target language such as listening, speaking, reading, writing, vocabulary, grammar, and pronunciation (Caruso et al., 2019; Kennedy & Levy, 2008) and at promoting their self-regulated learning under the EFL/ESL curriculum (Arifani et al., 2021).

In the domain of vocabulary learning, research applying texting messages has shown a range of intervention strategies and results. The experimental interventions of vocabulary learning are varied, ranging from the types of vocabulary and different types of text messages to instructional designs. Some of the vocabulary types include incidental vocabulary (Arifani, 2020), general academic vocabulary (Cetinkaya & Sütçü, 2018; Kilickaya & Krajka, 2010; Li et al., 2017), technical jargon (Cavus & Ibrahim, 2009) and a different amount of target vocabulary learning (Dashtestani & Stojkovic, 2015; Lu, 2008). Next, the instructional designs in applying vocabulary learning involve the use of both the learners' mother tongue and their second language (L2) to compare its effectiveness. A comprehensive review of previous studies indicates that the use of mixed languages (using the learners' mother tongue and English) through receiving many vocabularies from their teachers (L1 and L2) could be one of the effective vehicles for vocabulary learning (Dashtestani & Stojkovic, 2015) although this practice goes against the concepts of self-regulated learners and active vocabulary learners because learners do not have their initiatives to look for the vocabulary meaning using their gadgets (Arifani, 2020). Another irony is that although the results of experimental designs applying mixed languages in the vocabulary learning remain positive, most of the previous researchers have not followed up those findings with further inquiry.

To date, in a comprehensive review of the previous studies that used texting strategies (SMS or MMS) to teach second language vocabulary learning, several methodological barriers have been identified (Cavus & Ibrahim, 2009; Dashtestani & Stojkovic, 2015; Dehghan et al., 2017; Kilickaya & Krajka, 2010; Lu, 2008). These include inconsistencies in addressing previous research findings, the intervention models, and the negligence of self-active learning concepts of using the texting message because most previous studies applied texting using teacher-driven learning (Arifani et. al., 2020). In this case, the teachers provided a set of vocabulary items to their learners' mobile applications, along with their meanings and definitions. As a result, the learners remained passive since they did not autonomously attempt to find the meanings and definitions by themselves. To address those three main lacunas, the present study examined the effectiveness of an experiment that was designed to teach EFL learners' general academic vocabulary within a learning context using *WhatsApp*. Specifically,

it compared the learners' second language (L2) vocabulary learning with two different types of *WhatsApp* reporting and receiving activities while applying both the learners' first and second languages. In the *WhatsApp*-based reporting activity, the teachers send a set of blind vocabulary items in English with no definitions and meanings to the learners' *WhatsApp*. In this case, the students are assigned to find the meanings and definitions of the vocabulary through their mobile phones and report/send their definitions and meanings to their teachers' *WhatsApp*. By contrast, in the *WhatsApp*-based receiving activity, the learners receive a set of academic vocabulary items with their meanings and definitions via their *WhatsApps*.

2. Literature review

2.1. Inconsistency in intervention with academic vocabulary learning research

When reviewing 12 previous relevant studies, 10 findings illustrate the overall positive results of applying texting interventions for learners' English vocabulary or idiom learning. The only exception is a study conducted by Dehghan et al. (2017) involving 32 Iranian learners at a Language Institute that reports no significant differences in learners' vocabulary learning scores when comparing the experimental group applying *WhatsApp*-based learning and the control group applying traditional-based learning with the monolingual direct explanation of English definitions, synonyms and antonyms. The interventions of vocabulary learning can be further classified into three main areas. The first area involves vocabulary and idiom learning applying monolingual English definitions, synonyms, and antonyms (Basal et al., 2016; Bensalem, 2018; Dehghan et al., 2017; Tabatabaei & Goojani, 2012). The second area of research examines the effectiveness of vocabulary interventions using bilingual intervention strategies using a mixture of the learners' mother tongue and English definitions, synonyms, and antonyms (Cetinkaya & Sütçü, 2018; Dashtestani & Stojkovic, 2015; Hayati et al., 2013; Lin & Yu, 2017; Lu, 2008). The third area involves the implementation of vocabulary software, multimedia learning such as visual, audio, and video-based vocabulary and idiom learning (Cavus & Ibrahim, 2009; Kilickaya & Krajka, 2010; Lin & Yu, 2017; Saran et al., 2012).

In their previous work, most of the researchers in the L2 context employ different strategies to make L2 vocabulary learning much more comprehensible than the traditional learning strategies by using different types of mobile application platform. Their results, however, fail to reach a consensus on the use of learners' mother tongue and target language in vocabulary teaching and learning. Moreover, there is no clear relation between previous research findings and current research practices. Most of the previous positive findings such as

the use of bilingual vocabulary interventions have not been followed up by current researchers. For example, positive results of vocabulary interventions using bilingual definitions, synonyms, and antonyms using Chinese, Persian, and Turkish (the learners' respective mother tongues and English) conducted in Taiwan, Iran, and Turkey (Cetinkaya & Sütçü, 2018; Dashtestani & Stojkovic, 2015; Lu, 2008) are adequately grounded but no follow-up studies have used those interventions as their theoretical basis (Bensalem, 2018; Motlagh et al., 2020). Lastly, the author has been unable to locate studies that apply comprehensive interventions involving *WhatsApp*-based reporting and receiving activities compared to tradition-based vocabulary learning activities.

2.2. *WhatsApp* based-reporting or receiving activities

Since Lu (2008) raised concerns about the effectiveness of learning vocabulary using SMS via mobile phone, the validity of the concept of vocabulary learning mobile phones has stipulated a large body of inquiry that addresses the effectiveness of vocabulary teaching and learning in EFL/ESL contexts. After summarizing the key issues published on the theme, setting, the aims of the study, methods, data analysis and key findings, the summaries illustrate some observations about the effectiveness of vocabulary teaching and learning applying different types of mobile applications and also to identify the lacuna of further research (Appendix 1). One of the themes that can be derived from previous studies is that the use of mobile applications such as *WhatsApp*, SMS, MMS, and *Line* are considered crucial precursors to support vocabulary learning (Li & Cummins, 2019). An understanding of vocabulary learning strategies via mobile phones not only offers guidance for classroom practices and curriculum development but also an opportunity to discover 'an innovative strategy' of vocabulary learning. Second, although conducted in many different cultural settings (most of the above inquiries have been made in the Asian setting, except for those of Li et al. (2017) and Manca (2020)), these studies suggest that the interventions and strategies in applying texting-based vocabulary learning are inconsistent with the concept of self-regulated learning.

What remains uncertain is the argument for this. Some studies (Cavus & Ibrahim, 2009; Dashtestani & Stojkovic, 2015; Dehghan et al., 2017; Kilickaya & Krajka, 2010; Lu, 2008) have tried to examine the effectiveness of vocabulary learning using many different texting strategies. For example, Cavus and Ibrahim (2009) found that their students' technical vocabulary learning with a higher frequency of sending and receiving messages through the MOLT software increased in comparison with those using traditional strategies. Next, Li et al. (2017) also found that learners who were exposed to academic vocabulary three times per day

using SMS-receiving activities learned more target words but showed no difference in the transfer effects. Besides, Dashtestani and Stojkovic (2015) examined EAP learners' vocabulary learning SMS based-glosses involving mixed language definition. The results reveal that learners who received vocabulary items using the mixed definition in both Persian and English reached higher vocabulary scores than two other strategies using either Persian or English. However, the findings of other studies (Dehghan et al., 2017; Derakhshan & Kaivanpanah, 2011) suggest that texting strategies cannot always explain the results and some research reports show contradictory results. For example, Derakhshan and Kaivanpanah (2011) reveal that the students who learned vocabulary using SMS receiving strategies for their instructor did not show any significant difference in terms of vocabulary scores.

Apart from the above concern, this study intends to draw attention to a conceptual ambiguity about the implementation of texting strategies which may threaten the validity of the study. The two-way texting strategies do not apply the concept of self-regulated learning since the teachers always send a set of vocabulary items with their meanings and definitions using synonyms, antonyms, idioms and the students just receive and report them to their teachers without any efforts on their part to find and discuss them by themselves. The students remain remarkably passive during those texting intervention activities.

Furthermore, most of the researchers have dedicated their efforts to finding effective texting-based instructional strategies using different types of mobile applications such as SMS and MMS which are now considered more costly than the *WhatsApp*-based platform for the betterment of vocabulary acquisition. A review study conducted by Manca (2020) indicates that the *WhatsApp*-based platform is favoured over all of the other mobile applications available. Reputable scholarly journals indexed in Scopus and WoS databases contain 654 papers using the *WhatsApp* platform on teaching and learning in higher education.

Therefore, this inquiry aims to address the above issues. First, the conceptualization of texting activities should centre on the constructs of self-regulated learning and effective platform usage (Barak, 2010; Kauffman et al., 2011; Manca, 2020). By synthesizing the previous work on similar studies, as shown above, the implementation of texting activities involves a complex constellation of an effective strategy, frequency of vocabulary tasks, and language use related to taking charge of vocabulary teaching and learning. Those vital dimensions are good precursors of vocabulary teaching and learning using texting or *WhatsApp*-based activities. In this study, *WhatsApp*-based reporting activities are defined as the extent to which learners learn their academic vocabulary by themselves through self-exploration of meanings and definitions (Arifani et. al., 2020). Then, they report the vocabulary

that they have learned previously to their teachers. *WhatsApp*-based receiving activities refer to the extent to which learners receive some vocabulary items with no definition and meaning from their teachers. Finally, the positive results of previous studies on vocabulary intervention strategies involving the learners' mother tongue and target language have not been wisely applied as a basis of vocabulary learning in the current research.

3. Methodology

3.1. The aim of the study

This study attempts to fill up the lacunas mentioned above by realigning the concept of self-regulated learning (Barak, 2010; Kauffman et al., 2011), and incorporating mixed L1 and L2 into vocabulary learning (Dashtestani & Stojkovic, 2015). This inquiry specifically addresses the following questions:

1. Is there any significant difference between learners' academic vocabulary learning applying the four different methods of SMS-based activities (i.e., WAB reporting, WAB Receiving, Traditional-based reporting (TB reporting) and Traditional-based receiving (TB receiving) activities)?
2. Which one of the four treatments is the best predictor for learners' academic vocabulary learning?
3. What are the learners' attitudes towards the four different vocabulary learning strategies? Are there any significant differences among the EAP learners' attitudes?

3.2. Participants and context

A total of 80 EAP learners (29 male and 51 female ranging from 19 to 21 years old) who attended an English for Academic Purposes (EAP) course for two consecutive semesters at a private university in Gresik, East Java, participated in this inquiry. The EAP courses consisted of six main subjects namely vocabulary, grammar, listening, speaking, reading and writing. This course was designed to equip all EAP learners' with English communication skills for supporting their future careers. The four-month experiment was a part of the entire vocabulary course. The participants were selected using a placement test administered before the experiment, using the World English test initiated by Laufer and Nation (1995) to arrive at four equal classes out of a total of six EAP classes majoring in the Management department. Based on this researcher's previous project, the learners who obtained the placement test scores ranged from 6.5 to 7.5 were selected as the research participants. To support the validity of the

learners' placement test score, the author also used the study repports from the university language center as an additional consideration of the study. The research participants were then randomly assigned to four different groups. The first 20 learners were plotted as the *WhatsApp*-Based Reporting (WAB Reporting) group. The second group consisted of 20 learners who were labelled as the *WhatsApp*-Based Receiving (WAB Receiving) group. The third 20 group learners were assigned as the Traditional-Based Reporting (TB Reporting) group, and the remaining 20 learners were categorized into the Traditional-Based Receiving (TB Receiving) group.

3.3. Instrument

To assess learners' academic vocabulary scores enhancement, two types of general academic vocabulary tests (GAVT type 1 and GAVT type 2) were simultaneously applied in the pre-and post-test sessions. The GAVT type 1 consisted of 19 vocabulary question items, and the GAVT type 2 contained 19 items. Each GAVT question type contained three matching questions. Meanwhile, the six different definition options from a to f were presented in the right column of the questions. To answer the GAVT's questions, the learners were asked to write the letter (a, b, c, d, e or f) corresponding to one best option in the left column. These two different types of GAVT tests type 1 and type 2 had been adopted from Pecorari et al. (2019). The original Cronbach's alpha reliability level of these two test types amounts to .96. Meanwhile, after the two different types of GAVT tests had been tried out to different participants, the attainments of the internal reliability index using Cronbach's alpha measure for the present study amounted to .92, which indicates excellent internal consistency.

Next, to address the learners' attitudes towards the four different experimental designs, WAB reporting, WAB receiving, TB reporting, and TB receiving treatments, a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) with 15 question items was also applied after the post-test session. The questionnaire had been adapted from Dashtestani & Stojkovic (2015) with some minor amendments. For example, in the original questionnaire item, the words "learning academic vocabulary through SMS is interesting for me" were amended into "learning academic vocabulary through WhatsApp-based reporting activities is interesting for me", and "learning academic vocabulary through WhatsApp-based receiving is interesting for me". This had been applied to the entire set of questionnaire items. Before it was administered to the learners, the researcher conducted a try-out session involving 20 learners from a different experimental group to attain the acceptable reliability index. After the analysis

using a Cronbach's Alpha test, the consistency level amounted to 0.90, which indicates a very satisfactory index of reliability.

