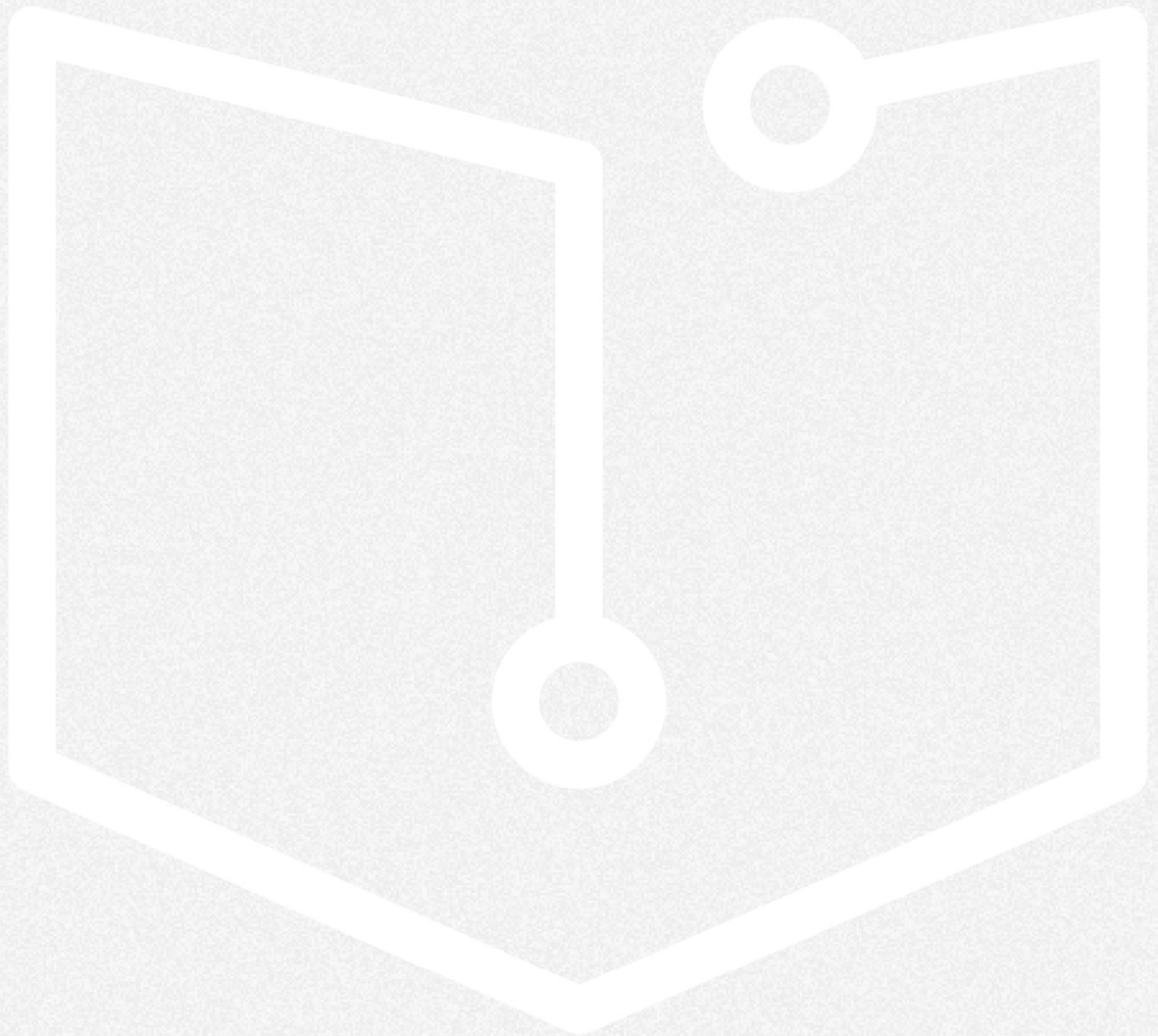




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FROM THE EDITORS

by **Christopher Alexander** and **Jarosław Krajka**

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The Journal of Teaching English with Technology (TEWT) in 2023 “Boldly Goes” forward with three of its new 2023 initiatives having already been realised!

1. Focusing on technologies of the Future

In this era of quickly developing AI-technologies, TEWT has announced it intends to focus on publishing more research that is aimed at understanding how using a ‘human with AI’ approach might lead to greater teaching and learning success. TEWT therefore in future will be fast-tracking relevant and well-researched AI-related studies (e.g. ChatGPT-related) for publication. Moreover, even though the use of the Metaverse in education is still in its early stages, it has the potential to revolutionize the way we learn and teach in the future. As such, TEWT believes it is important to publish suitable research that is focused on how the affordances of an immersive and interactive virtual Metaverse environment might lead to greater teaching and learning success. The Metaverse arguably provides a unique opportunity for educators and learners to experience a new form of education that could be more engaging, interactive and personalised than traditional classroom-based learning.

2. TEWT has moved to Scholastica!

TEWT has implemented a new editorial system, Scholastica, which is likely to considerably facilitate the publishing process, from the moment of submission through reviews, discussions and copy-editing to the final production. All TEWT reviewers have been invited to use Scholastica. All correspondence with reviewers and authors, with the very reviews, will be conducted only via Scholastica. TEWT therefore also has an additional Scholastica webpage Teaching English with Technology (scholasticahq.com)

3. TEWT is a member of Crossref (<https://www.crossref.org/>)

All new TEWT Issue articles now use the Digital Object Identifier (DOI) system. A DOI is a unique number made up of a prefix and a suffix separated by a forward slash.

Issue 1, 2023, comprises six papers from authors in well-known universities in Vietnam, Australia, Japan, Iran, the United States of America, China and New Zealand.

Paper one explores the potential of VR in enhancing authentic learning for EFL tertiary students in Vietnam. The authors are Diem Thi Ngoc Hoang of Thai Nguyen University, Vietnam, Nicola F. Johnson of Edith Cowan University, Australia, and Maggie McAlinden of Edith Cowan University, Australia. The results showed VR has the potential to enhance many of the ten attributes of Herrington et al.'s (2010) authentic tasks.

The second paper describes large language model-based artificial intelligence in the language classroom and presents some practical ideas for teaching. Its authors are Euan Bonner, Ryan Lege and Erin Frazier of Kanda University of International Studies Chiba, Japan. After giving specific examples and explanations, the paper discusses how this technology can provide teachers with new innovative ways to streamline the teaching process to focus on learner needs.

The next paper presents quantitative research on gamifying vocabulary acquisition and retention in virtual reality. The authors are Muleyke Sahinler Albayrak, Julian Chen and P. John Williams of Curtin University, Australia. Marked differences were found between pre- and post-tests and pre- and delayed post-tests suggesting that the gamified VR environment can stimulate content-based vocabulary acquisition and enhance its retention.

The fourth paper, written by Hanieh Shafiee Rad of Shahrekord University, Iran, by analysing flipping in a microlearning way, seeks to show its effects on EFL learners' achievement and motivation in a grammar course. Findings suggest that the use of microlearning, flipped, and microflipped teaching/learning can be considered as an alternative model of teaching, as opposed to the traditional method, to motivate EFL students to better learning.

Paper five looks at lexical collocational instruction in EAP writing via COCA. The authors, John I. Liontas of University of South Florida, United States of America, Imelda V. Bangun of Keiser University Flagship Campus, USA, and Siying Li of Xi'an International Studies University, People's Republic of China, proved that when students are given explicit instruction on how to utilize COCA to identify lexical collocations and their use in various contexts, both their lexical collocational competence and writing performance improves and, furthermore, these improvements correlate with each other.

The final paper of Issue 1 2023 is written by Dilani S. P. Gedera of Auckland University of Technology, New Zealand, and Anthea M. Fester of Waikato Institute of Technology Hamilton, New Zealand. This paper explains the process of integrating e-portfolios to facilitate collaborative learning and reflection in an EAP context. The findings demonstrate that learners appreciate the affordances of e-portfolios and collaborative nature of assessment tasks in them.

We wish you good reading!

EXPLORING THE POTENTIAL OF VR IN ENHANCING AUTHENTIC LEARNING FOR EFL TERTIARY STUDENTS IN VIETNAM

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Abstract

For language learners situated in contexts where there is limited exposure to the target language, an authentic learning environment is important. Virtual Reality (VR) has been increasingly used in education to simulate realistic scenarios; however, little is known about whether VR can enhance the nature of authentic learning for learners of English as a foreign language (EFL). Motivated by that reason, this study was conducted to examine the affordances of VR when integrated with language tasks to facilitate authentic learning for EFL learners. Herrington et al.'s (2010) model of authentic tasks was adopted to evaluate the VR-integrated tasks. Twenty-four students participated in the VR technology intervention and were followed up with individual interviews. The results showed VR has the potential to enhance many of the ten attributes of Herrington et al.'s (2010) authentic tasks. Suggestions are provided to further extend the model to be more applicable in EFL contexts, alongside implications for practice and future research.

Key words: authentic learning; authentic tasks; EFL; virtual reality; VR-integrated tasks

1. Introduction

Virtual Reality (VR) is now increasingly popular with the booming development of free or low-cost VR applications for smartphones to reach more users (Claudio et al., 2017; Woodford, 2019). In education, VR is a promising teaching tool to foster experiential education (Schott & Marshall, 2021) or provide students with experiences that are not available in the physical world (Alhalabi, 2016; Theelen et al., 2019). In English language teaching, the application of VR has also become popular over the last decade, but its use in language education still

remains low (less than 2%) compared to its use in other fields of instruction (Radianti et al., 2020).

For English learners in contexts where there is limited exposure to the target language, opportunities to learn a language in an authentic environment are crucial (Zainuddin, 2011). With the specific potential to enhance authentic learning environments, VR has been found to create real situational interactions and virtual target language communities, simulate realistic scenarios, and immerse learners in learning (Dobrova et al., 2017; Schwienhorst, 2002; Wang et al., 2017). Studies have shown that VR applications supports learners with additional opportunities to be exposed to the target language (Popova & Nenasheva, 2016; Schwienhorst, 2002). Despite these affordances, research into the application of VR in English language learning and teaching is still in its infancy and has lagged behind technological developments or usage in educational contexts (Bonner & Reinders, 2018; Bower & Jong, 2020). There have been very few empirical studies that provide comprehensive evidence into the use of VR in general, let alone the facilitation of authentic learning in contexts where English is learned as a foreign language (EFL). Hence, this study was conducted to investigate the affordances of VR integrated into Task-Based Language Teaching (TBLT) to facilitate authentic learning from language learners' perspectives. A group of 24 EFL undergraduate students at a public university in Vietnam were invited to participate in the qualitative research, which addressed the following research question:

- To what extent can VR-integrated tasks facilitate authentic learning from EFL undergraduate students' perspectives?

2. Literature review

2.1. Authenticity

Authenticity has been mentioned in the use of materials for foreign language learning as far back as the 19th century (Gilmore, 2007). However, it was not until the 1970s that it became prominent with the advent of the Communicative Language Teaching (CLT) approach (Buendgens-Kosten, 2014; Gilmore, 2007). Authenticity refers to *realness* or *realism* in language learning materials and activities (Buendgens-Kosten, 2014). Hence, it also refers to the use of a first language in EFL teaching and learning (Kirkpatrick, 2006). However, Kachru (1992) argued that although “native-like” use was appropriate for most language learning situations, whether it could be applied to the status of English in all situations should be reconsidered.

Another aspect of authenticity is the learning context itself (Roberts & Cooke, 2009; Wee, 2008; Widdowson, 1996, 1998). For communities that are served by a language other than English, native-speaker contexts cannot be replicated (Widdowson, 1996), and learners do not usually “have the contextual knowledge to authenticate English in native-speaker terms” (Chen & Wright, 2017, p. 518). Van Lier (1996) argues that authenticity not only denotes authentic materials, it also refers to the process of engagement in learning situations, the process of self-actualisation, intrinsic motivation, respect, and moral integrity. This viewpoint is relevant to contexts where EFL learners have limited opportunities to use English for meaningful and purposeful communication outside the classroom (Kessler et al., 2020). Authenticity in language learning is needed to motivate students and engage them in the actual use of the target language.

For communities where English is not the first language, pedagogic strategies are helpful to ensure or achieve authenticity in English language teaching and learning (Widdowson, 1998). TBLT is a popular pedagogical approach that views authenticity as the central characteristic of tasks (Ellis, 2017; Widdowson, 1996, 2003). A task is authentic when it resembles tasks that learners encounter in their everyday lives (Widdowson, 2003) or when it creates interactionally-authentic contexts that require the use of the target language (Ellis, 2003). Categorising tasks as real-world tasks and pedagogical tasks, Ellis (2017) argues that both categories of tasks aim at authenticity, that is, real-world tasks focus on situational authenticity, and pedagogical tasks give primacy to interactional authenticity.

Technology integration is also potential to enhance authentic learning. Researchers claim that EFL learners now have more opportunities than ever before to engage with the target language due to the proliferation of and access to new technologies (Chong & Reinders, 2020; González-Lloret & Ortega, 2014a; Lai & Li, 2011). This means that authenticity is becoming increasingly achievable in EFL contexts with the facilitation of technology.

2.2. The use of VR in language education

Virtual reality is defined as a state of mind that occupies a person’s awareness in a way that is similar to that of real environments, and VR devices are those that contribute to creating virtual reality (Macpherson & Keppell, 1998). With the recent development of VR technology, VR is categorized into non-immersive VR, semi-immersive VR, and fully immersive VR (Di Natale et al., 2020; Woodford, 2019). With the increasing use of VR in education, immersive VR has been found to be more effective in learning performance than non-immersive VR tools (Wu et al., 2020). Immersive VR offers first-hand experiences for learners that would not be possible

to have in the real world, provides unique opportunities for experiential and situated learning (Di Natale et al., 2020), and assists the cognitive process and language transfer (Araiza-Alba et al., 2021).

To date, research on the use of VR for language education purposes has shown mixed results in language learning outcomes. For example, Chen et al. (2019) used Google Earth to explore English learners' expository writing at a middle school in the USA. The study results showed a positive increase in both students' writing skills and their attitudes and engagement in using Google Earth VR. On the contrary, also related to writing skills, a study by Dolgunsöz et al. (2018) with the use of Samsung VR Goggles among EFL freshmen students in Turkey showed no effect of VR technology on EFL writing performance. In other studies, VR tools were found to potentially improve oral skills, confidence, and cultural awareness among EFL students (Ebadi & Ebadijalal, 2020) and significantly impacted young EFL learners' pronunciation (Alemi & Khatoony, 2020). Bonner and Reinders (2018) suggested using 360-degree videos and low-cost VR headsets to practise presentation skills with a virtual audience in the VR environment. In addition, VR was reported to reduce communication anxiety (York et al., 2021) and increase classroom collaboration (Donally, 2018; Singh, 2018).

Although the application of VR in language education is still in its infancy, a number of studies have pointed to the benefits of VR in increasing the exposure to authentic language and contexts for language learners (Dobrova et al., 2017; Popova & Nenasheva, 2016; Wang et al., 2017). To minimise the challenge of foreign language learning in contexts where there is a lack of exposure to authentic environments, VR is a promising tool to create real situational interactions or virtual communities to unite conversation partners in a virtual learning environment (Dobrova et al., 2017), simulate realistic scenarios to immerse learners in learning contexts (Wang et al., 2017), and enable language learners to communicate synchronously and asynchronously with native speakers (Popova & Nenasheva, 2016).

2.3. The synergy of TBLT and VR technology

Various studies have recently pointed to the reciprocal benefits of the combination of TBLT and technology (Chapelle & Sauro, 2017; González-Lloret & Ortega, 2014a; Thomas & Reinders, 2010). TBLT can be potentially enriched by the infusion of technology, while technology can become uniquely useful for language learning when used in conjunction with TBLT (González-Lloret & Ortega, 2014b). In other words, technology can enhance the benefits of TBLT, while TBLT serves as a framework to conduct research with technology (Ziegler, 2016). Technology-mediated tasks, the outcome of the synergy, can help minimise students'

fear of failure, raise their motivation, promote their creativity, enable them to meet other speakers in different locations, and increase exposure to authentic language environments and cultures (González-Lloret & Ortega, 2014b).

Among emerging technologies, VR has potential benefits to facilitate authentic learning, as discussed above. The advantages of TBLT and the affordances of VR mobile technology suggest that the synergy of the two has the potential to enhance and augment authenticity in language learning for EFL learners. Teaching methods and technology have an interrelated relationship that may support the active participation of students in the learning process, which has been recently found to be more effective in VR (Klingenberg et al., 2020).

As revealed from the literature review, VR has been used in various ways to support the learning of different language skills and language aspects. However, there is a lack of empirical research providing insight into the specific use of VR to facilitate authentic learning in EFL contexts. Despite the largely common use of TBLT approach in language teaching, little is known about the integration of this immersive technology tool in a task-based language learning approach with the aim to facilitate authentic learning. Hence, this study was conducted to explore the affordances of VR-integrated tasks in enhancing authentic learning for EFL students at the tertiary level. The following section discusses a theoretical framework of authentic learning and explains the reasons why it was selected for this study.

2.4. Theoretical framework of the study

Since TBLT has been increasingly implemented in technology-mediated learning environments, researchers have agreed that it is time to broaden the conceptualisation of “tasks” and allow for the possibility of freer and less structured tasks (Lai & Li, 2011; Ortega, 2009). The traditional definitions of tasks (Ellis, 2003; Long, 1985; Nunan, 1989; Skehan, 1998) emphasise the psycholinguistic approach of language learning, but this dominant focus on the linguistic aspect has been called into question when TBLT is applied in technology-enhanced language learning contexts (Lai & Li, 2011; Ortega, 2009). Although the definitions of tasks by Long (1985) and Ellis (2003) refer to the real-world relevance of tasks, they do not provide a specific framework to achieve authenticity of tasks, particularly tasks integrated with technology.

Given the challenges associated with the concept of tasks and task authenticity when integrated with technologies, we found the framework of authentic tasks designed by Herrington et al. (2010) the most suitable to characterise authentic tasks integrated with digital technology with its ten attributes as follows:

1. Authentic tasks have real-world relevance.
2. Authentic tasks are ill-defined, requiring students to define the tasks and sub-tasks needed to complete the activity.
3. Authentic tasks comprise complex tasks to be investigated by students over a sustained period of time.
4. Authentic tasks provide the opportunity for students to examine the task from different perspectives, using a variety of resources.
5. Authentic tasks provide the opportunity to collaborate.
6. Authentic tasks provide the opportunity to reflect.
7. Authentic tasks can be integrated and applied across different subject areas and lead beyond domain-specific outcomes.
8. Authentic tasks are seamlessly integrated with assessment.
9. Authentic tasks create polished products valuable in their own right rather than as preparation for something else.
10. Authentic tasks allow competing solutions and diversity of outcomes.

(Herrington et al., 2010)

This framework has been used to investigate authentic learning environments with different technologies in a range of educational contexts, such as web-based learning of English as a foreign language (Ozverir et al., 2016; Ozverir et al., 2017), or authentic mobile learning in higher education (Chiu et al., 2018). Pedagogically, these ten attributes align with methodological principles of TBLT in distant learning of less commonly taught languages by Doughty and Long (2003) in the way that it uses task – not text – as the unit of analysis and promotes learning by doing, collaborating, reflecting, and obtaining rich input from a variety of resources. Compared with the definition of tasks and criterial features of a task by Ellis (2003), the authentic tasks model by Herrington et al. (2010) not only covers the main elements of tasks such as a “work plan” (Ellis, 2003) with complex task sequences, clear goals and outcomes, students’ active roles, and real-world processes, but also adds more specific details of authentic tasks in technology-enhanced learning environments, such as task complexity, authentic assessment, reflection, polished products, and diverse outcomes. Most importantly, underpinned in the situated learning theory, the model places emphasis on task authenticity, which is also an important element of TBLT (Ellis, 2003). For all reasons discussed above, this framework was selected to evaluate the use of VR in facilitating authentic tasks in language learning with technology.

3. Methodology

3.1. Research design

The study adopted a qualitative research design to investigate students' perspectives on the use of VR-integrated tasks to support authentic learning based on their lived experience of using VR in EFL learning. Qualitative research allows researchers to focus on participants' meanings of a topic and develop a holistic picture of the problem from multiple perspectives of the participants (Creswell & Poth, 2018). Qualitative research also enables researchers to collaborate with participants interactively and use both deductive and inductive reasoning to develop patterns and themes (Creswell & Poth, 2018). This study aimed to understand EFL students' perceptions of their experience of using VR in TBLT and accordingly interpret the affordances of VR-integrated tasks in facilitating authentic learning. Therefore, a qualitative research design was suitable to seek the answer to the research question of the study.

3.2. Participants

Participants were 24 EFL students enrolled in an undergraduate language program at a public university in Vietnam. Participants were recruited on a volunteer basis, and consent was given before data were collected. Ethics was approved by the Human Research Ethics Committee at an Australian university.

3.3. Procedure

In order to examine the potential of VR affordances to facilitate authentic tasks in EFL learning, participants were invited to take part in a VR technology trial over a semester before they were interviewed about their lived experience of the phenomenon.

Google Expeditions was selected to be used in the VR technology trial. It was a free VR application developed by Google for educational purposes. The VR technology trial followed the existing syllabus of the course that participants were taking. Based on the syllabus, the VR trial activities were designed to provide students with supplementary opportunities to be exposed to the target language. It focused on extending the decontextualised activities in the textbook with VR tours from Google Expeditions. Table 1 shows an example of the textbook activity, which was extended with a VR-integrated task.

Table 1. A sample VR-integrated task

Textbook activity	VR-integrated task
<p>Work in groups. Compare humans and technology. Think of two more advantages or disadvantages for each.</p> <p>(Unit 8 – Technology, adapted from Hughes et al. (2015))</p>	<p>Pre-task: Students downloaded suggested Google Expeditions VR tours about robots and technology to their phones. They experienced the tours and noted down the ideas they learned from the tours.</p> <p>Task: Students formed groups and performed the discussion tasks in the textbook using the ideas they learned from the VR tours.</p> <p>Post-task: The teacher gave corrective feedback on students’ use of language. Students shared their feelings about experiencing the VR tours.</p>

The VR-integrated tasks ranged from simple to complex ones. The simple ones included tasks to explore the selected VR tours related to the textbook topics for discussion. More challenging tasks required students to deliver PowerPoint presentations or poster presentations based on their VR explorations. The most challenging task required students to create their own VR tours, which were then synced into the Google Expeditions mobile application.

3.4. Data collection and analysis

Interviews were the main data collection instrument of the study. They were designed with a semi-structure and conducted face-to-face with individual participants. Observation was also used as a secondary data source to supplement the interview findings. At the end of the trial, 18 students were selected on a volunteer basis for individual face-to-face interviews. The interview questions were designed based on the ten attributes of authentic tasks by Herrington et al. (2010).

A hybrid approach to interview data analysis was used, which began with a deductive or theory-driven coding system (Boyatzis, 1998). With the support of NVivo, the deductive approach was used first with ten attributes of authentic tasks (Herrington et al., 2010), forming the pre-determined themes as described by the theoretical framework of the paper. Initial codes were drawn from these pre-determined themes. An inductive approach was also used to identify the sub-themes under each pre-determined theme. This approach helped to reveal unanticipated and emerging themes/subthemes from the raw data and to avoid missing valuable findings. Evidence of themes, subthemes, patterns, and unexpected evidence beyond the pre-determined

themes within the data were then identified and counted for frequencies and consistencies. Coded data were then put into hierarchies and further analysed. Figure 1 is a screenshot of the NVivo analysis, illustrating the pre-determined themes based on the selected framework and the subthemes that emerged from the data analysis.

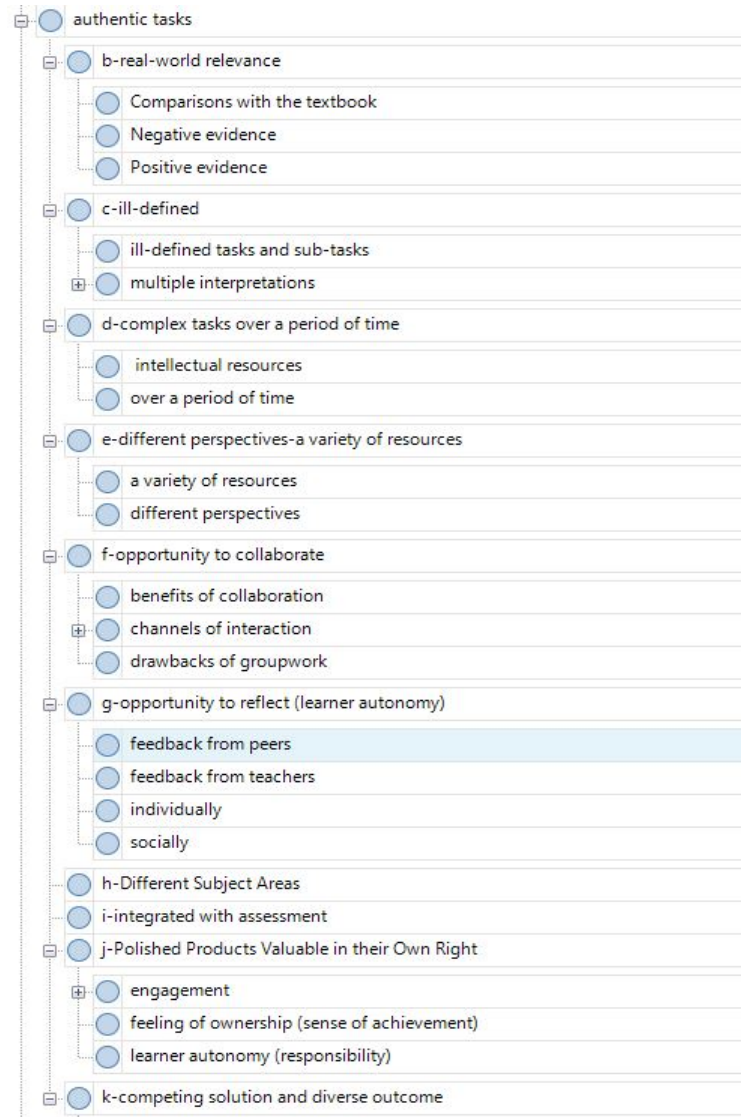


Figure 1. Themes and subthemes emerging from the data analysis

Observation notes were also used to support the analysis of the interview data in order to avoid any missing phenomena or factors happening during the technology trial.

4. Findings

The interview analysis revealed strong evidence of the support of VR to enhance authentic tasks derived from the framework by Herrington et al. (2010). The frequency of the patterns occurring in the ten pre-determined themes is presented in Table 2.

Table 2. Frequency of patterns occurring in attributes of authentic tasks

Attributes of authentic tasks	No. of participants	No. of NVivo references
1. Real-world relevance	18	107
2. Ill-defined tasks	18	63
3. Complex tasks	18	50
4. Different perspectives, using a variety of resources	17	93
5. Opportunity to collaborate	18	99
6. Opportunity to reflect	18	105
7. Different subject areas	15	30
8. Seamlessly integrated with assessment	3	5
9. Polished products	18	172
10. Competing solutions and diversity of outcomes	12	50

Out of these ten attributes, most of them were found to have been facilitated by VR technology. The attribute least supported by VR was *authentic assessment*. Due to the word limit, the following sections present major findings on seven attributes of the framework, namely Attribute #1 – Real world relevance, Attribute #4 – Different perspectives and a variety of resources, Attribute #5 – Opportunity to collaborate, Attribute #6 – Opportunity to reflect, Attribute #9 – Polished products, Attribute # 10 – Diversity of outcomes, and Attribute #8 – Authentic assessments.

4.1. Real-world relevance (Attribute #1)

Regarding the attribute of *real-world relevance*, the evidence emerged via the perceived authentic contexts brought about by the VR application and students' immersion in these perceived authentic contexts. First, foreign language learning tasks were perceived to be more authentic and life-like than the textbook tasks due to the add-on supplementary materials multimodally represented within the 360-degree environment. Students commented on the perceived authenticity that the VR application brought to them as being “so real”, “lively”, “genuine”, “direct”, “magnificent”, “magical”, or “triggering all senses”.

The multi-sensory language materials were reported to be the main reason for perceiving the VR contexts as authentic. For example, one student pointed out that she could watch, listen, and read at the same time within the VR tours thanks to its multi-sensory input, which was impossible with the textbook:

I can only listen when it comes to the listening part in the textbook... However, in the VR tours, I can watch, listen, read and know more vocabulary at the same time ... I can listen directly while I am watching the VR images. It evokes all my senses like in real life.

In addition to the real-life panoramic 360-degree view, participants reported two technical affordances of the VR application that added an extra dimension to the multi-sensory language materials. These affordances were the *guide* and *point of interest* function. The *guide* function allowed the presenter to lead participants to certain VR scenes or points within a VR tour, and the *point of interest* highlighted interesting locations on a VR scene. These two functions helped the VR viewers to move around with guided purposes, collaborate with others, or interact with texts in the VR environment. These functions assisted participants in learning the language in an interactive way.

In addition to the perceived authentic contexts, participants reported a strong sense of real-world connection from their immersion in the VR learning environment. For example, students reported being immersed in the 360-degree virtual environment when they put the VR headsets on. The lesson became a “tour or a field trip” to them while they could walk around experiencing the VR scenes.

I felt like I was there. It was so real. I felt like I was a local, and I spoke a little bit more naturally because I was in there, among them. It was hard to describe.

In an EFL learning class, the feeling like a *local* is very important to language learning because it gave students the impetus to produce language more naturally.

4.2. Different perspectives and a variety of resources (Attribute #4)

The analysis indicated that the VR application provided students with different perspectives and a variety of resources to complete the textbook tasks. Google Expeditions application covered a wide range of topics with various content. At the time of the technology trial, there were nearly 1000 360-degree expeditions distributed in some major themes, including Arts & Culture, Landscapes, Science, Environment, The World Today, Careers, Colleges, and AAPI Month (i.e., Asian American Pacific Islander Heritage Month). Each tour comprised five to nine scenes, each of which covered a subtopic of the tour. Therefore, it can be said that the application itself was a huge language resource for the students.

There was less information in the textbook, particularly topics related to technology and animals.

The VR tours supplemented us with more information, so we learned more vocabulary.

In addition, the VR application added additional perspectives to the same topic presented in the textbook. All of the related VR tours were produced by different authors, telling different stories about the same topic. Therefore, students could investigate the topics from different points of view and varying language input on the same theme. An example of this is illustrated in the tasks about nature exploration. After experiencing the VR tours about nature, students had a range of different approaches to the topic and designed different presentations. One commented she felt like a biologist “exploring things and places that I have never known or been there before”. This was a new experience to the student, which was impossible to experience in real life or from the textbook. As a result, he was highly engaged in exploring the VR tour to complete the task.

4.3. Opportunity to collaborate (Attribute #5)

The findings of the study showed that students had numerous opportunities to work in groups in VR-mediated tasks, and, more importantly, they strongly perceived the incentive structure for group performance. The first perceived reward of collaboration was mutual support in completing sub-tasks based on each person’s strength. For example, those who had good technology skills were responsible for technical tasks like creating 360-degree images and merging each person’s scene (including scene narration and audio) into one complete VR tour. Those with higher-level English competence were in charge of editing the written texts and helping others to rehearse for the narration recordings. Students were able to collaborate to finish these sub-tasks on a VR tour-creating platform before they could view their group products on Google Expeditions.

4.4. Opportunity to reflect (Attribute #6)

Students reported that they had numerous opportunities to reflect on their learning. Via collaboration on VR-integrated tasks, students could re-evaluate their learning experiences with peer feedback and teacher feedback:

When we made mistakes, we helped each other to correct them. Whoever recognised the mistake would correct it immediately. For example, we corrected our pronunciation while rehearsing the presentation or our notes for the narration.

The reflection process was also evident in students' comparison of their language use with the expert performance demonstrated in VR tours. During the VR tours, they paid attention to the audio narration, echoing the narrating voice to practise intonation or replaying the VR tours made by professional designers to check the pronunciation of the vocabulary. Many of them mimicked the voice in the application and imitated the intonation, pausing, and stress patterns. One commented that he realised many of his pronunciation errors from experiencing the VR tours.

In addition, the VR technology enabled students to download VR tours to their own devices. This helped them to digitally store and revisit the learning materials anytime and anywhere. This affordance supported the reflection process in the way that it helped them access the expert performance easily.

4.5. Polished products (Attribute #9)

In the current study, students' learning outcomes were polished as a result of time and intellectual investment, collaboration, and ongoing reflection. All students reported that they invested a large amount of time and great intellectual effort in completing tasks. Notably, the willingness to invest a lot of time, energy, and intellectual effort in the VR-mediated tasks revealed great enjoyment and engagement in task completion. One student commented that she was so engaged in the VR tasks that she almost lost her sense of time. Unlike taking notes during lectures or learning new knowledge by heart, she had more motivation to learn English. She could continue to learn for hours without getting bored.