3.4. Design, procedure, and data analysis

This study aimedto examine the effect of individual *WhatsApp*-based reporting activities, *WhatsApp*-based receiving activities, traditional-based reporting activities and traditional-based receiving activities on EAP learners' general academic vocabulary learning and their attitudes towards the implementation of four different treatments. Therefore, this study essentially employed a mixed-method using both experimental and non-experimental survey designs to explore learners' academic vocabulary enhancement and identify various attitudes. Randomized experimental research with pre-test and post-test design consisting of four different group treatments had been employed to attain the research aims.

The descriptive data from the surveys had been collected to identify the attitudes of the learners towards the four different treatments. The first group received a set of the academic vocabulary without meanings, definitions and synonyms via *WhatsApp* from their teacher and then reported the received vocabulary with their definitions and meanings in mixed Indonesian and English simultaneously. The second group received the same vocabulary words with their meanings, definitions, and synonyms in mixed Indonesian and English via *WhatsApp* from their teacher but they were not assigned to report them to their teacher. The third group received a set of printed vocabulary words without their definitions, meanings, and synonyms using paper-based media. Afterwards, they filled in the meanings, definitions and possible synonyms in mixed Indonesian and English and reported them to their teacher. Meanwhile, the rest of the group received the same printed vocabulary words with the meanings, definitions, and synonyms in Indonesian and English using the same paper-based media without being assigned to report them to their teacher.

The 120 academic vocabulary words had been cautiously selected from the EAP book and were prepared by two different senior English teachers who taught an English vocabulary course at the same university. The preparations were divided into two different formats. The first format, for the academic vocabulary with and without definitions, meanings and synonyms were separated into two categories for both the WAB receiving and WAB reporting cohorts. In the second format, the printed academic vocabulary with and without definitions, meanings and synonyms were separated into two categories for both the TB receiving and TB reporting cohorts. Regularly, twice a week (on every Tuesday and Friday from 09.00 to 11 a.m.), each group received 20 academic vocabulary items per week (10 words on Tuesday and 10 words on

Friday). These interventions were administered for two months from December to February 2020. Group 1 (the WAB reporting group) sent a *WhatsApp* message containing 20 academic vocabulary items and their meaning in common Indonesian and English to teacher 1 every week. Group 2 (WAB receiving) received a *WhatsApp* message containing 20 academic vocabulary items with their English definitions, meanings and synonyms from teacher 1 each week. Group 3 (TB reporting) sent 20 academic words, their Indonesian and English meanings, definitions (synonyms) via printed (paper-based media) to their English teacher 2 every week. Group 4 (TB receiving) received 20 academic words, their Indonesian and English meanings, definitions (synonyms) via printed (paper-based media) from their English teacher 2 every week. During the two-month experiment, all of the teachers were involved in the study.

Two types of general academic vocabulary test (GAVT) initiated by Pecorari et al. (2019) had been applied before the experiment as the pre-test and after the experiment as the post-test. They are GAVT type 1 and 2, which consisted of 38 matching words and their definition-related questions. Besides, learners' attitudes towards the implementations of the four experimental designs had also been assessed using a five-Likert attitude scale proposed by Dashtestani and Stojkovic (2015). The questionnaire was administered after the post-test session. In order to meet the ethical principles, a consent letter proposed by Mackey & Gass (2015) to maintain participants' confidentiality, study purpose, and anonymity was applied to avoid misunderstandings after it had been translated into the Indonesian language. To examine the significant differences among the four different groups' academic vocabulary scores, a one-way ANOVA was employed to draw the level of score differences after the criteria of normality and homogeneity of the data were met. Following this, an independent sample of the t-test was also conducted to interpret the significant differences of the learners' academic vocabulary scores among the four groups as well as the significant differences of attitudes observed in the four different groups derived from the learners' questionnaire.

3.5. Results

The normality and homogeneity tests were calculated as the primary requirements before explaining the significant differences of scores among the four different interventions using the ANOVA test. It was administered to estimate the normality and homogeneity of the data using one-sample Kolmogorov-Smirnov's and Levene's tests. The results of the homogeneity test are presented below.

Table 1. Normality test

		Pre-TB Reporting Group	Post-TB Reporting Group	Pre-TB Receiving group	Post-TB Receiving group	Pre-WAB Reporting Group	Post-WAB Reporting Group	Pre-WAB Receiving Group	Post-WAB Receiving Group
N		20	20	20	20	20	20	20	20
Normal Parameters [a,b]	Mean	67.6500	77.8500	63.8000	68.3000	70.9500	77.0000	66.5000	70.3500
	Std. Deviation	5.68724	4.51051	1.73509	4.84605	7.48665	6.54539	5.01052	5.22418
Most Extreme Differences	Absolute	.264	.217	.204	.213	.246	.239	.210	.277
	Positive	.264	.217	.204	.213	.246	.087	.210	.277
	Negative	-.161	-.097	-.150	-.098	-.156	-.239	-.142	-.161
Test Statistic		.264	.217	.204	.213	.246	.239	.210	.277
Asymp. Sig. (2-tailed)		.001[c]	.001[c]	.002[c]	.001[c]	.003[c]	.004[c]	.002[c]	.000[c]

Table 1 describes the outputs of the normality test. The normality test outputs illustrate significant values among the four different cohorts. The significant values of these four groups (TB Reporting .001, receiving .002, WAB Reporting .003, and Receiving groups .000) are lower than the alpha value of .005. Therefore, it was confirmed that the data distributions are normal.

Next, the test of homogeneity of variances was also implemented as the second requirement for conducting the ANOVA test to explain the significant differences of scores among the four different groups. The results of the homogeneity test are presented below.

Table 2. Test of homogeneity of variances

Levene Statistic	df1	df2	Sig.
4.474	3	76	.106

Table 2 depicts the output scores of homogeneity test. The test score results of the homogeneity test reveal that the data distributions among the four groups are also homogeneous. Therefore, the ANOVA test may be administered to explain the significant differences of scores among the four groups.

Research Question (RQ1): Is there any significant difference among learners' academic vocabulary learning applying the four different methods of SMS-based activities (i.e., WAB reporting, WAB Receiving, Traditional-based reporting (TB reporting) and Traditional-based receiving (TB receiving) activities)?

To address the first research question, the ANOVA test was administered to explain the significant differences of scores among the four different cohorts. The results of the test reveal

that there are significant differences among the four groups in terms of their general academic vocabulary scores. The results of the ANOVA test are presented below.

Table 3. Results of the t-test between and within groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1849.050	3	616.350	19.963	.000
Within Groups	2346.500	76	30.875		
Total	4195.550	79			

Table 3 presents the significant differences in learners' general academic scores among the four cohorts. The test calculation depicts that there are significant differences in vocabulary score among the four different groups of learning vocabulary through TB reporting, receiving, WAB reporting, and receiving since the obtained significant values .000 are below the alpha score of .005.

Research Question (RQ2): Which one of the four treatments is the best predictor for learners' academic vocabulary learning?

To address the second research objective, a descriptive statistics test was run to estimate the level of respective score differences between the four different vocabulary treatments. The following table indicates the results of the descriptive test.

Table 4. Results of descriptive statistics test

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Post TB Reporting Group	20	77.50	4.123	.922	75.57	79.43	68	88
Post TB Receiving group	20	66.80	4.225	.945	64.82	68.78	60	80
Post-WAB Reporting Group	20	77.75	7.926	1.772	74.04	81.46	65	90
Post-WAB Receiving Group	20	69.65	5.081	1.136	67.27	72.03	64	86
Total	80	72.93	7.288	.815	71.30	74.55	60	90

Table 4 elaborates upon the results of the descriptive test to estimate the level of score differences among the four treatments. The estimation results indicate that there were significant differences in learners' vocabulary scores of those who were taught using TB reporting, receiving, WAB reporting, and receiving strategies. The mean scores also indicate the effectiveness of strategies implemented in fostering EFL learners' vocabulary learning applying the four different treatments in mixed English and Indonesian definitions. In terms of effectiveness among the four different treatments, the WAB reporting strategies held the

highest vocabulary scores attainment (77.75). The second position rested on TB reporting strategies (77.50). Meanwhile, the WAB receiving and TB receiving deserved to come third (69.80) and fourth, respectively (66.80).

Research Question (RQ3): What are the learners' attitudes towards the four different vocabulary learning strategies? Are there any significant differences among the EAP learners' attitudes?

To achieve the third research goal, a normality test, a t-test, and a descriptive statistics test were run to calculate learners' attitudes and differences of attitudes between the four different vocabulary treatments. The following table gives the analysis results.

Table 5. Comparison of learners' attitudes

Groups	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max	Sig.
					Lower Bound	Upper Bound			
WAB Reporting	20	4.60	.754	.169	4.25	4.95	2	5	.031
WAB Receiving	20	4.05	1.191	.266	3.49	4.61	1	5	.000
TB Reporting	20	4.20	1.196	.268	3.64	4.76	1	5	.000
TB Receiving	20	3.75	1.482	.331	3.06	4.44	1	5	.000
Total	80	4.15	1.202	.134	3.88	4.42	1	5	.000

Table 5 draws the comparisons of learners' attitudes from the four different cohorts. Among the four groups, the significant difference in attitudes is convincing, since the significant values rank below 0.05. Further, the results illustrate that the WAB reporting holds the first position with the mean scores of (4.60), TB reporting (4.20), WAB receiving (4.05), and TB receiving (3.75).

4. Discussion

This study aims to address three research objectives: (a) to seek significant different of four different strategies of vocabulary learning, (b) to determine the best predictor of vocabulary learning using the four strategies, and (c) to examine learners' attitudes of applying WAB reporting, receiving, TB reporting, and TB receiving strategies. The results reveal that there are significant vocabulary score differences between the four different strategies. The WAB reporting strategies using mixed Indonesian-English deserves to be the highest predictor for

academic vocabulary learning. Besides, the results of the study also illustrate that learners' attitudes are positive towards learning academic vocabulary via WAB reporting strategies.

Consequently, the discussion will specifically refer to those three dimensions. First, the possibility of WAB reporting activities is found to be the best predictor for academic vocabulary learning taught using mixed Indonesian and English definitions. The power of blending two languages between the learners' mother tongue and English has also been recognized and successfully applied by previous researchers. Dehghan et al. (2017), for example, scrutinize Iranian learners' vocabulary using monolingual English-English definitions. The results show that the monolingual definition could not enhance learners' vocabulary mastery. Conversely, Dashtestani and Stojkovic (2015) applied an experimental design in a search of effective vocabulary learning using SMS platform. They found that Iranian university learners who learned vocabulary using mixed Persian-English definitions (PED) sent via SMS platform achieved higher vocabulary scores than the ED and PD groups. Some part of this current study corroborates those two previous studies in the aspects of positive attitude and vocabulary learning strategies using mixed Indonesian and English definitions. While that previous study relies on SMS receiving (where learners passively received several academic vocabularies), this present study adds its new insights by actively involving the 'learner's self-search' of vocabulary meaning in mixed Indonesian-English definitions, in addition to actively reporting the vocabulary items via their WhatsApp to their English teacher.

Other responses to different studies of vocabulary learning applying mobile applications such as SMS, Telegram, WhatsApp, Instagram, and Facebook are their inconsistency in applying previous research interventions and results (Dashtestani & Stojkovic, 2015; Kilickaya & Krajka, 2010; Lu, 2008; Motlagh et al., 2020; Tabatabaei & Goojani, 2012). Consequently, the research roadmap of applying a mobile application (*WhatsApp*) and comparing it to a similar platform and to traditional learning strategies could not be linked since the use of mixed mother tongue and English definitions have not been adequately investigated. This study fills up these lacunas by providing new insights of strategies where the positive results of previous studies, in this case "mixed learners' mother tongue and English target language", are equally applied in the experiment using *WhatsApp*-based reporting and receiving strategies. The findings illustrate that learners who learn their academic vocabulary using mixed Indonesian and English definitions perform better than the other three groups.

Also, teaching vocabulary using the various strategies mentioned above is still far removed from the concept of self-regulated learning proposed by Kauffman et al. (2011) and Li

et al. (2017), where most of the research participants in the previous studies applied the so-called 'dropping model', in which the teacher drops some vocabulary items to his/her learners with complete vocabulary definitions using learners' mixed mother tongue-English, English-English as well as mother-tongue definitions. The activities of receiving blind vocabulary words with no definitions and assigning the learners to look for the definitions, meanings, synonyms in a mixture between the learners' mother tongue and English and reporting the results to their teacher via *WhatsApp* are considered an improved model of intervention compared to the previous ones.

The next discussion concerns the learners' different attitudes towards the four interventions. This study finds that the learners who learn vocabulary learning through WAB reporting have more positive attitudes than the other three groups. The main arguments of improving their word retention, stimulating motivation, causing less anxiety and using mixed Indonesian-English definitions they create from their mobile dictionary to be reported to their teachers can cause positive attitudes. Similarly, Dashtestani and Stojkovic (2015) and Lu (2008) found the same positive result of applying *WhatsApp* to vocabulary learning in the Iranian University and Taiwan high school contexts. The previous studies had uncovered the active involvement of EFL learning in searching vocabulary definitions in mixed Indonesian-English languages using their *WhatsApp* compared to using a paper-based dictionary. Since the number of vocabulary items only amounted to 10 words sent twice a week to the learners' *WhatsApp*, this is more flexible and easier than writing them down in a paper-based format and submitting them to their teachers. These activities are predicted to have more positive attitudes in vocabulary learning. Meanwhile, the WAB receiving and traditional receiving groups which only receive the same vocabulary and their given meanings seem very passive since they merely receive the words with their meaning, then all they do is read and comprehend them passively without any endeavors to look for the meaning, definition, and synonym and subsequently report them to their teachers.

5. Conclusion

This study aims to address three research objectives a) to find out significant different of learners' vocabulary learning improvement using the four different strategies, b) to find out the best predictors of strategies, and c) to examine learners' attitudes among the four strategies. The results show that the WAB reporting strategies using mixed Indonesian-English EFL could improve their academic vocabulary learning. This WAB reporting activity using mixed Indonesian-English definitions is also perceived as a positive strategy.

The unique contribution of this current research lies in its comprehensive experimental design and the positive results reported in similar previous research. This design includes the active involvement of learners in a self-definition searching from their mobile dictionary using both mixed Indonesian-English definitions before they report it to their teacher, following positive results of the previous studies in terms of mixed English-learners' mother tongue definition in the study, and comprehensive experimental designs involving four different groups, and comparable language proficiency levels. Many of these elements were surely lacking in similar research conducted previously.

To sum up, the power of mixed language applying learners' mother tongue and English, either using a mobile application or the traditional teaching model could facilitate vocabulary learning because sometimes the unfamiliar vocabulary words could not be interpreted and comprehended using monolingual (especially English-English) definitions. Meaning transfer from learner mother tongue and its equivalent to English definitions helps the learners understand the meaning of the unknown academic vocabulary words more easily. Since this intervention study is only conducted within the relatively short time of three months with a small number of participants, it is hard to generalize the result to cover a bigger population. The familiarity of general academic vocabulary words was not investigated so it is relatively too early to draw any conclusions about the vocabulary learning effects. Therefore, it is recommended for future researchers to scrutinize the familiarity of academic vocabulary and learning process to explain how the EFL learners learn their vocabulary through the mixed Indonesian-English definitions applying this mixed method.

References

Anderson, J., & Rainie, L. (2012). Main findings: Teens, technology, and human potential in 2020. Pew Research Center.

Arifani, Y. (2020). Cartoon Video-Assisted learning. An investigation into the acquisition of EFL children's incidental vocabulary. *CALL-EJ, 21*(2), 17-31.

Arifani, Y., Hidayat, N., Mulyadi, D., & Wardhono, A. (2020). Enhancing EAP learners' vocabulary acquisition: An investigation of individual SMS-based reporting activities. *Teaching English with Technology, 20*(5), 125-146.

Arifani, Y., Mindari, R., Hidayat, N., & Wicaksono, A. (2021). Basic psychological needs of in-service teachers in blended professional training: Voices of teachers and learners. *Interactive Learning Environments, 29*(4), 1-14. https://doi.org/10.1080/10494820.2021.1943691

Barak, M. (2010). Motivating self-regulated learning in technology education. *International Journal of Technology and Design Education*, *20*(4), 381-401. https://doi.org/10.1007/s10798-009-9092-x

Basal, A., Yilmaz, S., Tanriverdi, A., & Sari, L. (2016). Effectiveness of mobile applications in vocabulary teaching. *Contemporary Educational Technology, 7*(1), 47-59.

Bensalem, E. (2018). The impact of WhatsApp on EFL students' vocabulary learning. *Arab World English Journal (AWEJ)*, *9*(1), 23-38. https://dx.doi.org/10.24093/awej/vol9no1.2

Caruso, M., Fraschini, N., & Kuuse, S. (2019). Online tools for feedback engagement in second language learning. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, *9*(1), 58-78. https://doi.org/10.4018/IJCALLT.2019010104

Cavus, N., & Ibrahim, D. (2009). m-Learning: An experiment in using SMS to support learning new English language words. *British Journal of Educational Technology*, *40*(1), 78-91. https://doi.org/10.1111/j.1467-8535.2007.00801.x

Cetinkaya, L., & Sütçü, S. S. (2018). The effects of Facebook and WhatsApp on success in English vocabulary instruction. *Journal of Computer Assisted Learning, 34*(5), 504-514. https://doi.org/10.1111/jcal.12255

Dashtestani, R., & Stojkovic, N. (2015). The effect of SMS-based L1 and L2 glosses on EAP students' academic vocabulary learning and attitudes. *Journal of Teaching English for Specific and Academic Purposes*, *3*(3), 521-537.

Dehghan, F., Rezvani, R., & Fazeli, S. (2017). Social networks and their effectiveness in learning foreign language vocabulary: A comparative study using WhatsApp. *CALL-EJ*, *18*(2), 1-13.

Derakhshan, A., & Kaivanpanah, S. (2011). The impact of text-messaging on EFL freshmen's vocabulary learning. *European Association for Computer-Assisted Language Learning*, *39*(1), 47-56.

Hayati, A., Jalilifar, A., & Mashhadi, A. (2013). Using Short Message Service (SMS) to teach English idioms to EFL students. *British Journal of Educational Technology*, *44*(1), 66-81. https://doi.org/10.1111/j.1467-8535.2011.01260.x

Kauffman, D. F., Zhao, R., & Yang, Y.-S. (2011). Effects of online note-taking formats and self-monitoring prompts on learning from online text: Using technology to enhance self-regulated learning. *Contemporary Educational Psychology*, *36*(4), 313-322. https://doi.org/10.1016/j.cedpsych.2011.04.001

Kennedy, C., & Levy, M. (2008). L'italiano al telefonino: Using SMS to support beginners' language learning. *ReCALL, 20*(3), 315-330. https://doi.org/10.1017/S0958344008000530

Kilickaya, F., & Krajka, J. (2010). Comparative usefulness of online and traditional vocabulary learning. *Turkish Online Journal of Educational Technology-TOJET, 9*(2), 55-63.

Laufer, B., & Nation, P. (1995). Vocabulary size and use: Lexical richness in L2 written production. *Applied Linguistics, 16*(3), 307-322. https://doi.org/10.1093/applin/16.3.307

Li, J., & Cummins, J. (2019). Effect of using texting on vocabulary instruction for English learners. *Language Learning & Technology, 23*(2), 43–64. https://doi.org/10125/44682

Li, J., Cummins, J., & Deng, Q. (2017). The effectiveness of texting to enhance academic vocabulary learning: English language learners' perspective. *Computer Assisted Language Learning, 30*(8), 816-843. https://doi.org/10.1080/09588221.2017.1366923

Lin, C.-C., & Yu, Y.-C. (2017). Effects of presentation modes on mobile-assisted vocabulary learning and cognitive load. *Interactive Learning Environments, 25*(4), 528-542. https://doi.org/10.1080/10494820.2016.1155160

Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning, 24*(6), 515-525. https://doi.org/10.1111/j.1365-2729.2008.00289.x

Mackey, A., & Gass, S. M. (2015). *Second language research: Methodology and design*. New York: Routledge.

Manca, S. (2020). Snapping, pinning, liking or texting: Investigating social media in higher education beyond Facebook. *The Internet and Higher Education, 44*(1), 100707. https://doi.org/10.1016/j.iheduc.2019.100707

Motlagh, H. S., Khafaie, H., Arastoo, A. A., Cheraghi, M., & Khafaie, M. A. (2020). Application of social network in traditional sciences education on the vocabulary acquisition of secondary English learner students. *Education and Information Technologies*, 25(1), 3071-3085. https://doi.org/10.1007/s10639-020-10108-4

Pecorari, D., Shaw, P., & Malmström, H. (2019). Developing a new academic vocabulary test. *Journal of English for Academic Purposes, 39*(1), 59-71. https://doi.org/10.1016/j.jeap.2019.02.004

Saran, M., Seferoglu, G., & Cagiltay, K. (2012). Mobile language learning: Contribution of multimedia messages via mobile phones in consolidating vocabulary. *The Asia-Pacific Education Researcher, 21*(1), 181-190.

Tabatabaei, O., & Goojani, A. H. (2012). The impact of text-messaging on vocabulary learning of Iranian EFL learners. *Cross-Cultural Communication, 8*(2), 47-55. http://dx.doi.org/10.3968/j.ccc.1923670020120802.1689

Appendix 1. Summary of the key issues published regarding the mobile application and vocabulary learning

Theme	Reference	Context	Purpose	Methodology	Conclusion
Mobile application and vocabulary learning	(Lu, 2008)	Vocational high school students in Taiwan	To explore the effectiveness of applying SMS via mobile phone in vocabulary learning and learners' perspective of learning vocabulary via mobile phones	1. Pre-treatment questionnaire and pre-test were applied to find participants uses of mobile phones; 2. The participants (31 students) were asked to recognize 28 target words and 22 non-target words using the Chinese translation; 3. The experimental group received two SMS lessons and the traditional group received paper-based material every day; 4. A post-treatment questionnaire, interview and post-test using 28 target words were administered. 5. A two-tailed t-test was applied to analyze the data.	SMS-based learning could foster students' target words exposures, improved students' motivation and frequency of reading the lessons.
	(Kilickaya & Krajka, 2010)	Upper-intermediate students of Academic English Class at a private university in Ankara, Turkey.	To compare the effectiveness of online vocabulary learning and traditional instruction	1. The students in the experimental group practise vocabulary items in ten reading texts using vocabulary *Word-Champ*; 2. The students in the control group practise vocabulary items from the same passages using vocabulary notebooks, cards, and	The students who learned English vocabulary using *Word-Champ* perform better than the students in the control group.

				a paper dictionary; 3. The three hours of training were conducted within five weeks. 4. An independent t-test was used to analyze the data.	
	(Hayati et al., 2013)	45 Persian learners who had been studying English at a private English language institute.	To compare the effectiveness of idiom-learning using SMS and contextualized learning, self-study approach and to draw learners' perception of learning idioms using SMS	1. Pre-test using 50 multiple choice common English idioms was administered after identifying the participants; 2. Students in the self-study group received English idioms from a printed pamphlet without attending the classroom. The SMS group received the same English idioms. They received four text message containing four English idioms to the 15 participants (60 idioms/day); 3. Post-test using the same English idioms test; 4. The SMS-based group was asked to fill a written survey; 5. Paired-samples t-tests and descriptive statistics were used to analyze the tests and survey.	The common English idioms scores in the SMS-based group were higher than those of students who learned common English idioms using the pamphlet.

| | (Tabatabaei & Goojani, 2012) | 90 pre-university learners of Shahed high school in Farsan, Iran. | To explain the effectiveness of using text messaging in English vocabulary learning and to learners' attitudes towards the use of SMS in vocabulary learning. | 1. Participants (60 out of 90 students) were selected using the Interchange Placement test (Richard, 2005);
2. Students from experimental and control groups were taught using four units of English book within twelve sessions plus pre-test and post-test;
3. Each session, 5 to 6 words were learned;
4. Students from the experimental group sent one original sentence from each given words using SMS and received feedback;
5. Students from the control group sent the same sentence using paper-based and received the same feedback;
6. One sample t-test and descriptive statistics were used to analyze the data. | The results show that there are positive impacts and attitudes of learning vocabulary using SMS. |
| | (Dashtestani & Stojkovic, 2015) | A total of 60 EAP students a state university in Tehran, Iran. | To assess the effect of SMS-based glosses on students' vocabulary learning and attitudes | 1. The students whose IELTS test band scores ranged from 5.5 to 6.5 were selected for the study.
2. The students were classified into three groups (20 students in each group). | The students from the first group who learned vocabulary using SMS in both Persian and English had higher vocabulary scores and |

| | | | | 3. The first group received 120 vocabulary items through SMS in both Persian and English definitions. The second group received the same vocabulary items from SMS in Persian definitions. The third group received similar vocabulary and activities in English definitions.
4. The test of Kruskal-Wallis and descriptive statistics were applied to analyze the data. | attitudes than the rests. |
| | (Lin & Yu, 2017) | 32 eighth-grade learners in central Taiwan who participated in out-of-class vocabulary learning | To examine vocabulary learning gains and retention, learners' cognitive load, and perceptions of the mobile-aided vocabulary learning program | 1. Before the program, the participants took a vocabulary survey on target words on Chinese equivalents;
2. During the program, the participants learned four sets of target words in the forms of text mode, text-picture mode, text-sound mode, and text-picture-sound mode;
3. Participants took a vocabulary test and completed a questionnaire of cognitive load.
4. Learner' vocabulary scores from the pre- | Learners' new words' meanings recall improved after two weeks of the program applying audio-input mode and their cognitive load also reduced. |

				test and post-test were analyzed using ANOVA and the questionnaire data were analyzed using descriptive statistics.	
	(Basal et al., 2016)	The participants consisted of 50 learners from the English language teaching department of a public university in Turkey	To investigate the effectiveness of mobile application on learners' figurative idioms gains	1. Learners from the experimental group were taught using the mobile application; 2. Learners from the control group were taught using the traditional strategy. 3. The idioms were adopted from the Michigan Corpus of Academic Spoken English (MICASE) (Simpson & Mendis, 2003);	The results reveal that the learners who learned figurative idioms through mobile application perform better than their counterparts.
	(Li et al., 2017)	108 English language learners (ELLs) at a large Canadian University	To explore learners' experiences and their in-depth perspective on the texting feature, intervention content, and suggestions for the development of academic vocabulary instruction	1. The participants were selected based on iBT 80+ and IELTS 60+ admission tests and a Vocabulary test; 2. A number of 189 of the 200 words from *Word Matters* was taught using text messages for more than two months; 3. Learners received three words per day through text messages (one word in the morning, at noon, and afternoon); 4. Each message contained a target	The results reveal that learners read the three text messages four days a week, email once a week and increased their learning interests.

				word, the page reference in the reading passage, definition and example; 5. Learners received an email summary of the three words learned and a game quiz format every night. 6. A 60-item targeted vocabulary pre-test and post-test were administered; 7. Combinations of descriptive analysis and thematic analysis were applied to analyze the post-treatment survey and the qualitative data.	
	(Dehghan et al., 2017)	The research participants involved 32 teenaged learners ranging from 13-16 years old in an Iranian language institute.	To probe the ELF learners' vocabulary knowledge (definitions, direct explanation, synonyms and antonyms) using WhatsApp	1. Learners in the experimental group received vocabulary files contained the meaning, definition, synonym, antonym, and examples; 2. Learners discussed the new words with their group and teacher from the dictionary (pronunciation, picture, expression and special use); 3. Learners in the traditional group received the same strategies using a traditional textbook;	The results reveal that EFL learners' perception of the use of technology were positive but their vocabulary scores did not show any significant difference.