In addition, students expressed their feelings of ownership plus achievement, which all resulted from the efforts to produce polished task products in their own right. Students reported their strong feelings of ownership and achievement when they completed the tasks as a whole product for the sake of their own learning process but not for anything else.

It feels like triumph. I was so happy to have one [VR tour] of my own. I couldn't believe it. Some weeks ago, I said "they are super!". Now I say, "I'm super!" to myself.

This was a typical feeling shared by other students when they finished creating and uploading their VR tours on Google Expeditions. Figure 2 shows a screenshot of student-generated VR tours – a complicated task that they all completed for their first time with the VR technology. This was the evidence of their learning outcomes as a combination of language practice and other skills needed for the VR production.

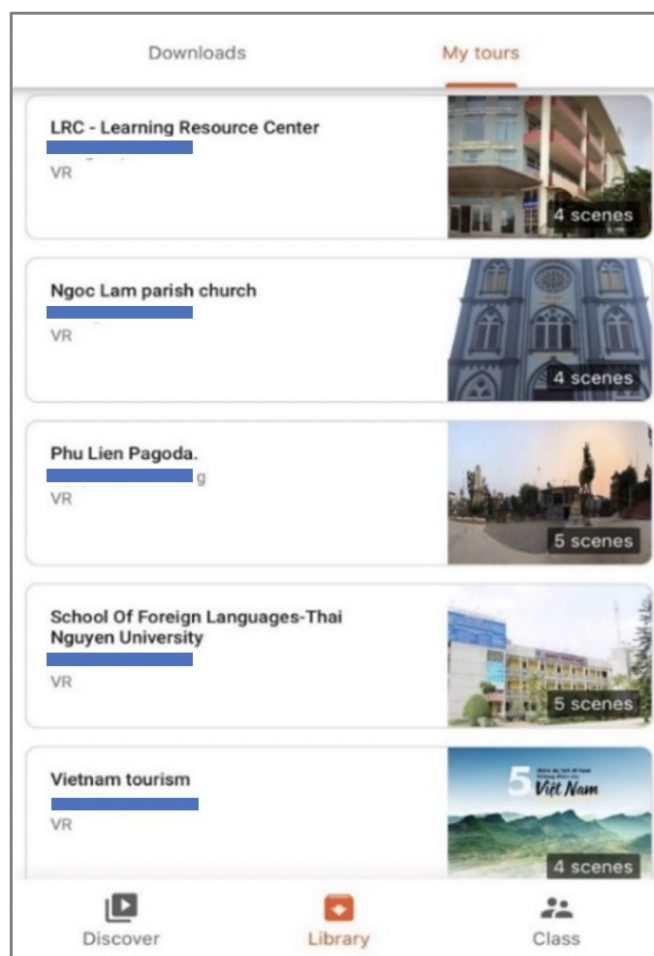


Figure 2. VR tours designed by students

4.6. Diversity of outcomes (Attribute #10)

There was strong evidence of the diversity of students' task products and performances characterized by students' multiple interpretations of tasks. For example, in the VR design task, one group introduced a church, another one a Buddhism pagoda, yet another one a Resource Learning Centre within their institution, while one virtualised their own school (Figure 2). Each student-generated VR tour consisted of four to five scenes, and each student was in charge of at least one scene. They all contributed to the process of creating the VR tours, leaving their digital footprints and identities in language use and product presentation.

Observations of VR tours designed by students revealed the diversity not only in the topic content but also in visual and technical presentation. For example, in the VR tour introducing students' institutions, students captured important images and information about popular places on campus like the administration building, the lecture halls, the dormitory, and the sports facilities. They even added some points of interest on the scene, a technical feature that some other groups could not do, as shown in Figure 3.



Figure 3. Points of interest in a VR tour designed by students

4.7. Authentic assessment (Attribute #8)

The attribute that was least supported by VR was *authentic assessment*. In this study, no traditional standardised assessment was used. Instead, students were all assessed based on their performances or task products. Students were effective performers, and direct examination of student performance was conducted. However, as observed, the VR affordances were not used as digital assessment tools. Authentic assessment was seamlessly integrated as a result of the teacher's assessment techniques but not strongly supported by the affordances of the VR technology in this study. The affordances of the VR application were not technically used to support real-life assessment to the full.

5. Discussion

The study revealed that VR-integrated tasks had the strong potential to facilitate authentic learning. The participants of the current study reported their perception of authentic contexts with multi-sensory input and their immersion in those perceived authentic contexts. This finding of real-world relevance facilitated by VR technology is consistent with findings from previous studies using immersive or non-immersive VR in language and culture learning (Shih, 2015; Xie et al., 2019). Early work by Herrington et al. (2003) and Herrington et al. (2007) also suggested that cognitive realism – the immersion of learners in engaging tasks – is more important than the real-life likeness of the learning design. The finding of the current study

indicated that VR, when integrated into task-based language teaching and learning, had the potential to create real-world relevance to support authentic learning in EFL contexts.

The study findings revealed significant evidence of students' perceptions about the support of VR in learning reflection. VR enabled students to revisit their digital products anytime and anywhere, share them with their peers, and consequently reflect on their learning experiences. These findings support those related to mobile affordances in general, which enabled students to create their own digital content, share it, and discuss it with their peers (Shadiev et al., 2017). In addition to these common affordances, VR allowed students to access expert performances (Herrington et al., 2010), which was important for reflection in language learning.

The findings related to a variety of resources, different perspectives, and diversity of outcomes are not unique in this study. A number of previous studies have realised the affordances of technologies in providing learners with access to rich media, resource connectivity, resource collections, and tools for the construction of knowledge representations (Howland et al., 2012; McQuiggan et al., 2015). However, different from other technologies, VR allowed students to obtain a real-life panoramic view of places they could not visit in real life and experience the perspectives of the persons who provided these VR tours. This adds to the authenticity of learning contexts for EFL students who may not have the opportunity to be exposed to the real-life materials or cultures of the language they are learning.

The findings of the study revealed that students not only invested an enormous amount of time in their tasks but also perceived time differently. They were so engaged in their tasks that they lost their sense of time, as reported by a number of students. This finding was in line with those of studies related to flow experience with emerging technology like augmented reality (for example, Bressler and Bodzin, 2016). This study added another possibility of VR in creating flow experience for learners in a foreign language learning context.

VR appeared to at least support authentic assessment in the framework of authentic tasks in this study. It can be argued that whether the assessment was authentic or not depends a lot on the teacher. Even though using VR technology for assessing was a possible option, it depends on whether the teacher uses it for assessment or not. This finding further supports the assertion by Herrington and Herrington (2006), which sees the neglected alignment between an authentic task and its assessment and the common teacher-driven role in assessment in higher education. Another possible reason was the unfamiliarity with using VR technology in assessment that hindered the teacher from making the assessment role more authentic.

The findings of the study suggested that one attribute in the authentic task model by Herrington et al. (2010) could be modified to make it more specifically applicable and appropriate for technology-mediated tasks in EFL learning. This model was once extended in another study with EFL students in online learning (Ozverir et al., 2016). In that study, motivation was added to the model as an additional attribute of authentic tasks. However, the current study revealed that motivation was found to be inherent in many of the existing attributes. Therefore, it was not relevant to make it a separate attribute. Unlike the study by Ozverir et al. (2016), the current study revealed important evidence related to EFL learning that may help to extend the attribute *real-world relevance*. First, the feature of real-world relevance was perceived by the participants to be authentic contexts with multi-sensory materials that the VR-integrated tasks provided. This represented the use of language in simulated real-life contexts with exposure to multi-sensory materials. Participants were immersed in the VR environment and engaged in language learning activities integrated with VR. In addition, tasks for EFL learners need to involve processes of language use and any of the four language skills in the TBLT approach (Ellis, 2003). However, the language element does not specifically feature in the adopted model. Hence, the study suggested expanding the attribute of *real-world relevance* to include real-world processes of language use as presented in the definition of tasks by Ellis (2003) and authentic contexts and authentic language input as revealed in the study. The suggested extension of the attribute is as follows:

Authentic tasks have real-world relevance: Activities match as nearly as possible the real-world tasks of professionals in practice rather than decontextualised or classroom-based tasks. Tasks provide authentic language input and authentic contexts which involve real-world processes of language use.

6. Limitations and suggestions

Regarding the implementation process, compelling evidence of VR support in achieving authentic learning emerged from exploring participants' perspectives. The study did not aim to statistically compare the achievement of each attribute with one another. This can be an open direction for future studies to statistically quantify the evidence of the technology support in each attribute in the authentic task framework. Regarding limited findings in authentic assessment, future studies may need to consider selecting more appropriate technologies or designing relevant assessment methods which involve the technology itself or real audience in assessing students' work.

7. Implications and conclusion

The study indicated that VR mobile technology had a strong possibility to support authentic tasks, covering almost all elements in the continuum of authentic tasks proposed by Herrington et al. (2010). EFL students had numerous opportunities to learn the language in simulated authentic environments, real-world collaboration, and real-world materials via completing VR-integrated tasks. What should be noted is that the VR technology used in this study is a free VR mobile application and requires a low-cost VR viewing device like a Google Cardboard, which is affordable to a majority of students and teachers in comparison to expensive high-immersion VR devices. The study findings should encourage both administrators and educators to consider integrating VR in developing syllabi or designing authentic tasks for students. Teachers may consider using VR inside and/or outside the classroom to provide students with an alternative to real-life contexts. Students can also expose themselves to multi-sensory language learning materials in VR environments with free or low-cost VR applications with their own devices. Findings from the study strengthened the point that future research on technology in education should consider the affordances of VR in language education in general and EFL learning in particular.

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LARGE LANGUAGE MODEL-BASED ARTIFICIAL INTELLIGENCE IN THE LANGUAGE CLASSROOM: PRACTICAL IDEAS FOR TEACHING

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Abstract

Large Language Models (LLMs) are a powerful type of Artificial Intelligence (AI) that simulates how humans organize language and are able to interpret, predict, and generate text. This allows for contextual understanding of natural human language which enables the LLM to understand conversational human input and respond in a natural manner. Recent examples of this, such as the Generative Pre-Trained Transformer (GPT) model, popularized by OpenAI's web application, ChatGPT, are able to complete an astounding variety of tasks when provided with simple language input. For education, LLMs can alleviate teacher curriculum and grading workloads and even perform specific tasks such as generating creative ideas for activities. Specifically for language learning, LLMs can draw on their immense corpus of language content to generate learner-centric materials to aid teachers in delivering targeted, personalized language instruction. The aim of this paper is to provide the reader with examples of how LLMs can be utilized for materials development, classroom activities, and providing feedback. After giving specific examples and explanations, the paper will conclude with a discussion of how this technology can provide teachers with new innovative ways to streamline the teaching process to focus on learner needs.

Keywords: ChatGPT; Artificial Intelligence; Large Language Models; language education; CALL

1. Introduction

Artificial Intelligence (AI) is a concept that educators should already be aware of and many may be interested in knowing how it will affect their jobs in the future (Marche, 2022). Many schools and universities have already taken advantage of Educational Data Mining, a tool that uses AI to process massive volumes of data to better understand students and the context in which they learn. It has been used to analyze the class attendance and assignment submissions of entire institutions

and provide support to students at risk of dropping out of school (Tsai et al., 2020). Numerous papers have also been written about its eventual role in helping teachers with curriculum planning, grading, student management, and more (Pokrivackova, 2019; Settles et al., 2020). AI has even been utilized in creating intelligent tutoring systems (ITS) that support students by providing personalized feedback and guidance (Kochmar et al., 2022). Shukla et al. (2019) remark that their ITS system was “not only capable of providing immediate intelligibility assessment, but also tracking the learner’s experience, which in long term can aid in improving the retention of the learning” (p. 64).

Within the field of foreign language learning, AI-powered tools have assisted students in accomplishing more with increasingly capable natural language processing and contextual understanding in conversation (Lu, 2018). AI tools such as Intelligent Personal Assistants (IPAs), including Amazon Alexa, Google Assistant, or Apple Siri, can understand various accents and interpret meaning from non-standard language production (Moussalli & Cardoso, 2020). This has allowed for their use in creative activities where students create and interact with their own personalized voice recognition systems used as tour guides (Frazier et al., 2020). Similarly, AI conversation partners have also been used in creative language learning activities (Cai et al., 2021, Fryer et al., 2017). Machine Translation (MT), using AI services such as Google Translate and DeepL, has long been evaluated for its affordances for language learning (Deng & Yu, 2022; Lee, 2019). Briggs (2018) revealed that most students use MT tools in their education, even if they are aware of their accuracy limitations. Lee (2019) investigated the use of MT in writing and showed that MT assisted students in decreasing the number of lexical and grammatical errors present in their work while improving their overall revision skills. Commercial applications such as Grammarly have also used the affordances of AI to assist language learners in improving the output of their foreign language writing.

However, a new kind of AI, Large Language Models (LLMs), has emerged as perhaps the most powerful tool that is affecting language teaching and learning today. LLMs have been trained on billions of human-generated texts that allows them to predict the next word in a given sequence, allowing it to generate coherent and contextually appropriate text. The ability of LLMs to interpret human written requests and predict and generate a natural human-like response, like student essays, has led many media outlets and educational institutions to predict enormous changes to existing educational paradigms (Roose, 2023; Gillani, 2023).

This paper will introduce the power and current affordances of LLMs and explore how they can reduce the amount of time teachers spend on classroom preparation and student feedback. For this paper, we utilized OpenAI’s ChatGPT (<https://chat.openai.com/>), but the principles

shared here could be applied to any LLM service. ChatGPT is a service where once users have created an account they are presented with a text input field. Users can then write *prompts* for the AI to complete using its LLM, called Generative Pre-Trained Transformer (GPT). Prompts can be written in natural, conversational language posed either as a question or incomplete statement, which ChatGPT will attempt to answer or complete. ChatGPT also features a built-in memory allowing users and the AI to reference previous parts of the conversation.

Prior to the release of ChatGPT, OpenAI's GPT Playground (<https://platform.openai.com/playground/>) was available in closed beta (see Figure 1). Over the course of 2020 and 2021, we investigated applying this technology to education by generating ideas for its potential use and creating textual prompts. These prompts were submitted to the AI and then the generated responses were evaluated for reliability and validity. Some of these prompts underwent numerous iterations and adjustments before the AI could generate accurate and useful responses consistently. The release of ChatGPT in late 2022 greatly simplified the way that humans can interact with LLMs, removing many of the barriers that prevented this technology from being used by the general public (see Figure 2). Using ChatGPT, we were able to simplify our workflow previously used in OpenAI's GPT Playground and use ChatGPT to complete the following tasks: *Summarize and level texts for learners, Automatically correct grammar and sentence mechanics, Compose narrative writing prompts, Create presentation notes, Generate lesson ideas and Level texts for testing or reading practices*. However, before we can understand how the AI accomplished this and provide details about how teachers can take advantage of these capabilities, we must first understand what AI really is, what LLMs are, and how they function in the context of being a teaching and learning aid.