				4. Learners took a vocabulary pre-test and post-test; 5. An independent sample t-test was applied to analyze the data.	
	(Cetinkaya & Sütçü, 2018)	The study participants were 123 ninth- grade learners of a public senior high school in Turkey	This study aims at determining the effects of two different mobile applications (Facebook and WhatsApp) on learners' vocabulary mastery and learners' opinions on the two different approaches.	1. The participants were selected using an achievement test. 2. Information messages in English definitions, Turkish, and samples of English sentences were sent using both WhatsApp and Facebook between 08.00 and 21.30. 3. The post-survey was given to 62 learners in the experimental group the following week after the post-test. 4. The ANOVA test was used to analyse the quantitative data. Meanwhile, the qualitative ones were analyze using a categorical analysis based on Corbin and Strauss (2017)	The results illustrate that the Whatsapp application is more effective in the enhancement of learners' vocabulary learning success than Facebook instruction.
	(Caruso et al., 2019)	50 university students who enrolled in Korean, French and	This study aims to introduce a series of classroom online tools to help learners engage in meaningful feedback, to	1. The 18 online questions survey designed using Qualtrics software were distributed to 162 students but only 50 students completed	The students responded positively towards the video in terms of effectiveness and enjoyment to

| | | Italian courses participated in the survey study and 7 of them participated in the focus group session | facilitate faster and more individualized feedback on the learners' writing assignment. | the survey.
 2. A simple paired t-test and Pearson's correlation were applied to analyze the 5-point Likert scale survey data.
 3. A focus group session was also conducted to draw the learners' qualitative view of online learning tools. | foster students' language learning and feedback and learners' responses towards the online data-bank feedback comments were useful for their future course. |
| | (Motlagh et al., 2020) | 61 participants of first and second-year learners of public Health (n=32) and Nutritional sciences (n=29) from the Iranian University of Medical Sciences. | To investigate whether communication between teachers and learners using the Telegram application could enhance their vocabulary mastery | 1. An eligibility assessment was applied to recruit the participants of the study
 2. A weekly assessment of concept learning was used to monitor learners' participation using the Telegram group.
 3. A pre-test and post-test using a 60-question set taken from a TOEFL Practice Test (Matthiesen, 2017) were administered to the two treatments to measure the learners' vocabulary growth.
 4. A linear regression model using STATA version was applied. | Learners in the intervention groups using the Telegram group communicated through spoken and written forms more frequently using new vocabulary terms. |

LEARNERS' WRITING SKILL AND SELF-REGULATION OF LEARNING AWARENESS USING COMPUTER-ASSISTED ARGUMENT MAPPING (CAAM)

by **Roderick Julian Robillos**

Faculty of Education, Khon Kaen University, Khon Kaen, Thailand

rodero @ kku.ac.th

Abstract

Software and digital visual mapping tools have recently been implemented by educators and academics for several educational and related purposes. The current study was set out to explore the effect of using CAAM on Thai EFL learners' argumentative writing performance and their self-regulation of learning awareness. A total of 28 freshman students were purposively selected as the subjects of the study. The researcher used a mixed-mode method type of research involving a pre- and post-test design. Data was collected from a single group of participants who participated in eight sessions based on the use of CAAM in their writing processes. A Self-Regulation of Learning Scale (SRS) was utilized to identify the students' awareness of their self-regulation of learning. The results reveal that the CAAM method used by the respondents made noteworthy gains on their argumentative writing performance across task achievement, coherence-cohesion, lexical resource and grammatical range and accuracy, as indicated by a significant difference between their pre- and post- test results. Furthermore, four out of six components of SRS reveal a significant relationship with their writing performance indicative that the respondents have become more cognizant of their self-regulation in terms of planning, self-monitoring, effort and self-efficacy. Finally, qualitative findings reveal that the respondents had positive feelings about using CAAM in their writing processes as well as enhanced their awareness on their self-regulation of learning.

Keywords: Computer-Assisted Argument Mapping; argumentative writing; self-regulation of learning awareness

1. Introduction

One necessary requirement for learners in their undergraduate studies is writing; however, developing an effective writing competency is a tough undertaking for them (Malmir & Khosravi, 2018; Robillos & Phantharakphong, 2020). One of the main problems among students is that many of them cannot develop their writing skills, mostly the ones who are making compositions in a foreign language. Knowledge of the task and content, lexical complexity, coherence and cohesion apart from the fluency of ideas are just some of the

difficulties relating to the development of an effective writing ability (Malmir & Khosravi, 2018). These difficulties and challenges get even more complex when different genres of writing are taught (Hyland, 2013). Writing genres (e.g. argumentative), according to Weigle (2013; Harrel & Wetzel, 2013), add to the inherent complexity involved in second language writing because of their special lexical and syntactical grammar apart from its structural organizations. These difficulties are overloading the learners' cognitive load and need to be reduced in order to acquire new information. In order to facilitate the acquisition of new schemas which are representations of either concepts or problem-solution procedures, Sweller (1994) recommends reducing the extraneous mental load during the learning process. One common method of reducing unimportant cognitive load is by using graphic organizers such as maps and diagrams to help supplement regular reading and instruction (Harrel & Wetzel, 2013). Mapping assists learners to gain more engagement in their process of writing. Humans are highly visual and mapping may provide students with a basic set of schemas with which to understand argument structures. The current study is aimed at investigating the effectiveness of an alternative teaching method that incorporates mapping to improve argumentative abilities in writing essay.

On the other hand, Self-Regulation of Learning (SRL) has emerged as an important new construct in the field of education (Soureshjani, 2013) as evidenced by a variety of studies that have been conducted in recent years (Pintrich, 2000; Pintrich & Schunk, 2002; Cleary & Zimmerman, 2004; Boekaerts & Cascallar, 2006; Zimmerman, 2008; Taghizadeh, 2016). Self-regulated learning is an active process whereby learners set goals for their learning and then monitor, regulate and control their cognition, motivation, and behaviour guided and constrained by their goals and contextual features of the environment (Pintrich, 2000). Zimmerman (1986) described that self-regulated learners systematically use metacognitive, motivational and behavioral strategies and proactively participate in their own learning processes. Those learners who self-regulate establish goals for their learning supervise, assess, and self-reflect upon their learning (Robillos, 2020). The use of CAAM stimulates students to have self-reflection on a particular task and help design a continuous monitoring and evaluating learning after an activity is completed. Susilowati (2015) notes that monitoring is a stage that helps trigger students to make self-reflection because they have already known their position in the task. It is notable that CAAM guides students to engage in critical thinking (Harrell and Wetzel, 2013) since the processes involved in CAAM are controlled by proper planning and monitoring during the process that raises students' self-reflection. With their critical thinking, reflection can optimize learners' self-regulated learning abilities. Learners who are self-regulated in their

learning are likely to become more capable of interpreting the signs of changes continuously. Self-regulatory capacity interacts with cognitive factors, and they separately and jointly affect writing processes, which include the planning, formulation, transcribing, and editing of writing (Pahlavani & Maftoon, 2015).

In the Thai EFL context, no studies to date have investigated the use of argument maps for improving EFL learners' argumentative writing performance and for promoting their self-regulation of learning. Therefore, the current study is aimed at investigating this research gap in EFL writing literature to further determine the role of CAAM on EFL learners' argumentative writing performance across writing components such as task achievement, coherence-cohesion, lexical resource and grammatical range and accuracy as well as their self-regulation of learning awareness.

2. Conceptualization of the study

Argument mapping (AM) is, roughly, making a picture of reasoning. AM, which is also known as argument diagramming or argument visualization, is a visual diagram that organizes a text-based argument into a hierarchical representation, with propositions arranged in a coloured boxes and connected by arrows that highlight the relations (i.e. *because, but, however*) between propositions (Dwyer et.al., 2012; van Gelder, 2007). Argument mappings are designed in such a way that if one proposition is evidence for another, the two will be juxtaposed (van Gelder, 2007). As Dwyer (2011) and Dwyer et al. (2012) describe, these organizational features have been hypothesized in past research to facilitate metacognitive processes both by making the structure of the argument open to deliberation and assessment, and by revealing the strengths and weaknesses of the arguments in an argument structure.

AM has been used for language teaching in general (e.g. Davies, 2009) and in L2/EFL writing in particular (Harrell and Wetzel, 2013; Malmir & Khosravi, 2018). This method has been carried with the use of manual and computer-based argument mapping strategies for enhancing L2/EFL learners' critical thinking which is considered as the foundation of many language skills and sub-skills (Chamot, 1995; Eftekhari et al., 2016). Some investigations have supported the efficacy of using argument mapping method for EFL text comprehension (Harrel & Wetzel, 2013). For example, Dwyer et al. (2010) examined the effect of prose-text versus argument maps on reading comprehension and memory ability. The findings of their study contrasted other studies; they found that learners who used argument maps as pre- and post-reading tools perform better than others who practiced residing through prose-text explanation

on tests of memory but the reading comprehension of both study groups did not differ significantly.

Argument maps have also been used for teaching L2 writing, indicating their effective use. Harrell and Wetzel (2013) claimed that using well-designed argument diagrams (AD) can both improve L2 learners' critical thinking and writing performance among first year language learners, stressing that argument maps ignite learners' schemas which are necessary in argumentative writing. Also, Davies (2010) compared the effect of argument, concept, and mind maps on ESL learners' writing enhancement, claiming that argument maps were more effective than the other two kinds of maps for teaching second language writing. Argument mapping method assists EFL learners to produce more developed and coherent written outputs (Dwyer et al., 2010). Gray (2012) backed up Dwyer et al.'s (2010) view and stated that argument maps can trigger L2/ EFL learners' critical thinking and problem-solving abilities and therefore optimize their writing performance. Added to this is the study conducted by Pinkwart et al. (2009), who reported that the use of argument maps enhances second language learners' writing specifically the argumentative type of writing.

The development of software programs has facilitated the process of constructing maps for the users. Further, it was the marriage of the mapping and the Internet that launched a completely new world of applications and uses for mapping as exemplified by the CmapTools software (Canas et al., 2004). CAAM as one of the computer-based instructional software programs is aimed at enhancing students' critical thinking since it provides an easy way to conduct diagram reasoning on any given topic (Davies, 2009). It also helps ones' own thinking and reasoning (van Gelder, 2007).

In CAAM, when writers draw reasoning through the process of mapping, they will have a fully refined conception of the reasoning in their mind. Thus, they will be better capable of distinguishing gaps and ambiguities. As a result, the reformation of mistakes would be possible. According to Davies (2009), in CAAM, arguments are considered as philosopher's sense of statements (premises) which are joined together to result in claims (conclusions) in a top-down arrangement. Arguments are followed by supporting claims with linkers in the map with different colours. The end of the argument tree is composed by basic boxes which provide defence for the main claims. These boxes also need support claims such as statistics, expert opinions, quotations and the like which can be accessed in CAAM. Figure 1 shows an example of an argument map produced with Rationale Software (van Gelder, 2007)
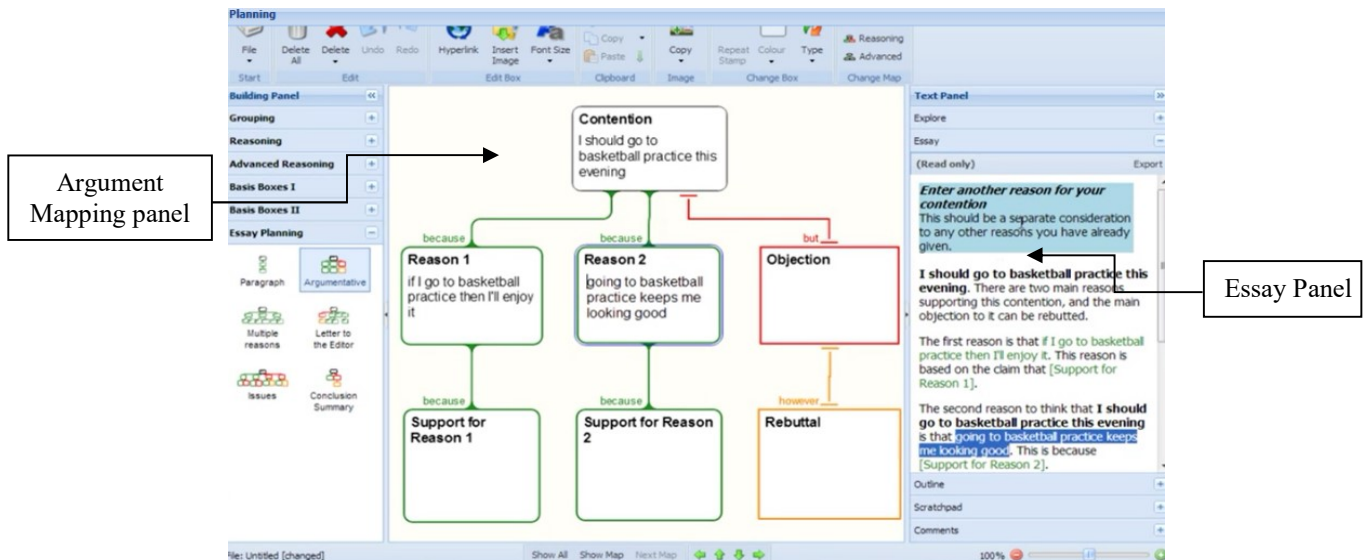
Figure 1. A sample of an argument map produced using Rationale Software (van Gelder, 2007)

A student using CAAM in accomplishing his/her argument map in the panel provided for him/her can possibly check his/her essay in another panel simultaneously getting support to be conscious of coherence and cohesion during the mapping process.

Recent research reported that individual differences such as personality traits, learning styles and strategies, motivation, beliefs and self-regulation, could predict success in language learning (Dornyei, 2005; Wang, Kim, Bong, & Ahn, 2013). Researchers are increasingly directing their research efforts towards the important role of learners' thoughts, beliefs, and cognitive/metacognitive behaviors to learn different second language skills successfully and writing skill is no exception to this. It has been suggested that individuals who self-regulate well must: (1) plan how to approach a task in advance of their actions, (2) self-monitor their improvement during task performance, (3) evaluate both process and outcome after the execution of their plan, (4) during cycles of planning, self-monitoring, and evaluation, reflect upon the learning process, meaning that they put their knowledge into action and increase the number of strategies they can use, which gives them more possibilities to approach and perform future tasks (Ertmer & Newby, 1996). It has been assumed that, besides knowing what aspects to improve and how to improve them, self-regulated learners must be motivated to improve (Zimmerman, 2006). Self-regulated learning research among students revealed that motivational outcome variables (e.g., effort) and motivational beliefs (e.g., self-efficacy) were positively linked to cognitive and metacognitive strategy use (e.g., Pintrich & Schunk, 2002; Schunk, 2001). Ericsson et al. (1993) stated that individuals must be willing to invest maximal efforts to improve and sustain these efforts over years in order to reach optimal levels of performance. For EFL learners, writing seems very difficult to accomplish because the

difficulty is not only within generating and organizing ideas, but is also about translating these ideas into readable texts. It also involves highly complex skills such as planning, monitoring, evaluating, skills apart from spelling, word choice and the like. Learners' awareness on their self-regulation of learning enables them to succeed in their learning endeavors (Robillos, 2019). In previous studies, the effectiveness of self-regulated strategies on L2 / EFL writing has been investigated (Graham & Harris, 2005; Harris et al., 2008; Robillos, 2020). Furthermore, computers and technological devices have been at the service of EFL writing learning and teaching as they enhance learners' motivation, interest, and beliefs.

Corollary to the above, the current study aimed to investigate the impact of using CAAM on learners' writing skill as well as on their self-regulation of learning awareness.

3. Methodology

3.1. Research design and samples

The researcher employed an exploratory case study – specifically a mixed-mode method design – to explore the effect of using computer-aided argument mapping on the students' argumentative writing performance across task achievement, coherence-cohesion, lexical resource and grammatical range and accuracy. A time series design was utilized to monitor students' progress in writing performance and awareness on their self-regulation of learning. This includes monitoring the students' progress during 10-sessions which constituted eight sessions for the implementation of the CAAM as the intervention: one session each for the pre-test and post-test. A single group of 28 first year university students majoring in the TESOL program at the study-university was purposively selected as participants. The participants consist of 9 males and 19 females with ages ranging from 18 to 19 years old. The rationale of targeting this group is because they have been exposed to different strategies in writing during their previous semesters, the researcher would like them to continuously practice and be able to use CAAM as another helpful method to improve their writing compositions in their succeeding semesters where they will still take two more writing courses that would cover various writing genres including expository and argumentative types. Employment of CAAM in their writing course has not been in practice for the learners in their regular classroom.

3.2 Research instruments and data collection

Four methods of data collection were employed to capture quality evidence that leads to the formulation of credible data to achieve the aims that have been posed above. The four methods of data collection are as follows:

First, a writing pre-test was used to measure the relationship between the use of CAAM as an intervention and the respondents' argumentative writing performance. During this phase, the respondents would elaborate upon a topic entitled *Living in the City is better than in the Countryside.* The title is in line with the topics they are studying in Academic Reading and Writing Task 2 in their regular classroom. They were given at least 60 minutes to finish their composition using at least 250 words. Before they were supposed to start writing, there were activities to be done such as activating their prior knowledge towards the topic and a reading text to comprehend to further develop their schemas towards the topic they are going to develop which took at least 1 hour. Moreover, the writing compositions of the respondents were corrected by two inter-raters (both English / TESOL Lecturers in the study university) based from the guidelines used in IELTS writing Task 2 scoring rubric provided by Cambridge IELTS (Hashemi & Thomas, 2011). This writing rubric had 4 components: task achievement, coherence-cohesion, lexical resource, grammatical range and accuracy. The highest mark was 9 and the lowest mark was 1. For the purpose of inter-rater reliability, all written compositions were read by two raters, and the correlation among scores marked by each rater was calculated. The inter-rater reliability of the first and second raters were .551 and .519 respectively, indicating a strong agreement to each other.

Secondly, the Self-Regulation of Learning Scale (SRS) was administered to the participants before and after the strategy intervention. This questionnaire was first formulated by Toering (2011) and is composed of 46 items divided into six components: planning, self-monitoring, evaluation, reflection, effort and self-efficacy. The Self-Regulation of Learning Scale (SRS) is intended to measure self-regulation as a relatively stable attribute in multiple learning domains. Originally, the subscales of planning (9 items), self-monitoring (8 items), effort (10 items), and self-efficacy (10 items) were scored on a 4-point Likert rating scale: (1) never to (4) always. However, in the present study, the scale was revised into a 5-point Likert scale with reliability values of 0.78, 0.73, 0.78, and 0.69 respectively to conform with the subscales of evaluation (8 items) and reflection (5 items) which were scored on a 5-point Likert rating scale. In accordance with the original scales, evaluation ranged from (1) never to (5) always, and reflection ranged from (1) strongly agree to (5) strongly disagree. Before data analysis, reflection scores were reversed to make them correspond to the scores on the other

five subscales. To ensure the reliability of the questionnaire, a pilot study was conducted on 26 third year college students who were not included in the target group. The reported reliability value was 0.79.

The third instrument was the writing posttest, which consisted of the argumentative writing test. The writing topic was selected from among the topics that normally appear in the IELTS writing task 2, which are also in relation with the topics they are studying in the classroom and were checked for their sociocultural and cognitive appropriateness by three experts before they were administered to the respondents. They were given at least 60 minutes to finish their composition using at least 250 words.

Finally, interviews were conducted after a week of intervention. This is to gather more details about how often and when the respondents would use the CAAM after the intervention as well as how the CAAM would assist them to further understand writing processes and be aware of their self-regulation of learning process.

3.3. Procedure

Table 1 presents the plan of activities (the intervention programme) with its corresponding number of sessions, with all the stages and activities detailed below.

Table 1. The intervention program

Session	Stages	Activities
1st Session	Introductory Part	- demystification of argumentative type of writing - discussion of different concepts of argument mapping such as conclusion, premises, counter-arguments, markers of coherence and the like
2nd session to 8th session	Advance Organization / schema building	- Students brainstorm the topic to set the scene before attending to the writing topic. - A short text that is related to the writing topic would be provided and students are given time to read and comprehend the short text and make some notes what they expect to write. This is to further build their schemas towards the writing topic. - Learners share their ideas (from the short text) for several minutes to gain more ideas from their peers.
	Writing Part	- introduce to students the writing topic to be developed asking them to brainstorm by writing all the ideas and thoughts as they could. They may write whatever comes in their mind which they think have something to do with the topic. - Students are asked to share their ideas in pairs or in groups in several minutes. The listeners may add some ideas for its development.
	The Map creation via CAAM	- Students create their argument maps through CAAM - Students share their argument maps to their peers/ groupmates to further help shape their essay and to further solve issues regarding mismatched premises, incorrect counter-arguments and logical connections as well as improper use of markers of coherence. - Teacher may provide advice to those students who had encountered problems in

	their work.
Writing and Submission parts	- Students would create their draft after their peers' suggestion and comments to shape their work and send their essay to the teacher through CAAM. - Teacher can do indirect corrective feedback and had the chance to monitor and evaluate their writing process via CAAM editor page.
Discovery/ Reflection parts	-After the teacher sends back the students' essays, learners evaluate their performance and discuss to their peers how successful their writing process is and share possible insights (*e.g.* strategies) that they can try in the future to help them deal with problems they may encounter.

Data from interview questions were subjected to frequency counts and were analyzed using the process of thematic coding (Cresswell, 2008). Table 2 presents the themes that emerged from the participants' responses after the semi-structured interviews.

Table 2. Emerged themes from the participants' responses after the semi-structured interviews

Theme 1	
The Use and Challenges of CAAM Method in EFL Argumentative Writing	• Helpful in dealing with arguments • Logical and coherent connections • Time-consuming (lack of knowledge)
Theme 2	
Quality Practice	• Provides scaffolding • Complexity is gradual • Guides learners what to do next
Theme 3	
Awareness of their Self-Regulation of Learning	• Planning • Self-Monitoring • Self-Evaluation and reflection

4. Results

4.1. Quantitative analysis

4.1.1. Test of difference on participants' argumentative writing performance

Table 3 presents the test of difference between the participants' argumentative writing performance in terms of task achievement, coherence-cohesion, lexical resource and grammatical range and accuracy before and after CAAM was employed on them. As revealed in the table, the component on "task achievement" was the most improved component in the

argumentative writing performance of the participants as it yielded Mean and SD scores of x=1.68; SD=0.55 before the intervention and x=3.61; SD=0.74 after the intervention. On the other hand, "grammatical range and accuracy" constituted the least improved component. As regards the overall mean scores before the intervention (5.21) and after the intervention (11.39), when compared statistically, the differences between the two results were significant with a t-computed value of -21.56 compared to the p-value of 0.000. Therefore, the research hypothesis that claimed the use of CAAM had no significant difference on the respondents' writing performance before and after the strategy intervention, was rejected indicative that CAAM helps facilitate students' argumentative writing process successfully.

Table 3. Test of difference on the participants' argumentative writing performance before and after CAAM was employed on them

Writing Components	Before the Intervention		After the intervention		*t*-computed value	*p*-value
	Mean	SD	Mean	SD		
Task Achievement	1.68	0.55	3.61	0.74	-4.84	0.000
Coherence-Cohesion	1.39	0.50	3.29	0.71	-14.62	0.000
Lexical Resource	1.61	0.50	3.50	0.96	-10.48	0.000
Grammatical Range and Accuracy	0.54	0.51	1.00	0.00	-18.92	0.000
Overall	5.21	1.32	11.39	1.83	-21.56	0.000

4.1.2. Test of relationship between participants' argumentative writing performance and self-regulation of learning awareness after the implementation of CAAM

As revealed in Table 4, there were four out of six components that showed significant relationships with the aforesaid variables. The components of planning, self-monitoring, effort, and self-efficacy yielded t-computed values of 2.27, 2.19, 5.09 and 2.07 respectively and were higher than the *t*-critical value of 2.05. This means that there was a significant relationship between the respondents' argumentative writing performance and the aforesaid SRS components. However, two other components (evaluation and reflection) that yielded *t*-computed values of 1.29 and 1.72 respectively were found lower than the *t*-critical value of 2.05 indicating that there was no significant relationship between the respondents' argumentative writing performance and the aforementioned components. The CAAM, in overall, used as an intervention to enhance to improve respondents' argumentative writing performance showed a significant relationship to that of their self-regulation of learning since the t-computed value of 2.09 is higher than the t-critical value of 2.05. This might be attributed to CAAM helping to improve students' argumentative writing abilities and making them more

conscious and active in dealing with their writing difficulties rather than simply accepting their writing problems.

Table 4. Test of relationship between the participants' argumentative writing performance and self-regulation of learning awareness after CAAM is provided

Components of Self-Regulation of Learning	Pearson r-value	t-computed value	t-critical value
Planning	0.40	2.27	2.05
Self-Monitoring	0.27	2.19	2.05
Evaluation	0.23	1.29	2.05
Reflection	0.28	1.72	2.05
Effort	0.70	5.09	2.05
Self-Efficacy	0.37	2.07	2.05
Overall	0.32	2.09	2.05

4.2. Qualitative analysis

4.2.1. The impact and challenges of using CAAM in EFL writing

There were 21 out of 28 respondents from the initial stage involved in the structured interviews. The interview results revealed the importance of using CAAM to help respondents gain a visual representation of the argument which helps them to understand it. When respondents were asked to express their comments on the impact and challenges of the method, one student contributed her opinion regarding it.

> The use of CAAM in argumentative writing is helpful to me. It helps me create a visual representation that aid me break down complex arguments into simple manageable components. And consequently, assisted me to write an essay. (R8)

Moreover, Respondents 1 and 2 maximized the effectiveness of CAAM in argumentative writing for it helped them to regulate their writing performances. They stated that because of the editor page in CAAM, they were able to come up with a complete grasp of their theses, reasons and contentions and achieve a coherent writing product.

> The steps in CAAM that I learnt helped me in dealing with arguments and make me perform better in displaying my arguments. With the CAAM editor page, it makes me my writing more coherent and more meaningful. (R1)

> With the help of those coherent markers such as "because, although, however, moreover", which are available in the CAAM editor page, it helps assist my ideas flow smoothly from the beginning to the finished product. (R2)

However, there were also respondents who felt that there was not enough time to complete the AM assessment task due to lack of knowledge of argument mapping. Respondent 3 expressed her opinion regarding unsuccessful writing performance due to insufficient knowledge in CAAM.