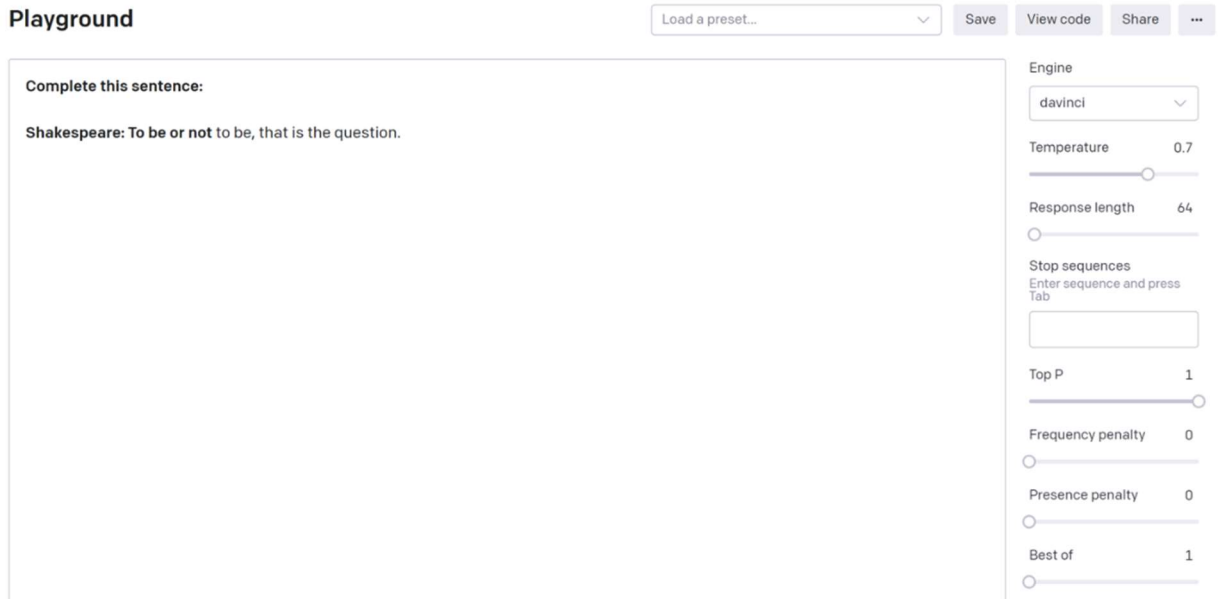


Figure 1. OpenAI's Playground command console

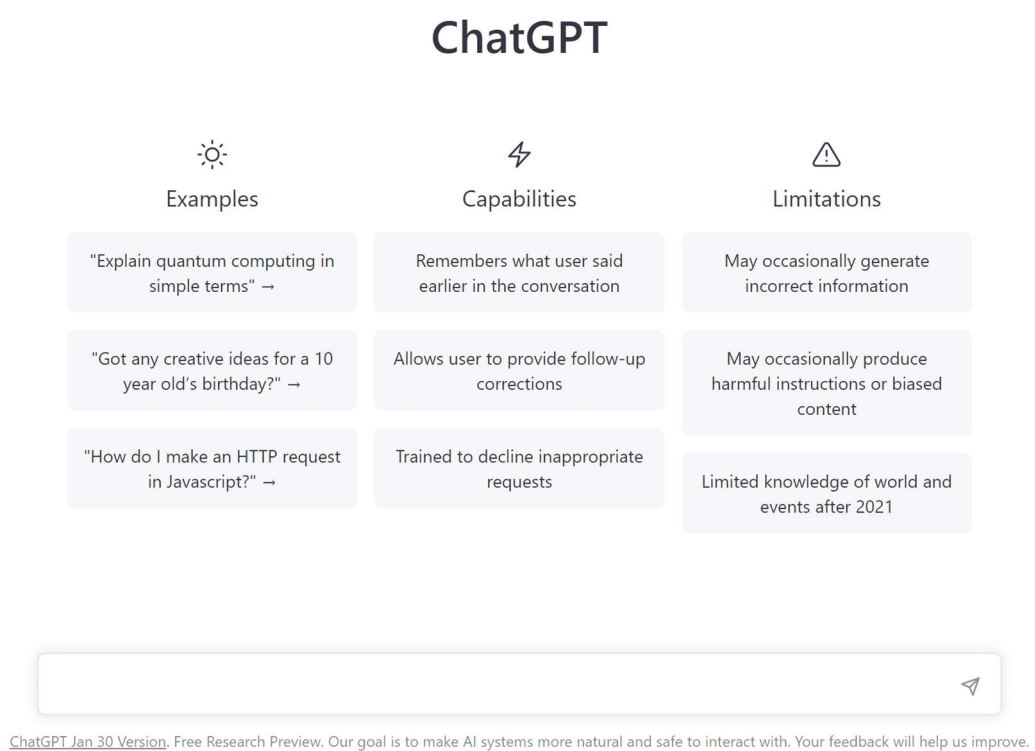


Figure 2. OpenAI's ChatGPT interface

2. Literature review

2.1. Thinking Machines

Alan Turing, the famous British computer scientist attributed as the father of computing and artificial intelligence, once stated in his seminal paper, “Computing Machinery and Intelligence,” that by the end of the 20th century, there would be no controversy in stating “that one will be able to speak of machines thinking without expecting to be contradicted” (Turing, 1950, p. 442). Nowadays, we offload an enormous amount of “thinking power” onto computers. Everything from calculating taxes through a smartphone calculator to using warehouses of supercomputers to calculate global weather patterns is a kind of computational thinking.

Turing, in addition to believing that computers could think, also felt that computers would ultimately start to think in the same way as humans, to the point where the difference between talking with a human or with a computer becomes indistinguishable. This type of thinking, one that mimics aspects of human intelligence and behavioral traits, is called Artificial Intelligence (AI). Distinct from the thought process used to calculate taxes or weather patterns, AI attempts to understand an aspect of human interaction and mimic it as best it can. In our everyday lives, AI is increasingly prevalent: Intelligent Personal Assistants (IPAs) listen to our speech and fulfill our requests and Automated Driving Systems (ADS) use cameras and sensors to process data about the driving environment to safely navigate to a destination.

2.2. Machine Learning

Modern AI, like those found in IPAs or in ADSs, is made possible by machine learning. Machine learning helps AIs improve their intelligence and performance by processing incredibly large amounts of data and being trained to identify patterns. As Holmes et al. (2019) state, “machine learning may be considered a three-step process (analyze data, build a model, undertake an action) that is continuously iterated (the outcomes of the action generate new data, which in turn amends the model, which in turn causes a new action). It is in this sense that the machine is learning” (p. 18). Over time, an AI becomes very adept at identifying patterns correctly, whether it is an IPA transcribing speech in a crowded environment, or an ADS identifying a stop sign while driving.

In education, machine learning AI services such as *Amazon Web Services* offer machine learning educational systems to institutions and claim to “spot struggling students earlier and take action to improve success and retention” (Machine Learning in Education, 2021). In foreign language education, machine learning has already been used to a great effect in automatic language translation (Niño, 2020). The Google Translate app can aid in automatic translation

merely by pointing a smartphone camera at a foreign language sign and translating it in a way that visually matches the fonts and colors of the original image (see Figure 3).



Figure 3. Google Translate

Recent research points to even greater possibilities in the near future. A publication by Google Research and the Indian Institute of Technology Kharagpur (Lahiri et al., 2021) focuses on automatically dubbing videos into additional languages. The AI not only provides an audio track in another language but crafts a voice that mimics the vocal character of the original speaker and modifies the video image so that mouth movements match the new language audio stream. This technology will likely be integrated into streaming platforms like YouTube, providing the same content in multiple languages without human input. This, of course, provides additional support for language learning by making authentic content more accessible.

2.3. Large Language Models

Finally, we arrive at neural networks, a method of machine learning that has great promise and potential for teaching and learning. Generally speaking, machine learning AIs train with vast amounts of data, stored in categories, and tagged with content features very logically. Neural networks, on the other hand, organize this training data in a much more human-like fashion, categorizing information not only by its features but also by its relationship with other information. Neural networks, as suggested by the word “neural”, organize information by the same principles we believe the human brain is organized, as a vast mesh network of connections. The human brain is made up of billions of neurons, all interconnected, and it is through the combination and strengthening of these connections that memories are formed and learning takes

place (Holmes et al., 2019). Hence, a neural network is able to naturally form contextual relationships among immense amounts of information. Large Language Models (LLMs), a kind of neural network, are able to interpret natural human input by drawing from their own human-like memory, searching for the topic and related topics that best apply. If an LLM were to be asked to write an email to one's boss about getting time off from work, it would create a template drawn from its own understanding of an email's common features, then add its own creative sentences and key components derived from what it knows of human requests, polite interactions, and work culture.

The ability of LLMs to accomplish complex context-dependent tasks that previously, no matter how banal, needed a human touch is arguably their greatest asset. LLMs allow for the offloading of more mundane tasks (Pokrivcakova, 2019), allowing humans to focus on the social, creative aspects of work. Good instructional design starts by identifying learners' needs and knowledge deficiencies, organizing this information, and designing learning experiences for the students (Brown & Green, 2019). When education is tailor-made for the learner, it is most effective; but due to temporal, budgetary, or practical constraints, education is often relegated to assembly-line, cookie-cutter style approaches. If educators could overcome the hurdles mentioned above, educational quality would inevitably rise, as "by customizing the content of every student's curriculum, each student's learning could be optimized to help them in areas where they need it the most" (Arslan et al., 2021, p. 35). However, these hurdles are not that easily vaulted, as pursuing individualized education would necessitate exponentially increasing the teacher workforce to deal with this demanding task. Here is where LLMs can turn an impossibility into a reality. They can support the teacher by processing vast amounts of information about the students and their learning process, then use this information to support the creation of adaptive learning environments that are catered to the needs of individual learners.

3. Practical applications for teaching and learning

Before going into each example use case of an LLM, it is important to understand how they receive and process input and generate output. Typically, computer programs receive instructions written in a language that is designed to be read by machines and not humans. This is not the case for LLMs. Services based on LLMs are designed to understand and process the same kind of instructions that a human would give to another human. Therefore, in order to have a service like ChatGPT generate a desired response, users need to provide the LLM with enough information for it to pick up on the context and continue to develop it. This also helps avoid

issues with LLMs, which are prone to faking information when their neural network database does not contain a clear answer (Summers, 2023).

The following section provides practical ideas for using ChatGPT to support teachers with their lesson preparation and student feedback. Each of the following examples will provide background information, provide a prompt to be submitted to ChatGPT, an example response, and an analysis of the output. These prompts can be modified to meet a teacher's particular learning context and need. Due to the nature of LLMs, everytime a prompt is submitted, there will be some variation in the response provided. Therefore, teachers are encouraged to submit the prompt multiple times and pick the response that is best for them.

3.1. Summarizing text in level appropriate language

The ability to summarize a text is often a skill practiced in a language learning context. LLMs are able to quickly and efficiently do this task to give learners not only a model of a well-written summary, but also provide learners with level-appropriate text.

Table 1. Example of summarizing text in level-appropriate language

Input
<p>My CEFR A2 student asked me what this passage means:</p> <p>Online options in higher education have expanded at an increasing rate over the last 10 years, from entirely online courses, to hybrid courses, to the greater prevalence of online components in traditional in-person courses. This growing trend will increase opportunities for non-traditional students to meet their educational needs (Nakamura, 2017), but at what cost to the quality of that education? How can institutions transition or modify materials to online settings, possibly toward a hybridized environment? In an effort to determine the efficacy of entirely online lessons vs. in-person lessons in the language-teaching field, this study gathered information from approximately 180 learners in a language-focused university in Japan about their perceptions of language learning in both online & traditional settings. The study aimed to establish whether online, asynchronous versions of core curricula, integrated with in-person lessons, could offer comparable educational value. The findings suggest that although online lessons were viewed mostly positively overall, they were not deemed as valuable as the traditional in-class format. Increasing opportunities to interact in an online language learning environment seems to be an important consideration.</p> <p>I summarized it for him, in plain language a CEFR A2 can understand:</p>

Output (AI response)

People have started studying online more in the last 10 years, and there are different types of online classes. Some classes are all online, some are a mix of online and in-person, and some have online parts added to regular in-person classes. This is good for some students, but people are worried about the quality of education. A study was done to compare online language classes to in-person language classes. The study found that online classes were liked, but not as good as in-person classes. To make online classes better, students need more chances to talk with others online.

As the example above shows, the AI is able to break down an academic abstract into an easily digestible text for learners at a particular level, in this case, CEFR A2. When asking for a summary, one must be very specific about the level of text they wish the AI to produce. Specific educational level terminology must be used in order to extract accurate level-appropriate summaries (e.g., 2nd grader, 12th grader, CEFR A2, TOEFL 500). This capability of the AI could also be used to check student summarization skills by comparing their summaries to what the AI generates.

3.2. Correcting grammar and mechanics

One of the most menial, time-consuming tasks of language teaching is correction of grammar mistakes. Grammar corrections are rule-based, basically binary in nature, either right or wrong; therefore the perfect target for correction by AI. LLMs not only have an enormous corpus of language to draw on, but they are also aware of what is considered correct language. In the example below shown in Table 2, the “Standard American English” text is used to prompt the AI into changing student language samples riddled with grammar, spelling, and punctuation errors into correct text.

Table 2. Example of correcting grammar and mechanics

Input

You are a professional English teacher who is good at grammar. You received the following sentences from your students. Correct the grammar and mechanics.

1. **Original:** Next, put sugar, salt and vinegar in a small bowl to make the vinegar for sushi.
 2. **Original:** First, cut the chicken and vegetables about the size of the meal easily.
 3. **Original:** First, put the oatmeal and water in a bowl.
 4. **Original:** First, Mix pork meat and ?ed vegetables . Pour some olive oil in a pan and heat
-

Output (AI response)

1. **Revised:** Next, put sugar, salt, and vinegar in a small bowl to make the vinegar for sushi.
 2. **Revised:** First, cut the chicken and vegetables to a size that is easily manageable for a meal.
 3. **Revised:** First, put the oatmeal and water into a bowl.
 4. **Revised:** First, mix the pork meat with chopped vegetables. Then, pour some olive oil into a pan and heat it.
-

The AI is able to complete a holistic correction of the text, correcting not only grammar, but also incorrect use of punctuation or spacing. While a rather impressive result, it is important to remember that the AI's corrections are a result of it consulting its database of billions of examples of real-world English usage. As an LLM, the AI has formed connections between these examples, including their grammar and mechanical features and based on that, determined whether each specific grammatical and mechanical feature identified in the student's text conforms to them. So for grammar purists of the prescriptive perspective, the AI may not identify all of the errors in accordance with traditional grammar books. Rather, it is making corrections based on language as it is actually used, taking a more descriptive approach that may deviate away from rules taught by teachers. Furthermore, one needs to consider that the grammar model adopted by the AI may exclude world Englishes as proper language models.

3.3. Generating narrative writing prompts

In writing courses, prompts are employed for a variety of purposes, giving students both a focus and catalyst for the writing process. Sometimes, as is the case for most standardized test writing prompts, these are carefully crafted to ensure that student writing adheres to a strict genre convention. In other cases, unexpected, offbeat prompts are used as an impetus for creative writing tasks. The AI can operate as a prompt generator, creating novel prompts that match the purpose of the writing task. Compared to random prompt generators, which essentially pull content from an existing list, LLMs can generate bespoke writing prompts that fit the instructional needs of a task. In the example presented below, the AI is given some core story elements such as information about the characters, setting, and plot, along with an example of how to convert this information into a story introduction. The result is a unique, creative prompt based on the information given (see Table 3).

Table 3. Example of generating narrative writing prompts

Input
Create a short story introduction based on the following information: Character: Lacy Occupation: English Teacher Setting: Waikiki beach Action: Learning to surf
Output (AI response)
Lacy, an English teacher, stood on the sandy shores of Waikiki beach, watching the waves crash against the shore. She had always been fascinated by the ocean, but never dared to venture into the water. Today, however, she was determined to conquer her fear and learn how to surf. With a determined look on her face, she approached her instructor, ready to take on the waves and embrace the thrill of surfing.

As above, you can see that the AI created a logical story based on the input. Language learners could then use this prompt as the basis for creating a story in a narrative genre unit of their writing course. Rather than the teacher spending a considerable amount of time thinking up and writing down numerous individual creative writing prompts or simply resorting to sharing a single prompt with all students, the AI can quickly generate bespoke creative prompts for as many students as needed. Students are then free to practice their narrative genre writing skills, knowing that when they share their stories with others in follow-up activities, no two stories will be alike. The content and format of the input could be modified for many different genre conventions or to include student-generated content. In our testing, the AI consistently produced unique, usable prompts. These kinds of tasks, ones that require the generation of many ideas within a desired structure, are well suited for the creativity of LLMs.

3.4. Creating presentation notes

LLMs have the ability to parse text and identify main ideas quickly. This is relatively simple, especially in texts like presentation scripts that use signposting words and phrases. Presentations are often a key part of education, frequently with a focus put on both content and presentation skills. While there are many factors contributing to either the success or failure of the students, one key contributing factor is students' use of notes or prompts. Reading verbatim from a script is often the kindling for an uninspiring presentation. LLMs can simply convert student scripts

into presentation notes or outlines to guide learners so that they do not need to rely on verbatim scripts. In fact, any text can be broken down into its core components by the AI (see Table 4).

Table 4. Example of creating presentation notes

Input

Script: Today I'm going to talk about the history of data storage. Early computers initially used punch cards as a way to store data. Data was stored by punching in a hole in a specific column. The modern concept of a hard disk was first introduced in 1956 by IBM in the form of their computer called RAMAC. The system used massive, 24-inch diameter platters to store data. They only held 5 megabytes of data! Eventually, the 3.5 inch hard drive was invented, allowing for more data to be stored on small devices. Next, the 2.5 inch size drive was invented. Now, much of our data is stored on solid state drives that don't use spinning disks at all, storing data on computer chips.

Summarize in bullet point form:

Output (AI response)

- Early computers used punch cards for data storage
 - IBM introduced the concept of a hard disk in 1956 with their computer RAMAC
 - RAMAC used 24-inch platters that held 5 MB of data
 - 3.5-inch hard drives were later invented, allowing for more data storage on smaller devices
 - 2.5-inch hard drives were then invented
 - Currently, solid state drives (using computer chips) are widely used for data storage, not relying on spinning disks.
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In this example, the AI pulled out the key elements of the script and made a simple outline that students can refer to when giving a presentation. In addition to presentations, this can be used in reading courses to create simple outlines of texts. The students can then use the outlines as guides for verbal summary tasks, reinforcing their learning and understanding of the text.

3.5. Generating lesson ideas

For veterans and new teachers alike, creating lessons can be challenging. Teachers want to ensure their lessons are educational, meet learning goals, and are engaging. Even teachers who have taught lessons numerous times may find it necessary and challenging to alter them to be more relevant to their learners. LLMs can draw on their vast knowledge of educational fields and aid in the generation of new lesson ideas for a wide range of topics. However, by no means does this

replace the knowledge the teacher holds in educational methodology, pedagogy, or classroom management. Using the AI in this way is similar to brainstorming class ideas with other teachers and determining which would work within their context and aid their learners. Within language learning, teachers also need to consider the language level of their students and develop activities that are accessible and appropriate for their level. In Tables 5 and 6, the AI is prompted with a topic and given a CEFR-level target to adjust the activities for two different classes of students.

Table 5. Example of generating lesson ideas for CEFR B1

Input
You are an EFL teacher. Generate three ideas to act as an introduction to the topic of Media Literacy for CEFR B1 level English learners.
Output (AI response)
Media scavenger hunt: Have students work in pairs or small groups to find examples of different types of media (e.g. advertisements, news articles, social media posts) and analyze them for credibility, bias, and purpose.
Picture analysis: Show students a series of images and ask them to identify the message being conveyed, who the target audience is, and what techniques are being used to influence the viewer.
Media creation: Have students create their own short piece of media (e.g. a news article, a social media post, a video) and present it to the class for discussion and critique. Focus on how media literacy skills can be applied when creating media.

Table 6. Example of generating lesson ideas for CEFR C1

Input
You are an EFL teacher. Generate three ideas to act as an introduction to the topic of Media Literacy for CEFR C1 level English learners.
Output (AI response)
Critical media analysis: Choose a current media issue or event and lead a class discussion on the different perspectives and narratives presented in various media outlets. Encourage students to use critical thinking and media literacy skills to evaluate the credibility and reliability of the sources.

Media representation: Have students analyze media representation of a particular group or issue (e.g. gender, race, politics) and discuss the impact of media representation on public perception and attitudes.

Media production: Have students create a media project (e.g. a podcast, a video, a news article) that addresses a current issue or event. Encourage students to consider ethical and responsible media production practices, and to apply media literacy skills in their research and presentation of information.

As the examples above demonstrate, the AI is capable of producing multiple lesson ideas for one topic that require varying skill sets. The generated activities range from applying basic topic knowledge to analyzing more complex ideas and creating multimodal projects. Interestingly, the AI is able to scale these lessons depending on the learners' language abilities. In contrast to the CEFR B1 ideas, the CEFR C1 ideas are more cognitively challenging for students. These activity ideas ask that learners have broad knowledge of adjacent topics or the ability to apply knowledge to societal and cultural concepts.

3.6. Leveling texts for testing or reading practice

Language teachers commonly have difficulties selecting topically, lexically, and syntactically appropriate texts for their learners. While there are many resources like graded readers or level-appropriate textbooks, it is only sometimes possible to find materials that are motivating for individual learners and appropriately leveled. Teachers often need to source an article from online or a book and modify it for the educational needs of their learners, an extremely challenging and time-consuming process. LLMs are uniquely suited to creating appropriately-leveled topical texts, saving teachers valuable time and effort. By providing the AI with specific instructions about the desired level, length of the passage, and a specific topic, teachers can utilize LLMs to create passages that are well-suited to the needs of the learners (see Table 7).

Table 7. Example of leveling text

Input
In language appropriate for a CEFR B2 English language learner, write a 200-250 word passage about the effect of the TV show CSI on forensic science.

Output (AI response)

The TV show CSI (Crime Scene Investigation) has had a significant impact on the field of forensic science. Firstly, it has helped to raise awareness about the importance of forensic evidence in solving crimes and has made people more familiar with the techniques used in forensic investigations. It has also popularized the field, making it more attractive to students who are considering a career in forensic science.

However, the show has also had some negative effects. One of the main criticisms is that it portrays forensic science as a much more glamorous and straightforward process than it really is. This has led to unrealistic expectations among the general public and even among law enforcement officials about what forensic science can and cannot do. The show also often presents forensic evidence in a way that is not scientifically accurate, which can create misunderstandings about the reliability of forensic evidence.

In conclusion, the impact of CSI on forensic science has been both positive and negative. While it has helped to raise awareness and attract new talent to the field, it has also created unrealistic expectations and distorted the public's understanding of the role of forensic evidence in solving crimes. Therefore, it is important for people to understand that the TV show is just a form of entertainment and should not be taken as a representation of the real-life practices of forensic science.

(230 words)

In the above example, the AI is able to fulfill the requirements well, meeting the length, language leveling, and topic requirements. Checking the text level using independent tools like *Text Analyzer* (<https://hub.cathoven.com/>) indicates that the text is correctly leveled as CEFR B2. It is important to note that the teacher should verify the generated text's accuracy at this point to avoid the possibility of the AI generating creative, yet untrue information. This issue can be somewhat mitigated by providing clear specific topics, as in the example above. Teachers should also note that the AI does not have knowledge of the most recent news or current events and as such is unable to generate accurate texts on recent topics.

Once teachers have a text, they can also use the conversational memory of ChatGPT to create exercises or comprehension questions based on this text. The example below in Table 8 is based on the text generated in Table 7.

Table 8. Example of question generation for leveled text

Input (as a follow up in the same conversation thread as above)

Generate 4 multiple-choice comprehension questions about the main ideas in the text.

Output (AI response)

What is the overall impact of the TV show CSI on forensic science described in the text?

- A. Positive
- B. Negative
- C. Both positive and negative

What is one of the main criticisms of CSI according to the text?

- A. It raises awareness about forensic science
- B. It is scientifically accurate
- C. It portrays forensic science as more straightforward and glamorous than it really is

How does CSI affect the public's understanding of the role of forensic evidence?

- A. It makes people more familiar with forensic techniques
- B. It creates scientifically accurate understanding of the role of forensic evidence
- C. It creates unrealistic expectations

What is the main message of the text regarding CSI?

- A. It is a good representation of real-life practices of forensic science
 - B. It is just a form of entertainment and should not be taken as a representation of real-life practices of forensic science
 - C. It is a negative representation of real-life practices of forensic science.
-

This example shows that the AI can generate a reasonable set of comprehension questions about a text. Of course, it would be necessary for the teacher to verify the content of the questions before giving them to students. The teacher could further refine the questions by asking the AI to change the number of distractors or to create a question about each paragraph of the text.

4. Discussion and conclusion

Using an LLM such as ChatGPT to help teachers create activities like the ones we have shared is a clear application of what is possible today with the technology. However, these uses for LLMs are only scratching the surface of what is possible. As educators and learners continue to embrace digital learning, more and more of their output is stored as retrievable data in documents, videos, and voice recordings. There is a growing opportunity for educators to make use of this information to more accurately assess students' abilities and provide them with better guidance. However, the more data we have, the more ways there are to interpret it. No teacher has enough hours in the day, nor days in the week, to sift through each student's treasure trove of data to

make accurate assessments. This is where the true power of AI becomes apparent and relevant to teachers and students as such a task is becoming increasingly trivial for LLMs like OpenAI's GPT. LLMs can save teachers time by analyzing their course outcomes, recommending topics, finding relevant texts, summarizing them, and creating assessment questions for students. Additionally, while students are writing, LLMs can simultaneously analyze grammar, cohesion, and style, while providing feedback and focused study advice. This kind of AI, rather than replacing teachers, has the power to enhance them and provide them with new tools and abilities to help their students focus on areas that need attention.

The activities discussed above demonstrate that LLMs can support teachers by completing tasks on their behalf that could have been overly time-consuming or mundane. Tasks such as correction of grammatical and mechanical errors, as well as adapting texts for learners in level-appropriate language, can be offloaded to LLMs to free up teacher time for other endeavors. Though marking and materials development are a necessary part of teaching in most contexts, they are not only time-consuming but tedious, wasting valuable teacher time that could be spent on personalizing content to meet the needs of learners better. LLMs can easily accomplish these tasks due to their understanding of the conventions of human language, as demonstrated by the activities presented in this article.

LLMs are not limited to mechanical, robotic tasks – and may be used to creative ends. They can also author personalized or unique content, such as generating narrative stories, activity prompts, and adapting texts to new mediums. Though completing these kinds of tasks can be rewarding for the teacher, they are overly time-consuming. Furthermore, while a teacher can create personalized materials for each student, this is simply not practical in the vast majority of language teaching environments. LLMs, fortunately, can accomplish this time-consuming task. This opens up the possibility of creating tailor-made educational experiences, which streamlines the instructional design process to focus on what the students need to progress. Already, AI is employed in educational data mining and intelligent tutoring systems, and as this paper demonstrates, it can be used in practical applications in the language classroom today. LLMs, through their ability to generate natural human-like text and draw from a vast multi-disciplinary knowledgebase, have incredible potential for the field of education, and the activities presented are just the beginning of how educators can use them.

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A QUANTITATIVE RESEARCH ON GAMIFYING VOCABULARY ACQUISITION AND RETENTION IN VIRTUAL REALITY

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Abstract

Despite being a building block in language learning, vocabulary can be a learning obstacle for some learners. This study explores the effects of virtual reality (VR) games on English as an additional language (EAL) EAL learners' content-based vocabulary acquisition and retention. Six Year 9 Middle Eastern students from an independent school in Western Australia were randomly selected to experience this VR approach. A Google Cardboard headset was utilised to immerse players in a 3D environment, enabling them to acquire target vocabulary while exploring the content in VR games. Data was collected through a pre-test (to screen pre-existing vocabulary knowledge), post-test (to measure vocabulary acquisition via VR games) and delayed post-test (to measure vocabulary retention). Marked differences were found between pre- and post-tests ($p = .021$) and pre- and delayed post-tests ($p = .033$), suggesting that the gamified VR environment can stimulate content-based vocabulary acquisition and enhance its retention. This 3D approach to vocabulary learning implicates the pedagogical benefits of VR games for struggling EAL learners.

Keywords: games; augmented and virtual reality; simulation; mobile learning; vocabulary acquisition and retention; EAL learners

1. Introduction

Although there are various approaches and methods available to teach vocabulary, its difficulty in acquisition and retention is generally perceived as an obstacle by language learners (Yousefi & Biria, 2016; Ahmadian & Tajabadi, 2020). This is particularly the case in an independent school in Western Australia (WA), in which 350 students were enrolled in 2020, 90 % of whom were from an EAL background. Migrating from the Middle East in early childhood, the students mostly come from families who do not speak English at home. As reported in previous

studies (Arifani et al., 2020; Erturk & Mimford, 2017; Kohnke & Ting, 2021), these EAL learners have difficulty learning content-specific vocabulary items related to Maths, Science, Humanities and Social Science, Art and English with specialist teachers attributing low achievement to students' limited vocabulary knowledge. This problem was also echoed in Laufer's (2021) research, in which EFL learners from an English for Academic Purposes class had to increase their content-specific vocabularies by a significant level to read and understand academic texts. Previous research could explain the role of vocabulary knowledge on these learners' academic success, stressing that a learner must know at least 6,000 words for daily language use, such as watching a movie or reading a novel in the target language, and 9,000 words to read books and academic texts in the target language (Laufer, 2021; Nation, 2006; Schmitt & Schmitt, 2014; Sonbul & Siyanova-Chanturia, 2022). Therefore, EAL learners' limited vocabulary knowledge in this study hinders their understanding of the content in their mainstream classroom. As a result, these EAL learners are struggling to complete tasks related to the mainstream subjects, which, however, determine their academic performance in school and in national assessments. The situation is high-stakes when these culturally and linguistically diverse (CaLD) students need to achieve a scaled mark of 50 or above in their end of semester exams to meet subject competency requirements mandated by the WA curriculum (School Curriculum and Standards Authority (SCSA), 2022).

Learning content-based vocabulary has the potential to improve EAL students' academic success, as retaining content-based vocabulary helps EAL students acquire new knowledge across subjects in mainstream classes (Helman et al., 2019). Given the digital age, previous research suggests that Virtual Reality (VR) games are conducive for situated learning as they enable EAL students to acquire the target lexis, whilst immersing themselves and engaging in topic-related scenarios (Alfadil, 2020; Chen, 2016). Therefore, this pilot study was conducted to investigate whether VR games could enhance content-based vocabulary acquisition and retention of Middle Eastern EAL adolescents. This is in response to a call for further studies to fill the gaps in determining the effects of VR on vocabulary acquisition and offer pedagogical implications for game developers, language practitioners and educational institutions that support at-risk English language learners (Alfadil, 2020; Godwin-Jones, 2016).

2. Literature review

2.1. Vocabulary learning via VR games

Vocabulary is a core element in second language acquisition (SLA) and the building block for

the development and construction of language skills such as reading, writing, speaking and listening in the target language (Laufer & Nation, 2012). Yousefi and Biria's (2016) study found that teachers put considerable effort into teaching vocabulary in EAL classes, but learners have complained that they are only able to recall a minimal amount of words. This has led researchers to explore different approaches to improving language learners' vocabulary acquisition and retention (Chen et al., 2021).

The advancement of digital technologies has enabled games to be played in VR environments, thereby providing unique opportunities to immerse EAL learners in engaging language learning activities (Dawley & Dede, 2014). Steuer (1992, p. 7) defined VR "as a real or simulated environment in which a perceiver experiences telepresence" and valued the human experience over the technological hardware aspect. In other words, VR presents the telepresence in a mediated environment which provides individual experience for the user and allows one to interact with 3D objects in a virtual space (Chen, 2016). Moreover, VR games immerse learners in authentic experiences to interact with virtual objects in a gamified context, which may not be possible or difficult to carry out in a classroom environment (Chen, 2016; Dawley & Dede, 2014; Feng et al., 2018).

VR can render digital games effective for learning mainstream subjects by enabling learners to interact with objects not normally available (Blyth, 2018; Shaffer et al., 2005). Learners can immerse themselves in authentic experiences, such as travelling through a human body, which are otherwise generally not possible (Gregory et al., 2014). Kastoudi (2011) developed a VR quest game to investigate learners' English language skills through interaction with native speakers in Second Life and showed that it enhanced vocabulary acquisition through interaction, negotiation of meaning, and recognition of vocabulary. York et al.'s (2021) research suggests that VR provided the most fun and effective environment for English learning to 30 undergraduate students, in comparison to the video computer-mediated communication mode.

In Chen's (2016) study, EAL learners gained new English words as they interacted with other residents in Second Life, whilst being exposed to multimodal 3D input. They acquired the target lexis by interacting with 3D objects they built and used both text and voice chats to communicate in English as they explored different Second Life islands. The results also showed that 3D virtual worlds enhanced learners' virtual learning experience, triggered the fun element, and provided an open, immersive, and creative space that further fostered their EAL learning. Similarly, Berns et al. (2013) found that gamified 3D VR learning made vocabulary acquisition easier and motivated students, as words were presented in context and the virtual

environments offered real-time feedback. Alfadil's (2020) study explored the influence of "House of Languages," a headset-enabled VR game, on Middle Eastern intermediate school English language learners' vocabulary acquisition. The study found that students who played the VR game – enabling learners to communicate with a native English-speaking teacher (Mr. Woo – raccoon character host) – attained a greater improvement in vocabulary acquisition in comparison to those using the traditional method. VR offers a sense of exploration, an immersive experience, active learning, and a higher concentration on topics (Hussein & Nätterdal, 2015).