> The steps in CAAM that I learnt in the class somehow helped me to write, unfortunately, I was not able to use them very efficiently because of lack of knowledge following its steps. Maybe I am just not exposed to this kind of software in writing. I felt that I wasted my time. Or maybe, I am a bit ignorant in using technology like CAAM in writing. (R3)

4.2.2. Quality practice

Since CAAM requires practice (hands-on tutorials), an overwhelming majority (19, 91%) of the participants enjoyed the activities and exercises. One participant (R18) felt motivated while doing those various activities since she was guided in using CAAM to map her arguments and successfully wrote down her arguments into paper.

> It is true that there were plenty of practices to accomplish, but by CAAM assistance, it is not a problem because it provides scaffolding steps. Actually, in CAAM, everything is in there, it helps us to improve our skill because we practice deliberately. We even tag our work to our peers and teacher if we would like to seek comments for improvement. It also guides us what to do next and the scaffolding step is directing us what to do and what activity to prevent. Finally, what I like the most in CAAM is, the complexity of the tasks is flowing gradually apart from telling whether a particular activity was successful or appropriate. (R18)

4.2.3. Self-Regulated Learning Awareness

Regarding autonomous and self-regulated learning, it is noticeable that all of the respondents (21 or 100%) utilized CAAM in argument mapping and thus were assisted in achieving a successful argumentative writing composition. Verbatim transcript from R12 and R15 were found to be consistent. R15 stated her insight regarding self- monitoring while using CAAM in her writing processes:

> To check if I understood the thesis, arguments and contention towards the text before writing, I try to check everything together and I try to understand one thing which I believe will lead to understanding another. Actually, CAAM has been assisting and guiding me to do these activities (R12)

R15 also maximized the effective use of CAAM by trying to self-monitor her arguments by going back twice or thrice around.

> Since using CAAM allows us to go back even how many times we wanted to carefully check
> our arguments, I am still trying my best to double check if my thesis, contention and
> conclusions are right and free from mismatches and errors. CAAM aids me to edit throughout
> my writing process (R15)

With regard to self-evaluation and self-reflection, R13 expressed her feeling regarding the effective use of CAAM in her argumentative writing process. She said that evaluating one's writing performance whether the correct arguments and evidences, or not, makes her more driven to continue writing and do her best to get correct answers. It also helps her to trace her performance.

> As I map my arguments, I see to it that I am right there. I am following my performance,
> whether I did get the right arguments and evidences or not. I always say, I am close! This
> attitude helps me become more optimistic. Actually, I can go back and change my arguments,
> premises, and evidences, that easy. Moreover, after seeking suggestions from my peers
> regarding my work, I am trying to self-evaluate and reflect by weighing the arguments they
> suggested to my paper. (R13)

The above qualitative results from the interviews indicated the significant impacts of the use of CAAM on learners' argumentative writing as well as their self-regulation of learning awareness.

5. Discussion

The findings of the present study revealed that Thai EFL learners' use of argument mapping method made significant gains on their writing performance in terms of task achievement, coherence-cohesion, lexical resource and grammatical range and accuracy. The effectiveness of employing argument mapping method on respondents' writing process can be attributed to the helpful features of argument mapping such as stating thesis and premises, developing schemas, planning the essay structures, locating links and relationships, developing subclasses, sorting information and giving supports to the reasons, which are considered important factors of a successful argumentative writing. The aforementioned factors are essentially vital as necessary steps in the process of writing as advocated by many researchers of L2/ EFL writing (Hyland, 2003, 2015; Flowerdew, 2017). Furthermore, Harrell and Wetzel (2013) claim that the use of well-designed argument maps or argument diagrams (ADs) can improve second language learners' writing performance and further highlighted that ADs help ignite learners' schemas which are vital in argumentative writing. Additionally, learners experiencing argument mapping develop better writing in terms of complexity and content (Gray, 2012). AM improves

writing process which assists learners at the start of the process, during the process down to the final product, an enjoyable and productive experience by lightening the intimidating atmosphere of traditional writing classes (Dwyer et al., 2010). This simply means that argument maps do not only trigger thinking for writing, but they also act as reliable guides and scaffolds during the writing and even for revisions after such drafts are developed. Further, visual maps and/or visual organizers facilitate learners' production of coherent paragraph texts (Chang, Chang, & Hsu, 2019). This view is echoed by Nurhajati (2016), who claims that visual maps / visual organizers serve as scaffolding tools to assist students write in English.

The study findings also showed a significant relationship between the learners' argumentative writing performance across task achievement, coherence-cohesion, lexical resource and grammatical range and accuracy and the use of argument mapping method as evidenced by a significant improvement towards their writing output after the intervention was employed. The findings revealed that there was a significant improvement on respondents' argumentative writing product in terms of the development of writing content since they were able to distinguish their argument conclusion and provide a number of different premises to support the thesis. They were also able to offer evidence and counter-arguments supporting the premise/s and thesis. The findings also showed a positive change on students' writing coherence. They were able to provide discussion on their reasons by logically linking their premises to the conclusion and between premises as well as the use of their "linguistic signposts" as noticed in their written output reflected from their writing post-test. The efficacy of CAAM assists to promote EFL learners' literacy skills which help them to produce more coherent and cohesive essays (Davies, et. al., 2010). This is in line with Pinkwart et al. (2009), who claim that the use of AMs fosters EFL learners' argumentative writing. Congruent to this view are the study findings conducted by Malmir & Khosravi (2018), proving the efficacy of using AMs on both descriptive and expository tasks in the Iranian EFL context and stating that AM could improve these two tasks in terms of grammar, coherence, cohesion and task achievement but not in improving vocabulary of participant's writing. However, the present study concentrated on how the students develop the content of their argumentative writing with emphasis on task achievement, (where students develop the content of their writing with emphasis on the statement of conclusion and how it is being supported by evidence as well as counter-arguments) cohesion-coherence, lexical resource and grammatical range and accuracy (where students focused on how they use markers of coherence to determine if they can be able to logically connect their premises to the conclusion and between premises).

The results of the present study showed that the students became more cognizant of their self-regulation of learning. Motivation and attitude can have a key impact on students' academic outcomes (Zimmerman, 2008). The findings of this study showed that CAAM within the aforementioned approach enabled the learners to enhance their interests in accomplishing writing tasks, managing their own learning, and involving themselves to active and constructive procedures. It was revealed further that those who worked in groups during the strategy intervention had their writing performance affected significantly, as manifested in the interviews conducted. This is in line with previous studies which found the positive impact of collaborative learning in the classroom (Bayat, 2014; Onozawa, 2010).

However, two out of six components of self-regulation awareness did not show a significant relationship with the participants' argumentative written composition performance. These components are "evaluation" and "reflection". In the traditional EFL classroom, the students are not given the chance or allotted time to evaluate the strategies and methods they used to improve their written works and to self-reflect the mistakes they had in their drafts. They were not also given the opportunity to share their difficulties and accomplishments to their peers and friends which is a potential activity to enhance improvement on their written drafts. Zimmerman (2000) and Zimmerman and Kitsantas (2002) highlighted that self-reflection as one of the phases of self-regulation which consisted of monitoring the adequacy of the content, organization, and form of one's written product, were not only cognitive but often affective processes whereby writers make different self-evaluative judgments about the text they produce.

6. Summary and conclusion

The present study investigated the effect of using CAAM on Thai EFL learners' writing performance and their self-regulation of learning awareness. Using CAAM method could enhance Thai EFL learners' writing skill across the 4 writing components such as task achievement, coherence-cohesion, lexical resource, grammatical range and accuracy. Secondly, CAAM made the respondents more aware of their self-regulation of learning as they manifested inclination on their planning, self-monitoring, self-evaluation, reflection, effort, and self-efficacy. Results also provided further empirical evidence that respondents' self-regulation of learning awareness remarkably improved after the employment of CAAM. Furthermore, as learners' personality traits could be considered as essential predictors in their success in language processing, identifying these traits and providing facilities to enhance them would be a great accomplishment in EFL teaching and learning. CAAM provides this opportunity for the

teachers and learners to improve some of these personality traits such as self-regulation of learning. Finally, the design of effective training procedures and the aiming of specific learning outcomes of training towards writing and other EFL macro-skills for the different groups of learners are further suggested for future research.

References

Bayat, N. (2014). The effect of the process writing approach on writing success and anxiety. *Educational Sciences: Theory & Practice, 14*(3), 1133-1141.

Canas, A. J., Hill, G., Carf, R., Suri, N., Lott, J., & Eskridge, T. (2004). A knowledge modelling and sharing environment. In A. J. Canas, J., D. Novak & F.M. Gonzalez (Eds.), *Concept maps: Theory, methodology, technology: Proceedings of the first international conference on concept mapping* (Vol. 1, pp. 125-133) Pamplona, Spain: Universidad Publica de Navarra.

Castillo, A. C (2012). Promoting argumentative abilities in written composition of psychology senior students: CAAM method. *Procedia-Social and Behavioral Sciences, 69*, 1664-1675.

Chamot, A. U. (1995). Creating a community of thinkers in the ESL / EFL classroom. *TESOL Matters, 5*(5), 1-16.

Davies, W. M. (2009). Computer-assisted argument mapping. A rational approach. *Higher Education,58,*799-820.

Davies, W. M. (2010). Concept-mapping, mind-mapping, and argument mapping: What are the differences and do they matter? *Higher Education, 62*(3), 270-301.

Davies, W. M. (2011). Mind-mapping, concept mapping and argument mapping: What are the differences and do they matter? *Higher Education, 58*, 799-820.

Davies, W. M (2014). Computer-aided argument mapping as a tool for teaching critical thinking. Retrieved June, 2014 from http://www.mitpressjournals.org/doi/pdf/10.1162/IJLM_a_00106.

Dornyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition.* Mahwah, NJ: Lawrence Erlbaum.

Dwyer, C. P., Hogan, M. J., & Stewart, I. (2010). The evaluation of argument mapping as a learning tool: Comparing the effects of map reading versus text reading on comprehension and recall of arguments. *Thinking Skills and Creativity, 5*(1), 16-22.

Dwyer, C. P., Hogan, M. J., & Stewart, I. (2011). The promotion of critical thinking skills through argument mapping. In: C. P. Horvart, & J. M. Forte (Eds.), *Critical thinking* (pp. 97-122). New York: Nova Science Publishers.

Eftekhari, M., Sotoudehnama, E., & Marandi, S. S. (2016). Computer-aided argument mapping in an EFL setting: Does technology precede traditional paper and pencil approach in developing critical thinking? *Educational Technology Research and Development, 64*(42), 425-445.

Ericsson, K. A., Krampe, R. T. & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review, 100*, 363-406.

Ertmer, P. A. & Newby, T. J. (1996). The expert learner: Strategic, self-regulated, and reflective. *Instructional Science, 24*, 1-24. DOI: 10.1007/ BF00156001

Graham, S., & Harris, K. R. (2005). *Writing better: Effective strategies for teaching students with learning difficulties.* Baltimore, MD: Paul H. Brookes Publishing Co.

Gray, J. W. (2012). *Introduction to argument mapping and critical thinking.* Retrieved from http://ethicalrealism.files.wordpress.com/introduction-to-argument-mapping

Harrel, M., & Wetzel, D. (2013). Improving first-year writing using argument diagramming. In: M. Knauff, M. Pauen, N. Sebanz, and I. Wchsmuth (eds.), *Proceedings of the 35th Annual Conference of the Cognitive Science Society* (pp. 2488-2493). Austin, TX: Cognitive Science Society.

Harris, K., Graham, S., Mason, L., & Friedlander, B. (2008). *Powerful writing strategies for all students.* Baltimore, MD: Brookes.

Hashemi, L., & Thomas, B. (2011). *IELTS Trainer. Six Practice Tests with Answers: Cambridge books for Cambridge Exams.* Cambridge: Cambridge University Press.

Hyland, K. (2013). Writing in the university: Education, knowledge, and reputation. *Language Teaching, 46*(1), 53-70.

Magno, C. (2009). Self-regulation and approaches to learning in English composition writing. *TESOL Journal, 1,* 1-16

Malmir, A., & Khosravi, F. (2018). The effect of argument mapping instruction on L2 writing achievement across writing task and writing components: A case study of Iranian EFL Learners. *Applied Research on English Language, 7*(4), 514-538.

Onozawa, C. (2010). A study of the process writing approach - A suggestion for an eclectic writing approach. *Proceedings of Kyoai Gakuen Maebashi International University, Japan*, 10, 153-163.

Pahlavani, P. & Maftoon, P. (2015). The impact of using computer-aided argument mapping (CAAM) on the improvement of Iranian EFL learners' writing self-regulation. *The Journal of Teaching Language Skills, 7*(2), 127-152.

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research and applications* (2nd ed.) Englewood Cliffs, NJ: Prentice Hall Merrill.

Robillos, R. J. (2019). Crossing metacognitive strategy instruction in an EFL classroom: Its impact on Thai learners' listening comprehension performance and metacognitive awareness. *Asian EFL Journal, 21*(2), 311-336.

Robillos, R. J., & Phantharakphong, P. (2020). Enhancing EFL learners' argumentative abilities in written composition and critical thinking dispositions through argument mapping within metacognitive approach. *Asian EFL Journal, 27*(3.3), 181-208.

Robillos, R. J. (2020). Instruction of metacognitive strategies: Its role on EFL learners' listening achievement and awareness of their metacognitive listening strategies and self-regulation. *Asian EFL Journal, 27*(3.2), 442-452.

Schunk, D. H. (2001). Social–cognitive theory and self-regulated learning. In: B. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (pp. 125-151). Mahwah, NJ: Lawrence Erlbaum.