Given recent technological developments, an affordable VR headset device, Google Cardboard, was released in 2015. This made language learning supported by a VR headset possible as these headsets block the vision of real-life environments and increase the sense of telepresence in the VR world in unique settings related to the content of games (Dawley & Dede, 2014; Chen, 2020). 3D immersion enhanced by the sight and sound provided by the headsets offers an innovative approach to retaining new knowledge for learners who prefer visual, kinesthetic, or auditory learning styles (Freina & Ott, 2015). Given the primacy of vocabulary acquisition (Laufer & Nation 2012), headset-enabled content-based VR games (e.g., InCell, which teaches cells in science; Luden.io, 2017) enable learners to be part of a 3D world in that they can explore the content and build their own experience through telepresence, thus fostering active vocabulary learning (Chen, 2020). These video games can be powerful learning tools offering a large variety of contexts in which to learn (Martinez-Garza et al., 2013), as they enhance experiential learning and enable players to construct their own knowledge through experience (Gee, 2005). In this sense, allowing students to play content-based VR games to support the WA curriculum has the potential to boost these EAL students' vocabulary learning. Building content-based vocabulary knowledge may facilitate subject learning of these low performing students in order to meet their ultimate academic needs and future study and job demands.

3. Methodology

3.1. The aim of the study

To investigate the effects of a headset-enabled, game-based VR learning environment on EAL learners' vocabulary acquisition and retention, the main research question is:

Does a VR game-based, headset-enabled approach enhance the content-specific vocabulary acquisition and retention of struggling EAL learners?

3.2. Participants and the context

This study took place during a seven-week period in an independent K-12 school in Western Australia. Twenty-four Year 9 EAL learners, whose English proficiency levels had been assessed at the lower band (SCSA, 2022), were pre-selected. This lower proficiency level places these struggling students in a high-stakes situation where they have to grapple with the demands of learning subject knowledge with limited English proficiency and insufficient content-based vocabulary. From these 24 students, six Year 9 EAL learners were selected via simple random sampling. Table 1 summarises the background information of these Middle Eastern EAL participants.

Table 1. Summary of Participants' Demographic Information (Albayrak et al., 2022)

	Aisha	Fatma	Zaynab	Aleen	Lara	Ali
Gender	Female	Female	Female	Female	Female	Male
Country	Egypt	Somalia	Syria	Jordan	Egypt	Egypt
Age	14	14	14	14	14	14
Age when moved to Australia	6	7	13	8	6	0
Home language	Arabic	Somali	Arabic	Arabic	Arabic	Arabic
Ways of learning new words	Using a dictionary	Asking my teacher	Asking my teacher	Reading	Asking my friend	Internet

Ethical approval was first obtained from the related University Human Research Ethics Committee. The independent school Curriculum Director's approval was gained, informed consent was received from the students, and their guardians received a copy of the informed consent and information form. The consent form clearly stated that students would not be penalised for not participating or withdrawing from the study, using simple language that was understandable for the students and their guardians. Pseudonyms were adopted for all students to protect their identity and confidentiality as participants were drawn from a refugee and immigrant population that fears the disclosure of sensitive information.

3.3. Design and procedure

This study adopted a quasi-experimental design in that pre-test, post-test and delayed post-tests were employed to measure the levels of students' acquisition and retention of target vocabulary

items (Mackey & Gass, 2015). The pre-test was designed to gauge the number of target vocabulary items each student knew before playing the VR games. The post-test was designed to measure the number of vocabulary items they learnt after playing the VR games, taking the pre-test results into account. The delayed post-test was designed to determine if they retained those target vocabulary items after playing the VR games.

VR games that included the content-based vocabulary items were chosen for this study. Table 2 below provides an overview of vocabulary items related to subject areas in pre-, post- and delayed post-tests which were visualised and configured in VR games. For example, the target vocabulary items found in the InCell VR game were related to the WA curriculum (SCSA, 2022), in Year 9. They included mitochondrion organelle, invasion, inflating cell, influenza virus, nucleus, molecular machine, centrosome, lysosome, vehicle, microtubes and mitochondrion (See Figure 1 for the InCell VR game).

Table 2. Vocabulary items related to subject areas in pre-, post-, and delayed post-tests

Science	Humanities and Social Sciences (HASS)	Art
Bond	Marine	Motif
Microtubules	Asteroid	Exhibit
Influenza virus	Archeologic	Texture
Dopamine	Reconstruct	Portrait
Molecular Machine	Statue	Medium
Organelle	Coral	Volume
Centrosome Cells	Reef	Rectilinear
Solid	Antique	Contrast
Nucleus	Seabass	Dominance
Diamond	Polar Vortex	Neutralism
Inflating Cell	Symmetrical	Scenery
Cortex	Rockfish	Converse
Red neurons	Architecture	Abstract
Nanotube	Continent	Non-objective
Lysosome	Rig	Form
Noradrenaline	Substructure	
Graphite	Exosphere	
Serotonin	Constellation	

Atom	Sculpture
Super Virus	Ancient
Cell	Orbit
	Solar System'
	Citadel
	Pharaoh
	Opel eye
	Harbour

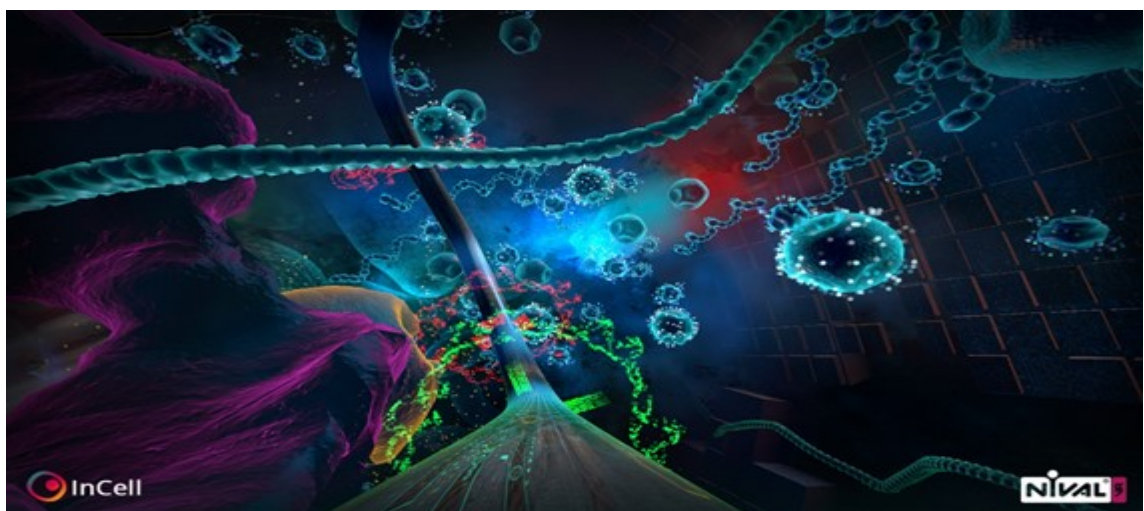


Figure 1. A screenshot from InCell (Luden.io 2017)

3.4. Data collection tools and procedures

3.4.1. Vocabulary test construction vis-à-vis VR games

The vocabulary test design was based on the vocabulary items currently used in Year 9 textbooks, following the WA curriculum. The chosen vocabulary items related to the subject content covered in the curriculum informed the selection of VR games as presented in Table 2. Each of the three tests included three question types: *match the target vocabulary items with their meanings* (21 questions), *fill in the blanks using the appropriate vocabulary items listed in the box* (21 questions) and *multiple choice* (21 questions). There was a pool of questions in each question type and seven test items were randomly selected from each pool for each test. To reduce the possibility of the practice effect, a counter-balance design was used to ensure that participants did not receive the questions in the same sequence (Mackey & Gass, 2015).

3.4.2. Selection of VR games

Teachers of the mainstream subjects approved the content-suitability of nine different games (see Table 3 for all VR games and relevant subject areas) that were carefully selected by the lead researcher (three related to science, one related to art, and five related to humanities and social sciences (HASS)). The curriculum coordinator also confirmed the games suitability for the chosen year group. The chosen games provided a 3D visualisation of the target vocabulary items, as well as written and audio information about the content. Based on Gee's (2005) good game principles, these headset-enabled VR games enabled players to interact with the game, reach a goal, explore and think about the relationships between the subject matter and vocabulary items. EAL students played two games each week, except for the last week when they played one, and each student played each of the nine games once. To illustrate, InMind VR is an action and racing game where players explore cells in a micro world with the task of stopping the virus advance (Luden.io, 2017). At the end of the game, a progress report is provided to players about their achievements (e.g., killing all viruses). The other eight games (see Table 3) were also related to the content of the WA curriculum. All games were played using Google Cardboard, an affordable VR headset device that enables VR gaming in a 3D environment.

Table 3. Summary of VR games and relevant subject areas (Albayrak et al., 2022)

Week	Science	Art	Humanities and Social Sciences (HASS)
1	InCell (Luden.io, 2017a) InMind (Luden.io, 2017b)		
2	Learning Carbons VR (EduChem VR, n.d.)		Solar System – Space Museum – VR/AR (Yin, 2016)
3		Magi Chapel VR (EON Reality, n.d.)	VR Diving Pro – Scuba Dive with Google Cardboard (Wang, n.d.)
4			Toumanian Museum VR (Arloopa, n.d.) Ancient Egypt VR (Insypiro, 2016)
5			Qantas Guided Meditation Series in 360 – Sydney Harbour, New South Wales (Qantas, 2018)

3.4.3. Data collection

Before students started to experience the VR games, the pre-test was conducted in the first week of the study in order to screen their pre-existing knowledge of the target words. After the pre-test, six randomly selected Year 9 students attended their regular class and only went to a separate classroom to play the vocabulary games, whilst the rest of the class were completing

the normal review activities from their worksheet. One of the researchers, who also works at the independent school, guided the students to play headset-enabled VR games. After each student was given a headset and a phone with the VR game application, they received instructions on how to start the game, move themselves, and select options.

Throughout the first five weeks of VR gaming intervention, they played the content-specific games to learn new vocabulary items. Students played two games each week, except for the last week (Week 5) when they only played one, and each student played each of the nine games once. The VR game session took approximately 30 minutes. The post-test was administered in Week 5. The data collected from the pre-tests and post-tests helped to answer the question of whether or not using game-based VR with headsets increased vocabulary acquisition. A delayed post-test was followed up in Week 7, with the aim to determine the level of EAL learners' vocabulary retention. The delayed post-test took place two weeks after the post-test, as applying a delayed post-test more than two weeks after the treatment may lead to maturation and losing participants (Mackey & Gass, 2015).

The five-week intervention was conducted during the regular class time (in the beginning of the school term) to avoid the issue of not having sufficient accumulated change to measure students' performance in a short intervention period (Alfadil, 2020).

To exemplify, in Week 1, the students played InCell, an action and racing game. They began the period by reading about cells, the parts of cells and their function from their Science Worksheet. The target vocabulary items related to the Year 8 Science curriculum (SCSA, 2022), and the reading passage included vocabulary such as mitochondrion organelle, invasion, and molecular machine. Once the worksheet was completed, each student received a Google Headset with an iPhone attached and the game pre-opened ready for the students to play. Students were instructed on how to play the VR game. The game also provided written and audio information about the content and the players' mission. Players were in a human cell and had to stop the virus advance. At the end of the game, players received a progress report. Table 4 presents a summary of data collection across all the tests and VR game intervention weeks.

Table 4. Summary of data collection procedure

Week	Pre-test	VR Games	Post-test	Delayed Post-test
1	✓	✓		
2		✓		
3		✓		
4		✓		

5	✓	✓
6		
7		✓

3.4.4. Data analysis

The pre-, post-, and delayed post-test results were co-marked by the researcher and a colleague to check the inter-rater reliability, and the percentage of agreement was 100 per cent (Mackey & Gass, 2015). The tests were scored out of 21, where each correct answer was worth one mark, and were then compared to assess language gains. The average scores the six students were awarded for each test is listed in Table 5, in which the Minimum and Maximum shows the range of scores for each test.

Table 5. Descriptive statistics of the three tests' scores

	N	M (SD)	Minimum	Maximum
Pre-Test	6	10.50 (4.593)	3	16
Post-Test	6	14.33 (3.077)	9	17
Delayed Post-Test	6	13.00 (5.514)	3	17

Descriptive statistics in Table 5 were analysed as follows and explained in detail in the Results and Discussion Section. As the sample size was small, the Shapiro-Wilk normality test was chosen and run before further statistical procedures could be conducted in order to determine whether the data set (scores) was drawn from a normally distributed population (Mackey & Gass, 2015). The Shapiro-Wilk test (Table 6), which is appropriate for small sample sizes, shows that the results fail to meet normality (i.e., delayed post-test result is $p = .020$). As such, a non-parametric Friedman test, which does not require a normal distribution to meet the assumptions of analysis, was employed to compare the repeated vocabulary tests.

Table 6. Shapiro-Wilk Test to ascertain whether results meet normality

	M (SD)	df	P
Pre-Test	10.50 (4.593)	6	.789
Post-Test	14.33 (3.077)	6	.256
Delayed Post-Test	13.00 (5.514)	6	.020*

Note. * $p < .05$

Whilst the Friedman test (Table 7) showed a statistically significant difference between tests, it did not indicate in between which tests the difference occurred. In order to find whether there was a marked difference between pre- and post-tests, or whether the 3D content-based games had an effect on vocabulary retention (delayed post-test), the Wilcoxon test was employed as a post-hoc test and the results are discussed in the Results and Discussion section.

Table 7. Friedman test statistics to determine whether there is a difference between tests

	M (SD)	df	P
Pre-Test	10.50 (4.593)	2	.041*
Post-Test	14.33 (3.077)		
Delayed Post-Test	13.00 (5.514)		

Note. * $p < .05$

4. Findings and discussion

In the results of Table 7, the null hypothesis, which specifies that there is no significant difference between the test results, is rejected ($p = .041$). Hence, it shows that vocabulary gains differ significantly between pre-, post- and delayed post-tests. In order to determine the location of the difference between groups (tests), the Wilcoxon test was applied (see Table 8). The Wilcoxon test indicates that there is a statistically significant difference between pre-test and post-test ($p = .021$), as well as pre-test and delayed post-test ($p = .033$). The post-test mean increased by 41 per cent in comparison to the pre-test mean, which shows that students improved their content-specific vocabulary, as they recognised more target words accurately in the post-test after experiencing the immersive environment. The high immersion in a 3D simulation environment may have formed an effective basis to learn new content-based lexis through direct experiential experience, such as diving with sea creatures in the VR Diving Pro – Scuba Dive with Google Cardboard (Wang, n.d.) game. This immersive simulation approach seems to have helped learners explore the low frequency target words that are hard to grasp only in text. In such a reflective and learner-centred immersive environment, language learners may have incidentally acquired the academic terminology. For example, they may have learnt the names of the cells by self-directing their movements, monitoring, and reflecting on their first-hand experiences through these games, thus developing learner autonomy, which aligns with previous research (Barab & Duffy, 2000; Y.J. Lin & H.C. Wang, 2021; Shih & Yang, 2008). Therefore, feeling highly immersed in the subject matter context could be an innovative approach to deepening understanding and acquiring content specific words.

Table 8. Wilcoxon test statistics of differences in vocabulary acquisition across three tests

	M (SD)			P	Post Hoc (Wilcoxon Tests)		
	T1	T2	T3		T1 -T2	T1-T3	T2-T3
Vocabulary test scores	10.50(4.593)	14.33 (3.077)	13.00 (5.514)	.041*	.021*	.033*	.229

Note. T1 = pre-test; T2 = post-test; T3 = delayed post-test

*p < .05

Delayed post-test scores (M = 13.00, SD = 5.514) indicated that the Middle Eastern students retained the target English words they learnt after exploring the content related lexis in a simulated environment. The mean (the average accurate responses) in the delayed post-test increased by 24 per cent from T1. Another finding is that students' vocabulary gains did not show a marked difference in their scores between post-test and delayed post-tests ($p = .229$). Although the post-test scores are higher than the delayed post-test scores (T1: M = 14.33 > T3: M = 13.00), it still shows students' retention in two ways: there is a significant difference between the pre-test and delay post-test ($p = .033$), and the mean difference between the post- and delayed post-tests is quite small. In other words, the average number of target vocabulary EAL students recognised correctly in T2 and T3 test results were quite similar albeit a slight decrease in the delayed post-test results even after a two-week gap from VR game treatment (M = 13.00, SD = 5.51). Although EAL students' mean scores in T3 did not outperform those in T2, students still retained those content-specific target words to a certain degree, even not being exposed to those target words via the VR games after two weeks, which could be a result of the interactive feature of VR environments. For example, whilst playing the InCell VR game, students were virtually travelling in a human body for the whole game and probably interacting with target words, such as identifying the virus and trying to shoot it. This direct interaction with the virtual environment and related content lexis could have deepened their understanding and acquisition of academic words. Coinciding with previous research findings (Alfadil, 2020; Monteiro & Ribeiro, 2020; Tai et al., 2020), the interactive property of HMD VR games that enable language learners to solidify experiences by virtually touching or manipulating objects were seen as an invaluable and effective approach to foster vocabulary learning. However, a strong claim cannot be made due to the limited number of participants. The small sample size may have decreased the statistical power, as there was no control group put in place and the effect size was not computed in the results. Nevertheless, the purpose of this study was to trial

the research design and test the suitability of VR games to be used on a larger scale of a future study. In this sense, the findings drawn from this pilot study still provide insightful information for researchers and EAL practitioners. A further constraint is also acknowledged since only a limited number of educational VR games in three mainstream subjects were available and complied with the year 9 curriculum.

In conclusion, these results implied that the VR game-based, headset-enabled approach was proven to facilitate students' acquisition and retention of content-specific vocabulary related to Science, HASS, and The Arts. Content and language integrated learning could be cognitively demanding as learners are expected to acquire content-specific language alongside learning knowledge about the subject matter. Thus, the novel HMD VR approach adopted in this research, were found to facilitate language learners' vocabulary acquisition and retention.

Indeed, Middle Eastern EAL students showed marked improvement as they not only learnt content-based vocabulary items when playing VR games, but also managed to retain most of those target words after the intervention. Immersive gamified learning seems to be a pedagogically appropriate approach to stimulating content-based vocabulary acquisition and retention as EAL learners in this study inferred meaning of unfamiliar vocabulary items through context, and consequently retained the target vocabulary items. This study echoes previous studies that VR games can be conducive to not only acquiring but also retaining content-based vocabulary for language learners (Alfadil, 2017; Berns et al., 2013; Chen, 2016; Kastoudi, 2011). Hence, content-based VR games can have pedagogical benefits in helping EAL students comprehend mainstream subject content and may be applicable to other subject matter in different year levels.

5. Conclusion

As evidenced in this study, headset-enabled VR games are potentially promising learning tools to foster content-based vocabulary acquisition and retention. VR games provide learners with rich exposure to the target vocabulary, and the visuals immerse the players in an artificially generated 3D world to explore the content, thus reinforcing students' vocabulary acquisition and retention. Additionally, students can construct knowledge and immersive learning experiences through directly interacting with content-specific vocabulary visualised in the VR environment. As vocabulary is learnt and retained more effectively in context, there is a strong connection between interaction and SLA (Laufer & Nation, 2012). If selected carefully, this 3D interaction with content can be made available through VR games and turn a mundane English classroom into an engaging 3D gamified playground for learners. The findings in this study are

a step towards understanding the effects of 3D gamified learning and how this immersive VR environment can foster vocabulary acquisition, retention and content learning of EAL students, especially those who are struggling with mainstream subjects.

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FLIPPING IN A MICROLEARNING WAY: EFFECTS ON EFL LEARNERS' ACHIEVEMENT AND MOTIVATION IN A GRAMMAR COURSE

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Abstract

This research employed microlearning and flipped teaching approach, both together and separately, to examine EFL learners' grammar achievement and motivation. The design of this study was quasi-experimental by employing three intact classrooms as experimental groups (i.e. microlearning, flipped learning, and microflipped learning) and one intact classroom as a control group (N = 25 for each group). The data was collected through pre-test and post-test that were administered to experimental and control groups, as well as motivated strategies for learning questionnaire (MSLQ) that was filled by the participants from experimental groups. The results showed that microlearning, flipped learning, and flipped learning approaches could help EFL learners to achieve significantly higher grammar skill. Besides, it was depicted that EFL learners revealed higher motivation in experimental groups for learning when compared with the control group. At the end of this study, the researchers provided recommendations on how to use flipped learning and microlearning methods, both together and separately. Findings suggest that the use of microlearning, flipped, and microflipped teaching/learning can be considered as an alternative model of teaching, as opposed to the traditional method, to motivate EFL students to better learning.

Keywords: Flipped Learning; grammar course; microlearning; microflipped learning

1. Introduction

The significance of EFL grammar teaching is endorsed by both teachers (Farshi, Tavakoli, & Ketabi, 2019; Myhill & Watson, 2013), and students (Graus & Coppen, 2016). For a long time, EFL teachers were interested in teaching grammar employing the traditional PPP (presentation, practice, production) approach (Carless, 2007). In these classes, teachers favor teaching grammatical rules directly and deductively (Andrews, 2003), and students consequently learn grammatical forms in a sequential order, and combine such grammatical knowledge with performing drill-like practicing and large amounts of activities in

workbooks. Nonetheless, one great problem with this prevalent method is that little consideration is spent on developing EFL students' grammatical ability (Richards & Reppen, 2014). Accordingly, L2 students generally find it hard to employ the grammatical knowledge which is learned in real-life conversation.

To migrate from this problem, the researcher is calling for reformation in L2 grammar teaching after the innovation of Communicative Language Teaching. There is growing agreement that instead of isolated grammatical rules (which are the locus of the traditional teacher-fronted grammar class), L2 students should be taught the meaning and application of grammatical structures in concrete contexts (Ellis, 2006). In a nutshell, L2 grammar classes should be communicative and improve L2 students' grammatical ability (Richards & Reppen, 2014) or "grammaring" (Larsen-Freeman, 2014). The utilization of Information and Communication Technologies has become popular in recent years (Myhill & Watson, 2013; Graus & Coppin, 2016), and investigations measuring the effects of technology-enhanced instruction on grammar learning have also grown in number (e.g., Liu et al., 2018). Two new methods of technology-enhanced learning are flipped and microlearning, but unfortunately the research on the effect of these two methods on the grammar skill of EFL learners is scarce. To reach this aim, form, meaning, and context should all be taken into account (Richards & Reppen, 2014). This study argues that the two methods that can be used to enhance active learning and improve EFL learners' grammar skill and motivation through communicative interaction are microlearning and flipped learning strategies, both when applied together and separately. These teaching methods are described in detail in the following sections.

2. Literature review

2.1. Microlearning

With the use of the Internet and the Web, theories and research often struggle to catch up with developments, interactions, and changes in technology and the social forms and practices evolving with it (Callow & Orlando, 2015). Concerning practical issues, lots of agreements have been made when introducing distributed education, networked learning, and distance learning (Lo & Hew, 2017). One of the new methods of technology-based and distance learning is microlearning. Microlearning is a technology-mediated learning approach through which students are directly exposed to short-term learning exercises formally or informally at their own pace (Khong & Kabilan, 2020). The research on microlearning is rare

in language learning and especially in the EFL field. In recent years, research by Khong and Kabilan (2020) introduced a theory of microlearning for L2 learners that is elaborated in the following part.

Three theories can be related to microlearning: Sweller’s (2020) “Cognitive Load Theory” (CLT), Mayer’s (2014a) “Cognitive Theory of Multimedia Learning” (CTML), and Ryan and Deci (2017) “Self-Determination Theory” (SDT) (Khong & Kabilan, 2020). Besides, promoting the typical alignment of cognitivist view on SLA (Atkinson, 2010) in contrast with behaviorism and constructivism can be another important issue. The suggested cognitive theories also explicitly support the conceptual characteristics of microlearning, for instance, CLT is most similar to the design and construction of microcontent and the manipulation of micro-activities, while CTML is closely associated with the use of mobile and digital micromedia (Khong & Kabilan, 2020). Furthermore, microlearning is associated with the student-centered approach because it supports the patterns of using media daily that support new generations’ learning needs and preferences (Nikou & Economides, 2018). Looking back on definitional keywords of microlearning like personalized, adaptive, autonomous, and self-regulated learning it can be depicted that they highlight the significance of the motivational aspect of microlearning for L2 instruction (Khong & Kabilan, 2020). A theoretical model encompassing the dynamic interplay of cognitive and motivational theories within the concept of microlearning devised by Khong and Kabilan (2020) to offer a more principled way to integrate microlearning into L2 instruction across diverse languages and learning contexts as illustrated in Table 1.

Table 1. Theoretical and structural model of microlearning for L2 instruction by Khong and Kabilan (2020)

Effective Microlearning	Cognitive Psychology Domain	CTML	Dual-Channel	Technical Aspect
			Active Processing	Technical Aspect
			Limited Capacity	Technical Aspect and Instructional Design Aspect
	Motivational Psychology Design	CLT	Intrinsic CL	Instructional Design Aspect
			Extraneous CL	Instructional Design Aspect
			Germane CL	Instructional Design Aspect
	Motivational Psychology Design	SDT	Autonomy	Learner Motivational Aspect
			Competence	Learner Motivational Aspect
			Relatedness	Learner Motivational Aspect

In this model, CTML concentrates on creating a micromedia using different technology affordances that mainly adheres to the multimedia policy, while CLT focuses on creating the architecture of digital microcontent, and SDT is purposefully optimized to decrease the element interactivity, therefore, lower the overall complexity of learning material for a given L2 learning purpose (Khong & Kabilan, 2020). These correlations among CTML, CLT, and SDT are compatible with Bikowski and Casal's (2018) framework for learning with digital resources that presents the inter-relationship among learners (who), content (what), and technology (how). Besides establishing the interrelationships within cognitive and motivational theories, this CTML-CLT-SDT model justifies the practicality of microlearning as a successful learning approach in previous research in diverse domains (Liu, Sands-Meyer, & Audran, 2018; Webb & Doman, 2019).

2.2. Flipped learning

One of the technology-enhanced learning approaches is flipped learning (Shafiee Rad, 2021). Flipped learning can be described as the process of transferring information that would be presented during the traditional in-class time to out-of-school time; it can also be defined as a learning process carried out by students in the home context as if they were in the classroom (Bergmann & Sams, 2012; Jensen et al., 2015). In other words, in the flipped classroom the use of classroom and extracurricular time exchanges, exercises, such as homework, are done in the classroom; that is, an activity that was traditionally done in the classroom is done outside the classroom (Abeysekera & Dawson, 2015; Hao, 2016). Flipped learning also provides a more pleasant environment (Abeysekera & Dawson, 2015; 2017; Chang & Hwang, 2018; Enfield, 2013; Hwang et al., 2019; Sergis et al., 2018; Zainuddin, 2018), which leverages learner-centered activities (Foldnes, 2016) and natural group work (Ferreri & O'Connor, 2013). This method can take advantage of instructional technologies to put passive content in use outside of the classroom. Flipped learning allows the core content to be studied before face-to-face class time (Lo & Hew, 2017). As Talbert (2014) states, this method can be with and without technology use. The flipped classroom without technology use was first used in the schooling schemes of Socrates, law schools, and composition classes where learners read core content before attending the class. Subsequently, it was used by Mazur (1997) in his physics' class (Talbert, 2014). The technology-based type of flipped learning was introduced by Bergman and Sams (2012), where they received help from the emails and videos to deliver the content of the physics' class to their students.

It can be said that flipped learning has found support from the theories of constructivism, Bloom's (1978) taxonomy of learning, and Vygotsky's theory of the Zone of Proximal Development (Shafiee Rad et al., 2021). Constructivists (e.g., Piaget, 1968) assert that the use of interactive actions in which learners play active roles can involve and motivate learning more efficiently than activities where learners are passive. Bloom (1978) also highlights the necessity to focus on higher-level learning goals, not simply on basic skill. He puts great importance on problem-solving, analytical skill, and creativity which can be used in the flipped classroom. The flipped learning approach also finds support from Vygotsky's theory of the Zone of Proximal Development. Vygotsky (1978) assumes that when a learner is at the zone of proximal development for a particular task, affording the appropriate assistance will help the learner achieve the task.

The flipped teaching method and research investigating its effectiveness have mostly been based on university students in different fields (Akçayır & Akçayır, 2018). Meta-analysis research on language learning carried out on the flipped learning/teaching method shows positive effects of the method on language learning outcomes, in general, compared with traditional methods (Cheng, Ritzhaupt, & Antonenko, 2019). Some studies indicate that flipped teaching/learning have positive effects on L2 educational outcomes and variables, such as academic achievement and self-efficacy (Lai & Hwang, 2016; Ye, Chang, & Lai, 2019), motivation (Chang & Hwang, 2018; Hwang et al., 2019), project performance, critical thinking, and group self-efficacy (Chang & Hwang, 2018). When examined conceptually, flipped teaching/learning method can affect the L2 grammar skill (Liu et al., 2018; Shafiee Rad, 2021), but is rarely examined in the EFL context.

2.3. Microflipped learning

This study aims to integrate flipped and microlearning to introduce a stronger model of teaching. This model of teaching aims to take the lecture outside the classroom as it is one of the key features of a flipped classroom (Lai & Hwang, 2016; Ye, Chang, & Lai, 2019). Also, the traditional homework activities can be replaced by the lecture time as it is an advantage of flipped learning (Chang & Hwang, 2018). Besides, microflipped learning takes into account the length of the video to consider the cognitive psychology domain of teaching/learning (Erbil & Kocabaş, 2018; Hattie, 2009; Johnson et al., 2000; Kyndt et al., 2013) and includes controls to ensure that participants have seen the video so as to obtain the same functionality that students have in a lecture and motivate them to have active learning (Khong & Kabilan, 2020). This includes opportunities to ask the teacher questions, to have a dialogue between

the classmates and the teacher, and to be recommended additional material that helps them to take into account the motivational psychology design subthemes (Khong & Kabilan, 2020). In other words, the combination of microlearning and flipped learning prepares students to learn in a technology-based context and enhances their skill by activating their motivation, cognition, active learning, and interaction.

2.4. Purpose of the study

One of the aims of this research is to uncover how the flipped classroom and microlearning methods affect students' motivation levels. Khong and Kabilan, (2020) proposed a model for investigating the effect of microlearning on academic achievement in an L2 context. By using this model as a reference, this study examines how the microlearning method affects student grammar achievement. Furthermore, the flipped classroom method is considered as a new method that lacks sufficient research into its impact on EFL grammar. Also, most research done on the flipped classroom was conducted with university students (Liu et al., 2018). This study will contribute to the literature in examining the effects of flipped learning and microlearning methods used both together and separately in the EFL context and in comparing the effectiveness levels between the groups. Thus, the objectives of the research can be summed up by the following research questions:

1. Does the implementation of micro, flipped, and microflipped learning have any significant effect on the achievement of EFL students' grammar skill?
2. Does the implementation of micro, flipped, and microflipped learning have any significant effect on the motivation of EFL students' in learning grammar skill?

3. Method

3.1. Design of the study

This study used the pretest-posttest design for the control group from the experimental method and semi-trial models (Cohen et al., 2011). Semi-experimental models are a kind of study in which the data is observed under the supervision of the researcher in order to discover cause and effect relationships (Karasar, 2009). The reason behind using this model as part of this research is that it is not possible to impartially assign students to different groups (Kerlinger & Lee, 1999).

3.2. Setting and participants

This study was undertaken in two English language institutes in Iran. The research was conducted with the participation of 100 intermediate male EFL students (N for each class = 25) who attended general English classes twice a week for 90 minutes each session. All participants were native speakers of Persian and were from 19 to 24 years old ($M = 18.5$, $SD = 2.1$). The student's proficiency level was determined based on the Oxford Placement Test (OPT) taken by the institute before registration. All of the students had 1-3 years ($M = 25$ months) of experience since they formally began learning English. The participants were in four intact classes which were randomly selected and assigned to the microlearning, flipped, microflipped, and control groups. They studied with *Oxford Living Grammar Intermediate* (Coe, 2010) as their coursebook, which is a generally taught coursebook in the country. Students in the research were volunteers and written informed consent from learners and institutes authorities was obtained. Their course included instructions sections on learning grammar. The teacher of the four classes was the same non-native English teacher (female, age = 26).

3.3. Experimentation

To investigate the effectiveness of microlearning, flipped, and microflipped approaches on enhancing L2 grammar skill, three experimental groups and one control group were assigned. They were: Group 1 (microlearning), Group 2 (flipped learning), Group 3 (microflipped learning), and Group 4 (traditional lecture-based learning). The treatments were given for 11 weeks (see Table 2). The same teacher and the same coursebook were used with the four groups. In the experimental groups, the same mobile software (Edmodo App) was used as a technology-enhanced tool. Additionally, care was taken to ensure the time allocated for teacher lecturing was the same in four groups. The following parts elaborate on the procedure of the control and experimental groups.