Soureshjani, K. H. (2013). A study on the effect of self-regulation and the degree of willingness to communicate on oral presentation performance of EFL learners. *International Journal of Language Learning and Applied Linguistics World (IJLLALW), 4*(4), 166-177.

Susilowati, T. (2015). Metacognitive strategies in building autonomous learning on teaching listening to the second semester "TI.C class" of STAIN Ponorogo in academic year 2014/2015. *Cendekia, 13*(2), 227-251.

Taghizadeh, M. (2016). The effects of metacognitive strategy training on the listening comprehension and self-regulation of EFL learners. *International Journal of Foreign Language Teaching and Research, 4*(16), 36-54.

Toering, T. T. (2011). *Self-regulation of learning and the performance level of youth soccer players.* Groningen: UMCG. s.n.

van Gelder, T. (2007). The Rationale for Rationale™. *Law, Probability, and Risk, 6,* 95-116.

Wang, C., Kim, D. H., Bong, M., & Ahn, H. S. (2013). Korean college students' self-regulated learning strategies and self-efficacy in learning English as a second language. *Asian EFL Journal, 15*(3), 81-112.

Weigle, S. C. (2013). ESL writing and automated essay evaluation. In: M. Shermis, & J. Burstein, (Eds.). *Handbook on automated essay evaluation.: Current applications and new directions* (pp. 36-54). New York: Routledge.

Zimmerman, B. J (2008). Investigating self-regulation and motivation: historical background, methodological development, and future prospect. *American Educational Research Journal, 45*(3) 166-185. DOI: 10.3102/0002831207312909.

Zimmerman, B. J., & Kitsantas, A. (2002). Acquiring writing revision and self-regulatory skill through observation and emulation. *Journal of Educational Psychology, 94*(4), 660-668.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81*, 329-339. DOI: 10.1037/0022-0663.81.3.329

Zimmerman, B. J. (2006). Development and adaptation of expertise: The role of self-regulatory processes and beliefs. In: K. A. Ericsson, N. Charness, P. J. Feltovich & R. R. Hoffman (Eds.), *The Cambridge handbook of expertise and expert performance* (pp. 705-722). New York, NY: Cambridge University Press.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*(1), 82-91.

SPEAKINGPAL: LEARN ENGLISH, SPEAK ENGLISH

(App Review)

by **Musa Nushi** and **Kimia Askarian**

Shahid Beheshti University, Daneshjo Boulevard, Evin Sq. Tehran, Iran, 1983969411

M_nushi @ sbu.ac.ir / askarian.kimia @ gmail.com

Application Details:

Publisher: SpeakingPal Ltd.

Product type: Mobile Application Software

Language(s): English

Level: Any

Media format: APK/IPA

Operating systems: Android/iOS

Hardware requirements: Smartphone/Internet Connection

Supplementary software: None

Price: Free**,** offers in-app purchases

1. Introduction

With the introduction and integration of technology within the lives of individuals, it is no surprise that a majority of disciplines have and will continue to experience changes, and by no means educational settings are an exception to such changes. Second language (L2) teaching and learning has been experiencing its own share of technological innovations; mobile-assisted Language Learning (MALL), for instance, is a fast-growing area of research and tends to be favored in certain circumstances when compared to its traditional counterparts such as textbook-based language learning and Computer-Assisted Language Learning. Brown (2010) states that "the distinguishing aspect of mobile learning is the assumption that learners are continuously on the move" (p. 7) and this move encompasses not only the physical aspects but also the contextual changes that individuals may experience.

As a matter of fact, mobile technologies enjoy multimodality in their design and applications, which is also manifested in the cognitive processes that learners' minds go through. Chanier and Lamy (2017) state that in these environments, "learners orchestrate various resources including language, in its written and spoken forms, as well as images,

colors, movements, and sounds" (p. 428). This multimodality can help learners engage more deeply in learning the content than in real-life situations. The least these mobile applications can do is providing a context in which learners can be exposed to language use. According to Genesee (2000), after some time and with enough exposure, "activation and recognition become relatively automatic" (p. 4). Nevertheless, we know that in many educational settings, the class time is limited and insufficient for automaticization to happen. As Thornton and Houser (2005) point out, it is believed that the existence of mobile devices and the applications programmed for them can help extend the opportunities for exposure and practice in language learning and/or teaching contexts.

However, integrating technology into language classes, specifically to enhance speaking, is not an easy task and using technology to teach speaking is among primary worries of L2 teachers (Blake, 2017). Such integration is proved to be beneficial to L2 development since, as argued by Reeves and Nass (1996), "people's interactions with computers, television, and new media are fundamentally social and natural, just like interactions in real life" (p. 5). Therefore, an app that simulates human interaction can help teachers and learners by improving speaking ability.

Given that background, the present article reviews *SpeakingPal,* a mobile application which is designed to improve EFL/ESL learners' speaking ability by enabling them to talk in English with an in-built video character.

2. Description

In order to use the application, learners must first download it from either Google Play or App Store on their respective platforms. The default language of the application is English; therefore, learners are required to have a basic command of the language to work with the application. When users launch the app and press 'start', they are directed to a page where they have a choice to either have the contents translated or continue with no translation. The in-built translation feature provides users with the translations (up to 15 languages) of the sentences used in the dialogs within the employed platform. After creating an account and logging in, users are directed to the main page of the app. There are eight sections in the main page. The content of each section is shown in Table 1.

Table 1. Main page topics and contents

Section	Number of lessons
Weekly lesson	1 free lesson each week

Everyday – L1	22 (3 free)
Friends – L1	10 (3 free)
At work –L2	20 (3 free)
Travel – L2	31 (3 free)
White House – L3	12 (3 free)
Beginner – L0	51 (3 free)
English Sounds – L0	52 (3 free)

It is important to note that learners are not required to start from a specific section, that is, they do not have to start from Beginner – L0 and then move on to the more advanced levels. Upon creating their own accounts, learners can access all the sections and proceed as they wish. Each section/lesson centers around a particular situation. Except for *Beginner* and *English Sounds*, all other sections consist of a number of short pieces of video scenarios of people having a conversation. Some of these videos are specifically designed for the app and some are real videos which have been taken from other sources and adapted. It should be noted that only three videos of each topic are for free and users can buy the whole lessons or some of them from the *shop* icon. The language used in the conversations is natural, conventional and coherent. Characters behave naturally with clear accents and appropriate body language. Learners can watch the video provided for each lesson and then proceed to the 'dialogs', that is, the text version of the conversation with translation in another chosen language (Figure 1).
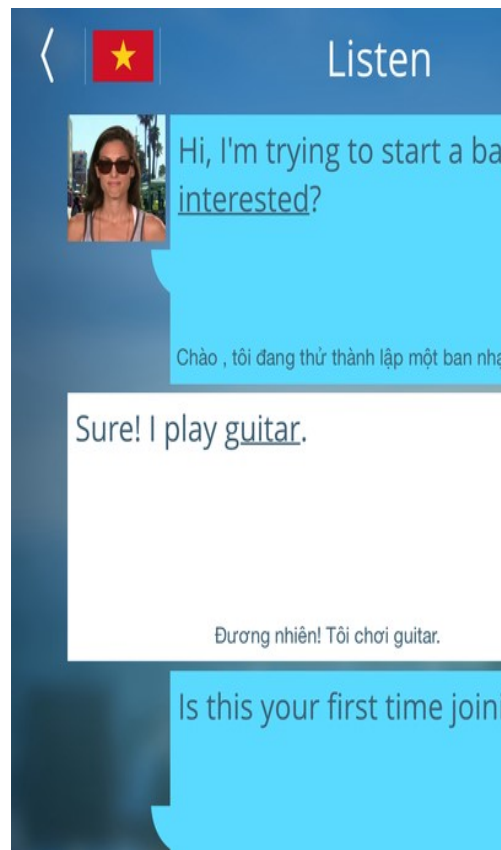
Figure 1. Dialogs

Within the dialogs, learners need to respond to the video character by reading the response that is given by the app out loud. Therefore, users can practice communicating with the other virtual character. The activity aims at getting the user to read (pronounce) the video's script as closely as possible. The vocal responding process, which comes with an evaluation, is associated with a specific sound technology, namely Automated Speech Recognition (ASR), which analyzes and converts audio streams of speech into written text using a speech recognition engine. ASR, however, does not analyze the audio semantically. Unlike Natural Language Processing which makes sense of language data, the ASR output cannot evaluate meaning or coherence, that is, it merely converts spoken language into written language – using sophisticated statistical and language analysis models (Carrier, 2017). By means of ASR, *SpeakingPal* can provide its users with a considerable opportunity to work on their pronunciation and accent, using ASR's Computer-aided Pronunciation Teaching (CAPT) software – it enables apps to listen to a learner's pronunciation and provide formative assessment and feedback on the accuracy of the enunciations. Moreover, the use of ASR allows the app to perform computer-based automated marking of ELT examinations – spoken examinations and quizzes – with an accuracy approaching that of human assessors. After each response, users' speech is rated using a three-

star scale, and when the whole dialog is done, a transcript of the whole dialog is provided. The transcript within the application is color-coded to reflect users' voice performance. The text written in green indicates that the utterance has been pronounced accurately, and those written in red must be improved (Figure 2).
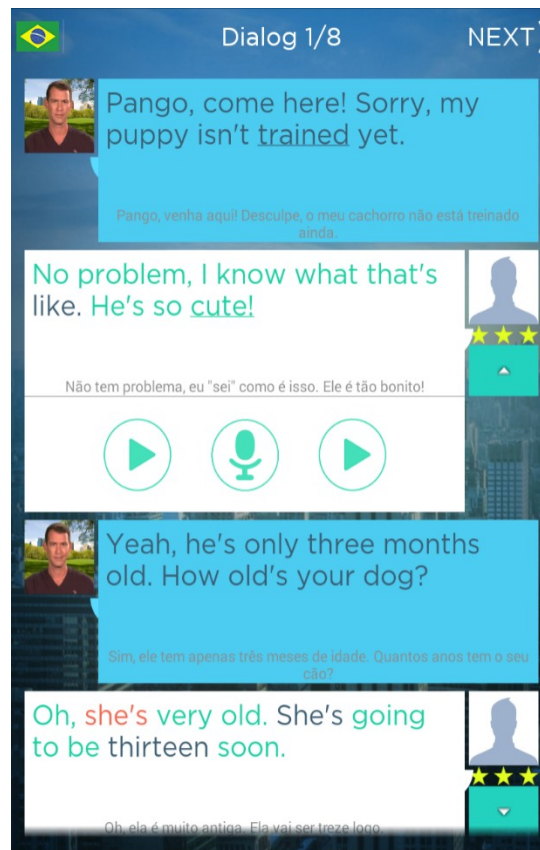

Figure 2. Color-coded feedback and dialog translation

The transcript also provides additional features such as the opportunity for learners to watch the cropped part of the video in which the response was spoken by a video character, play back their own recording, and re-record their response based on the feedback they have received. Some of the words in the transcript are underlined and by tapping on them their definition will appear in a pop-up box. Therefore, the app can help users to gain a variety of words and conversational phrases, which can lead to more proficiency in their speaking skills (Milton et al., 2010).

Another video exercise scheme called the 'Double Answer' allows users to participate in how the conversation progresses by providing them with the option of choosing between two sentences to reply to the corresponding questions. This feature of *SpeakingPal* is powered by 'English Tutor', a technology which presents users with short, authentic dialogs, enabling users

to direct the conversation flow, much like in a real-life communication. English Tutor also makes it possible for the app to provide immediate feedback on the users' speaking performance.

SpeakingPal can help promote learners' listening skill as well. Listening to the native speakers of English can help students improve not only their listening skills but also their pronunciation. After all the dialogs are practiced in each lesson, learners can take a quiz. All the questions are time-bound, multiple-choice, and based on the conversations of the lesson. However, when the learners answer the questions incorrectly, there is no feedback as to why their answer is wrong. At the end, it scores the performance as a percentage along with a three-star rating scale (Figure 3).
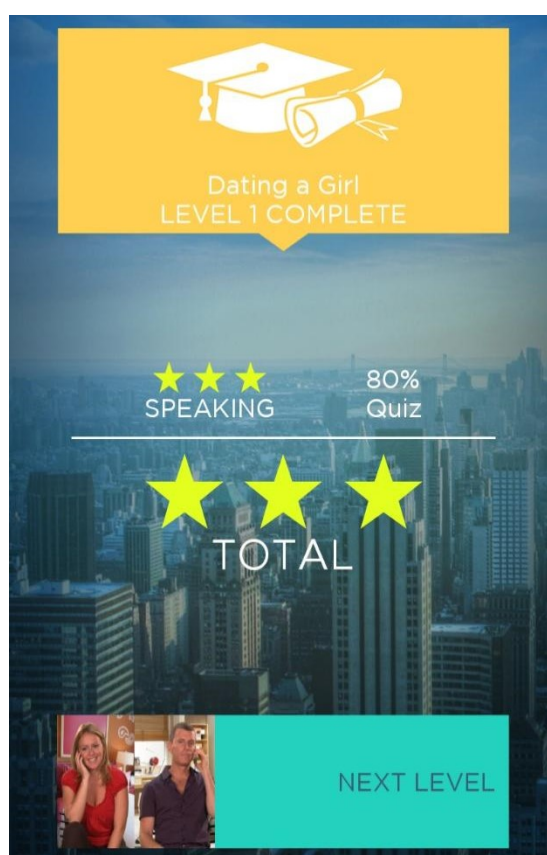

Figure 3. Scoring the performance

It should be noted that the *Beginner* lessons introduce some vocabulary items using pictures and videos in the same manner that the other lessons mentioned above provide conversation practice for learners. The section labeled *English Sounds* contains videos about how to say all English sounds demonstrating how to articulate them in addition to providing interesting pronunciation tips. It is also worth mentioning that the content of the app is not constant in all the parts; for example, sometimes learners need to just repeat what was said in the video

instead of replying to it and therefore, there is no interaction pattern. Also, even when the translation option is activated, there is no translation available for some of the videos.

3. Evaluation

Learning English in traditional ways, like attending classrooms, does not allow learners to practice their speaking skills adequately and on a regular basis. Meanwhile, with English learning apps for communication, learners can listen to any dialog and improve their speaking skills at any time and as long as they want. Most of the English-speaking apps provide original dialogs spoken by native speakers and interactive activities, which help learners grasp the Standard English accent and pronunciation in a natural way and improve their speaking skills. *SpeakingPal* is quite innovative, user-friendly and has an appealing interface that employs colorful layouts which make language learning more interesting and enjoyable to users. The sections are clearly arranged, well-organized and the menus are easy to work with, therefore, it seems a very face-valid app. The app is compatible with both smartphones and tablets and is supported by both Android and iOS operating systems, showing that the publisher has tried to reach out to a wider range of users. *SpeakingPal* is powered by ASR which enables the app to enjoy computer-based automated marking of ELT examinations. This feature can provide the benefit of speed and instant analysis and evaluation of learners' performance – the spoken production of a learner does not need to be recorded and sent to a human examiner, but can be assessed immediately.

Despite the benefits, the app suffers from some weaknesses. As in many CAPT applications, the interaction is essentially self-study, taking place between learner and device, with no learner-to-learner or teacher-to-learner interaction. *SpeakingPal* may help learners with their pronunciation and speaking skills, but since they interact with a virtual video tutor appearing in short video clips, without using the phrases or the sentences in a real interaction with real people, users must be aware of the fact that these computerized listening and speaking exercises provided in the app might not be enough for what they actually need in real-life communications and situations.

Another drawback concerns the feedback; the one provided by the app consists of a review screen which provides all utterances that were articulated, along with the color-coding feature for each word of each utterance, so that users can pinpoint where to improve, by realizing which words they pronounced well (in green) and which ones they need to work on (in red). There does not seem to be any explanation as to what in particular the problem is with the learner's pronunciation and they may have to only repeat the red word or utterance a couple

of times to pass the dialog, so the users are not any wiser as to how to improve. Therefore, they might get stuck in saying some word or utterance which could lead to a communication breakdown. Here again, the absence of an actual person with whom the users could adopt a strategy to improve their communication and interaction skills is felt and is quite a profound pitfall. *SpeakingPal* tends to underpin criticisms of ASR-based educational procedures, namely that such activities lead to learners talking to a device by themselves in isolation. Lack of synchronous speaking and listening activities with no promotion of collaborative learning are among the main problems of many language learning apps (Kukulska-Hulme & Shield, 2008). To compensate for this problem, some language learning applications like *Duolingo* have created a community of their users in order to create real interaction among them and get users to assist one another with their learning process (Nushi & Eqbali, 2017).

As explained earlier, after watching the video, users are supposed to play roles of one or two characters. The validity of using role-plays as a pedagogical strategy has been backed by numerous studies. Role-play is defined as "a simulation activity in which students are expected to take on a personal attitude, opinion, or role of someone else in a set context" (Senf, 2012, p. 3). Burke and Guest (2010, p. 34) describe role-plays as an excellent means to engage learners, which emphasize "interactive, inquiry-based scholarship rather than passive learning." For the activities to be successful, a few key points need to be attended to including modelling, providing students with language support, establishing realistic objectives, making use of practical scenarios, and using objects and material from everyday life (Parrish, 2004).

The app also provides learners with almost every utterance translated into the selected language to make the content more comprehensible. The use of translation in L2 teaching and learning has and will continue to be a controversial issue. Some teachers and researchers have negative attitudes toward translation whereas others hold a more positive attitude toward its use, believing that it facilitates the teaching and learning process (Samardali & Ismael, 2017). Researchers (e.g., Ur, 2012) argue that it is wrong to assume that translation always cause negative interference by the native language; on the contrary, it can increase students' awareness of similarities and differences between the two languages, and it also promotes their acquisition of difficult structures and elements in the target language. However, some researchers do not prefer the use of translation in language teaching and learning due to the fact that it has allegedly many drawbacks. Harbord (1992), for instance, warns that the use of translation may lead to the development of an excessive dependency on the students' mother tongue. Considering this controversy, many L2 scholars (e.g., Cook, 2010; Liao, 2006) believe that it is not the very translation but the way it is used for pedagogical purposes that counts and

it seems that *SpeakingPal* developers are convinced that the way translation is used in the app benefits the learners.

The interactive exercises included in the app require the learners to select a response from prefabricated options rather than to create their own answers, which raises a concern regarding the development of creativity in the learners' production. Furthermore, a speaker can choose to rephrase what they are trying to say using a variety of structures or vocabulary, referred to as adaptive strategies, whereas, through the in-app interactions, users are locked into a very narrowly-defined response scenario with no chance to employ and practice such strategies which are highly required in a real authentic conversation.

To compare the *SpeakingPal* app with other similar applications (e.g., *Replika*, *Tandem*), one can notice that those applications try to prioritize real communication with people and incorporate updated instructional methodologies in the teaching and learning process. *Replika*, for instance, allows users to personalize their virtual friends by talking to them every day about their daily routines and share their life experiences. Another similar app that focuses on speaking skills is *Tandem*. In this application the developers prioritized real communication with people over incorporating updated teaching methodologies in the learning process. Unlike *SpeakingPal* this app does not have an in-app dictionary or a built-in translation (see Nushi & Khazaei, 2020 for a review). *Speaky* is another app that assists students with their speaking. One of its most important features is that it provides students with a forum where native and non-native speakers with all levels of language proficiency learn from each other. However, unlike *SpeakingPal* it does not provide learners with voice recognition to practice speaking skills.

It is quite obvious that a learner cannot become proficient in English by using only the free features of the app, although it can be used to learn and practice some new points, and more importantly, to have a quick preview and get familiar to how the app works and how the topics and conversations will unfold in the future, so the learners can decide whether the app's teaching procedure suits their needs or not. Nevertheless, *SpeakingPal* contains many favorable features. It is not too expensive – its complete version runs from $7.5 to $21 per year, depending on the lessons the users want to purchase – its appearance is modern and clear and its subjects are well-structured, highly-organized, and as mentioned earlier, user-friendly. Thus, it seems a great idea to recommend even the free version of the *SpeakingPal* application as a beneficial supplement for learning or improving English – but not as a substitute.

4. Conclusion

Mobile devices have been steadily incorporated into L2 education, thus transforming the traditional teaching and learning into a whole brand new mode of virtual education (Kukulska-Hulme, 2009). This vast use of mobile devices has brought about the production and launch of loads of smartphone applications in English language teaching and learning. A great many apps are available presently for language learners to download from the Internet. The portability and accessibility of mobile devices has made learning materials easily accessible. Accordingly, MALL has been widely recognized as providing "portability", "social interactivity", "context sensitivity", "connectivity" and "individuality" for language learners (Miangah & Nezarat, 2012, p. 311). That is why the popularity of language learning apps has grown immensely. As a result, as the App Store chart of the Education category on the Chinese market on Jan. 21, 2013 demonstrates, 39% of the top 100 free apps and 34% of the top 100 paid apps were for language learning (Yang, et al., 2013).

As a relatively well-known language learning app assistant, *SpeakingPal* enjoys all these great features. With a high 4.2 score on Google Play and thousands of five-star reviews, the app offers a fun, interactive way to its users to excel in English. Even popular Russian English-learning project *LinguaLeo*, which has more than 9 million users worldwide, is allegedly interested in connecting with *SpeakingPal* (The Russia Times, 2014). *SpeakingPal* is a mobile-learning product that turns its users' cellphones into a personal English tutor. This app is one of the subscription-based English language learning systems that offers a unique range of interactive exercises, role plays and other language activities. Users can improve their English-speaking skills at some point during their busy schedules, on-the-go, anytime and anywhere (TOEIC, n.d.).

The variety of topics, built-in pronunciation technology facilities, exercises, and 'to-the-point' teaching process makes the app a valuable learning tool for both learners and teachers. Users are simply and directly presented with different topics and new related vocabularies, which are in a specific order, can skip around the built-in syllabus (Ellis, 2005) and go through any level of any course topic anytime they want. However, *SpeakingPal* is not an app which one should be solely dependent on; its over-reliance on the learners' native language, and lack of human interaction and over-use of prefabricated dialogs in presenting the materials do not make the app a good companion for more determined learners of the English language and for those who want to achieve a higher level of proficiency.

Despite the shortcomings, it seems a good idea to recommend *SpeakingPal* as a useful secondary learning aid, one that can definitely help its users learn new things in English and

boost their speaking skills. After all, for many learners, self-study activities are a preferable way to gain enough time with and exposure to the target language to enhance their proficiency, either because they cannot attend real classes or their class hours are limited. Furthermore, for many learners this alone would be a welcome support to their learning, building more confidence in speaking when they see their correct pronunciation is recognized and rated by the ASR engine (Carrier, 2017). We should also take into account that for human-to-human synchronous interaction, there are some barriers such as scheduling, sound quality, operation, and cost (Kukulska-Hulme & Shield, 2008) and apps like *SpeakingPal* attempt to remove such barriers.

References

Blake, R. J. (2017). Technologies for teaching and learning l2 speaking. In C. A. Chapelle, & S. Sauro (eds.), *The Handbook of Technology and Second Language Teaching and Learning* (pp. 107-117). Hoboken, NJ: John Wiley & Sons.

Brown, E. J. (Ed.). (2010). Education in the wild: Contextual and location-based mobile learning in action*. A report from the STELLAR Alpine Rendez-Vous Workshop Series*. Nottingham: University of Nottingham.

Burke, T., & Guest, A. (2010). Using role playing as a teaching strategy: An interdisciplinary approach to learning. *Proceedings of the 2nd Annual Conference on Higher Education Pedagogy,* 34-35.

Carrier, M. (2017). Automated Speech Recognition in language learning: Potential models, benefits and impact. *Training, Language and Culture, 1*(1), 46-61. DOI: 10.29366/2017tlc.1.1.3.

Cook, G. (2010). *Translation in Language Teaching: An Argument for Reassessment.* Oxford: Oxford University Press.

Ellis, R. (2005). Principles of instructed language learning. *System, 33*(2), 209-224.

Genesee, F. (2000). Brain research: Implications for second language learning. *ERIC Digest*. https://eric.ed.gov/?id=ED447727.

Harbord, J. (1992). The use of the mother tongue in the classroom. *English Language Teaching Journal, 46*(4), 350-356.

Introducing SpeakingPal® Plus!™. (n. d.). TOEIC. http://www.toeic.com.hk/English/popup_speaking_pal.htm.

Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL, 21*(2), 157-165.

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

Liao, P. (2006). EFL learners' beliefs about and strategy use of translation in English learning. *RELC Journal, 37*(2), 191-215.

Maxfield Capital Invests in Israeli English-Learning APP SpeakingPal. (2014, May 29). The Russia Times. https://www.russiatimes.org/maxfield-capital-invests-israeli-englishlearning-app-speakingpal/.

Miangah, T. M., & Nezarat, A. (2012). Mobile-assisted language learning. *Journal of Distributed and Parallel Systems, 3*(1), 309-319.

Milton, J., Wade, J., & Hopkins, N. (2010). Aural word recognition and oral competence in English as a foreign language. In R. Chacón-Beltrán, C. Abello-Contesse, & M Torreblanca-López (eds.), *Insights into Non-native Vocabulary Teaching and Learning* (pp. 83-98). Clevedon: Multilingual Matters. https://doi.org/10.21832/9781847692900-007.

Nushi, M., & Eqbali, M. (2017). Duolingo: A mobile application to assist second language learning. *Teaching English with Technology, 17(1*), 89-98.

Nushi, M., & Khazaei, V. (2020). Tandem language exchange. An app to improve speaking skill. *Journal of Foreign Language Education and Technology*, *5*(2), 240-250.

Parrish, B. (2004). *Teaching Adult ESL: A Practical Introduction*. New York: McGraw-Hill Companies.

Reeves, B., & Nass, C. (1996). *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*. Cambridge: Cambridge University Press.

Samardali, M. F. S., & Ismael, A. M. H., (2017). Translation as a tool for teaching English as a second language. *Journal of Literature, Languages and Linguistics, 40*, 64-69. http://iiste.org/Journals/index.php/JLLL/article/viewFile/40072/41218.

Senf, M. (2012, Dec). Role-play, simulations and drama activities. *DocumBase*. http://en.convdocs.org/docs/index-44311.html.

Chanier, T., & Lamy, M.-N. (2017). Researching technology-mediated multimodal interaction. In C. A. Chapelle, & S. Sauro (eds.), *The Handbook of Technology and Second Language Teaching and Learning* (pp. 428-443). Hoboken, NJ: Wiley-Blackwell.

Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Computer Assisted Language Learning*, *21*, 217-228.

Ur, P. (2012). *A Course in English Language Teaching*. Cambridge: Cambridge University Press.

Yang, B., Zhou, Sh., & Ju, W. (2013). Learning English speaking through mobile-based role-plays: The exploration of a mobile English language learning app called engage. *The EuroCALL Review, 21*(2), 27-38. https://doi.org/10.4995/eurocall.2013.9788.

UNIVERSITY of NICOSIA

UMCS
MARIA CURIE-SKLODOWSKA UNIVERSITY