Table 2. General scheme of teaching grammar in four groups

Weak	Focus
1	Administering pretest motivated strategies for learning questionnaire (MSLQ)
2	Administering pretest
3	Elaborating on verbs and tenses
4	Elaborating on modal verbs

5	Elaborating on verb forms and structures
6	Elaborating on noun, pronoun, determiners
7	Elaborating on adjectives and adverbs
8	Elaborating on propositions
9	Elaborating on building sentences
10	Administering posttest motivated strategies for learning questionnaire (MSLQ)
11	Administering posttest

3.3.1. Control group

In the control group, the traditional lecture-based deductive teaching was employed and participants met twice a week for a total of one-and-a-half hours. The teacher utilized the traditional lecture format, disseminating teaching through the use of multiple sliding whiteboards and an overhead video projector. The lecture classroom was designed to seat about 26 students. The students in this group normally sat passively at their seats and listened to their teacher, taking notes in the class. They rarely engaged in dialogue with the teacher. At home, they did their homework on paper and pencil (such as completing the coursebook exercises).

3.3.2. Microlearning group

Instruction administered in the microlearning group was based on the theoretical and structural model of microlearning for L2 instruction by Khong and Kabilan (2020). Using the Edmodo App, a group channel was created by the teacher, and the students were added to the class. Every lesson of the course was divided into smaller parts (e.g., elaborating on verbs and tenses were divided into five parts namely 1) Present Simple and Present Continuous; 2) talking about the past; 3) Present Perfect; 4) Past Simple and Present Perfect; and 5) the future), and 10-min videos were created by the teacher on each of these topics (Cognitive Psychology Domain). The students did not have to attend the physical classroom (Motivational Psychology Design). Every day of the week, one of these ten-minute videos was uploaded by the teacher to the Edmodo app. The students had to watch the videos and then answered the quiz in the App (Cognitive Psychology Domain). In order to engage students in learning and make them motivated the teacher asked them to use the grammar rule, they had learned in a real-life context and record it, then share it with the classmates (Motivational Psychology Design). After that, the teacher checked the recorded videos of the students and looked at the answers of the students to the quiz, and gave them feedback through the Edmodo App. The videos were available for them to watch whenever they want.

The students had to do homework (such as doing the exercises in the book) and share them with the teacher through a technology-enhanced App.

3.3.3. Flipped learning group

The teacher in this approach also created a channel group of the class in the Edmodo app. The students also had to join the Edmodo and then enter a code to join the class. A day before attending a physical classroom, the teacher uploaded a video of her lectures on the topic of the course (e.g., elaborating on verbs and tenses). The length of the video was about one and a half hours/an hour and a half. The students had to watch the video and answer a quiz in the App by cooperating with their classmates. The logic behind the quiz in this approach was that the students had watched the video and then were encouraged to work collaboratively. In the physical class, the time was spent on doing exercises and solving the problems. There was not any homework after a class for the students to complete at home.

3.3.4. Microflipped learning group

The purpose of this model is usually to deliver the lecture outside the classroom. Microflipped learning takes into consideration the length of the video and adds controls to ensure that students had seen the video. This involves possibilities to ask the teacher questions, to have a dialogue between the students and the teacher, and for the teacher to recommend additional material. The idea here was not to cover the entire lecture, but only the most important parts of it and to begin employing concepts. The video used in the model was about ten minutes long. In this study, the teacher created a single flipped learning video session, empowering the student to focus on the most significant part of the lecture. For these purposes, it was the teacher themselves who had to record the video and share them with the students in the Edmodo app. Each video has an associated obligatory quiz that students had to answer in an Edmodo App. In this way, it was established that participants had seen the video and learned the most important parts. The students were equipped with additional material that was extended, supplemented, or reflected upon what is displayed in the video. The teacher might provide such material or it may be presented as an external resource. The students had to do the tasks individually at their own pace after watching the videos. Accordingly, in this activity students have generated learning resources, which had three purposes: (1) to check the degree of assimilation of the concepts in exercises outside the classroom; (2) to generate instructional resources for use in classroom activities; and (3) to get students to be actively engaged in the learning process. In a physical classroom, the

objective was that the learners interact, participate and cooperate. The teacher used the results of the students' works they shared with her to trigger a discussion with other students (for example, a student with various results shares his/her opinion setting a discussion to see which results were more valid). The usual format for this activity was a brief lecture begun by the students and fulfilled by the teacher in the right format (see Table 3 to overview the procedures in control and experimental groups).

Table 3. The procedure of four groups of the study

Group	Material delivery	Teaching Method					
		Before class		In class		After class	
			Online Session		Face-to-face Session		
Control Group (Teacher fronted classroom)	Learning materials were in print format and were delivered during in-class activities to the students.	None	None	30-minute lecture of the teacher	30-minute reading of examples in the textbook and elaborating on them	30-min writing activities and checking them by the teacher	Composing a piece of argumentative writing and submitting it over the following week
Experimental Group (Microlearning)	The learning materials were made available in the electronic format via the Edmodo App and students can use them whenever they wish.	None	Watching 10-min videos every day on every topic Do the quiz on the App Receive feedback on the quiz	None			Creating a 5-min video and sharing with the teacher and friends what they understand from the topic Doing homework and delivering it to the teacher through App.
Experimental Group (Flipped Learning)	Learning materials were in the print format and were delivered during in-class activities and before physical class, the materials were available on the Edmodo App.	Watching the video uploaded by the teacher and completing the quiz in the App.	None	30-minute solving the homework and at-home activity through cooperative learning	30-minute reading of examples in the textbook and elaborating on them	30-minute tutorial and/or strategy training	None

Experiment al Group (Microflipp ed learning)	Out-of-class learning materials were made available before class in the electronic format via the Edmodo App as a supplement, while worksheets associated with in-class activities were provided in written format.	Watching a 10-min video that was uploaded by the teacher. Interacting with the teacher and ask about their problems. Doing the quiz in the App. Receiving additional material and study them. Doing an individual exercise and delivering it to the teacher via App	None	30-minute task analysis of the students delivered online to the teacher 10-minute micro lecture of the teacher 20-minutes problem solving 20-minutes of cooperative working with classmates.	None
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3.4. Instrumentation

3.4.1. Motivated strategies for learning questionnaire (MSLQ)

One of the tools used in this study was the motivated strategies for learning scale, which is known as the “Motivated Strategies for Learning Questionnaire” (MSLQ, Pintrich et al., 1993), rather than forming a new one. This scale has viewed motivation from a socio-cognitive perspective. According to this concept, students are active processors of education. Cognition and opinions are affected by the characteristics of the task and educational inputs (Duncan & McKeachie, 2005). The scale is based on three basic motivational constructs, which are expectancy, value, and affect. Pintrich et al. (1993) describe the first concept of expectancy, which is the opinion of students regarding success. The value describes how students are committed to an academic task or subject, and the effect is relevant to the anxiety and worries students experience during exams. The expectation part of the scale consists of two subscales: self-efficacy for learning and production and control of learning beliefs. The value sub-dimension consists of three subscales: intrinsic goal orientations (concentrate on learning and mastery), extrinsic goal orientations (supported by grades and others), and task value (how interesting, helpful, and important the course content is for the student). The

affect component consists only of the test anxiety subscale. In this research, only the motivation component was involved in the implementation process, and the original factor that was produced for the scale for undergraduate students was adhered to. To ensure reliability, Cronbach's Alpha was calculated and internal consistency coefficient was found to be 0.71 for the intrinsic goal orientation (4 items), 0.75 for extrinsic goal orientation (4 items), 0.77 for task value (6 items), 0.69 for control of learning beliefs (4 items), 0.82 for self-efficacy for learning and performance (8 items), 0.81 for test anxiety (5 items), and 0.91 for the whole scale.

3.4.2. Grammar task

To obtain the data for analysis, two parallel researcher-made grammar knowledge tests were outlined and developed by a board of well-experienced EFL instructors. The board members, who were two EFL instructors, were selected based on their experience in teaching the English language and familiarity with the learners' coursebook. The tests included the grammatical constructions involved in each lesson of the learners' textbook. The textbook's lessons covered a range of grammatical structures such as passive and active voice, direct and indirect speech, two-word verbs, be going to, Present Perfect tense, relative clauses, and gerund structures. Each of the tests contained 20 multiple-choice items and 20 grammaticality judgment items containing all grammar points of the learners' coursebook to assess the grammatical knowledge of the learners before and after the experiment. The reliability was calculated as (Item = 40, $\alpha = .95$). The allotted time was 60 minutes and the correct answer to each item received one point. There was no penalty for false responses. At the end of the treatment, a post-test was administered to the participants of the research. The post-test was the second stage of the mixed test of the book whereas the pretest was the first stage. The validity of the post-test was also checked by the teachers who validated the pre-test and its reliability was computed as (Item = 40, $\alpha = .89$).

3.5. Data collection and analysis

After and before the experiment, the researchers asked the participants to complete MSLQ on motivation. The paired sample t-test was used to compare the scores of MSLQ in the pre-and post-test. Additionally, the participants completed the pre-and post-test in order to compare the achievements of participants in different groups. The pre-and post-test scores were analyzed through the one-way between-groups analysis of variance (ANOVA) and Scheffe post-hoc test to reveal the difference. Regarding the MSLQ, paired-samples comparisons for

pre-test and post-test scores were computed to see whether the groups have improved in terms of motivation and motivation subskills.

4. Results

4.1. Research Question 1

Descriptive statistics and relevant statistical tests were carried out to address the first research question. Table 4 shows the descriptive statistics of writing scores in control, microlearning, flipped learning, and microflipped groups. As displayed in Table 4, the learners' writing mean scores in the microlearning group increased largely from the pretest ($M = 26.81$) to the posttest ($M = 35.69$). Besides, in the flipped group the mean scores increased from the pretest ($M = 26.58$) to the posttest ($M = 36.65$), and the microflipped group the pretest ($M = 26.65$) to the posttest ($M = 37.31$), whereas the learners' mean scores in the control group increased slightly from the pretest ($M = 27.88$) to the posttest ($M = 30.42$). Based on the descriptive results, the learners in the microlearning, flipped, and microflipped group performed better on the grammar posttest than the learners in the traditional group. Also, it seemed that the learners in the microflipped group had performed better than the microlearning and flipped group.

Table 4. Descriptive statistics of grammar skill scores in four groups

Variable	Groups	N	Min	Max	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Pre-test	Control	25	24	31	27.88	15.06	-.204	-.618
	Microlearning	25	21	30	26.81	13.30	-.399	-.914
	Flipped	25	22	27	26.58	23.67	-.383	-.794
	Microflipped	25	21	28	26.65	13.60	-.442	.456
Post-test	Control	25	28	39	30.42	14.71	-.164	-.812
	Microlearning	25	32	47	35.69	7.94	-.63	-1.303
	Flipped	25	31	49	36.65	7.53	-.278	-1.133
	Microflipped	25	33	50	37.31	7.50	-.261	.456

The examination of the descriptive statistics assured that the skewness and kurtosis values of the argumentative writing scores were well within a range of ± 1.5 showing fairly acceptable normality of variances. However, because the samples were small, the normality and homogeneity test, that is, the Shapiro-Wilk and Levene's tests for homogeneity of variances

were used. The results of the Shapiro-Wilk test demonstrated that the grammar scores were normally distributed both in the pre-test [$D(26) = .954, p = .305, D(26) = .942, p = .301, D(26) = .940, p = .240$ and $D(26) = .938, p = .136$] and in the post-test [$D(26) = .964, p = .500, D(26) = .953, p = .432, D(26) = .937, p = .463$, and $D(26) = .934, p = .291$] for the control, microlearning, flipped, and microflipped groups, respectively. Moreover, the Levene's test for homogeneity of variances demonstrated no significant difference in the variances between four groups ($F = .05, p = .985$), which supported the use of a parametric test for further data analysis.

A one-way between-groups analysis of variance (ANOVA) was conducted on the grammar scores in the pre-test phase in the four groups of the study. In effect, as Table 5 shows, the performance of the four groups was not significantly different in the pre-test ($p < 0.05$).

Table 5. One-Way ANOVA on Pretest Grammar Scores

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	29.038	3	9.679	.050	.985
Within Groups	19398.923	97	193.989		
Total	19427.962	100			

Another one-way between-groups ANOVA was conducted to see whether the implementation of the microlearning, flipped, and microflipped learning had any significant effect on the performance of EFL learners' grammar skill in comparison with the traditional instruction. The independent variable was the type of instruction/class (traditional vs. microlearning, flipped, and microflipped learning) named as Group in the analysis.

Table 6. ANOVA for treatment effects on posttest grammar score

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected model	10218.6 ^(a)	3	3406.21	34.68	.000	.51
Intercept	649380.03	1	649380.03	6611.95	.000	.98
Group	10218.65	3	3406.21	34.68	.000	.51
Error	9821.30	97	98.21			
Total	669420	100				
Corrective total	20039.96	99				

^(a) R² Squared = .510 (Adjusted R² = .495)

The ANOVA results revealed a statistically significant main effect for Group, $F(3, 97) = 34.68, p < .05$, partial eta squared = .51, which means that there were significant differences among the post-test writing mean scores of the four groups receiving different types of instruction. A partial eta squared value of .51 represented quite a large effect size, indicating that 51% of the variance in the grammar post-test means could be explained by the type of instruction. To investigate the differences between the groups on the posttest, the Scheffe post-hoc test was conducted (see Table 7).

Table 7. Multiple comparisons on the posttest writing score in the Scheffe Post-hoc test

Groups	Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Microflipped	Control	6.89(*)	2.749	.000	-34.09	-18.45
Microlearning	Control	5.27(*)	2.749	.000	-28.05	-12.41
Flipped	Control	6.23(*)	2.749	.000	-27.70	-12.07
Microflipped	Microlearning	2.37	2.749	.192	-1.78	13.85
Microflipped	Flipped	1.33	2.749	.152	-1.43	14.20
Microlearning	Flipped	1.04	2.749	.999	-7.47	8.16

* The mean difference is significant at the .05 level.

As Table 7 indicates, microflipped, microlearning, and flipped groups scored significantly higher than the control group ($p = .000$) regarding the EFL learners' grammar skill performance. However, there was no significant difference between microflipped, microlearning, and flipped groups when compared with each other ($p > .05$).

4.2. Research Question 2

To examine whether the pre-and post-training motivation levels of students in the microlearning, flipped, and microflipped differed significantly, the participants answered the questionnaire items. First, the descriptive statistics were calculated to check for the normality of the data. As displayed from the data, learners' mean scores in the microlearning group increased largely from the pre-test ($M = 2.50, 2.35, 1.98, 2.23, 3.35, 2.76$) to the post-test ($M = 3.69, 3.42, 3.24, 4.01, 3.86, 3.47$). Besides, in the flipped group the mean scores increased from the pre-test ($M = 2.58, 2.34, 2.87, 2.36, 2.34, 2.65$) to the posttest ($M = 3.65, 3.78, 4.21, 3.93, 3.46, 4.45$), and the microflipped group the pre-test ($M = 2.65, 2.45, 2.76, 2.67, 2.89, 2.83$) to the posttest ($M = 3.31, 3.76, 3.89, 3.76, 3.78, 3.67$), whereas the learners' mean scores in the control group increased slightly from the pre-test questionnaire ($M = 2.88, 2.23,$

2.34, 2.54, 2.45, 2.65) to the post-test ($M = 2.77, 2.12, 2.14, 2.31, 2.23, 2.17$). Besides, the skewness and kurtosis were between ± 1 for all four groups, which shows a normal range. Based on the descriptive results, the learners in the microlearning, flipped, and microflipped group had better motivation based on the post-test questionnaire than the learners in the traditional group. Further analysis was conducted to see the differences.

Paired samples comparisons for pre-test and post-test scores were computed to see whether the experimental groups had improved in terms of motivation (intrinsic goal orientation, extrinsic goal orientation, task value, and control of learning beliefs, self-efficacy for learning and performance, and test anxiety). The results of paired samples *t*-test indicated that microlearning, flipped, and microflipped conditions increased motivation and subskills of motivation questionnaire respondents, that is the people that filled in the questionnaires over time (Table 8).

Table 8. The results of paired samples t-test

Group	Variable	Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error	95% Confidence Interval of the Difference				
					Mean	lower			
Microlearning	Intrinsic goal orientation	-2.88	1.13	.22	-3.34	-2.41	-12.74	24	.000
	Extrinsic goal orientation	-2.96	1.02	.20	-3.38	-2.53	-14.51	24	.000
	Task value	-3.16	.98	.19	-3.56	-2.75	-16.01	24	.000
	Control of learning beliefs	-3.20	1.08	.21	-3.64	-2.75	-14.81	24	.000
	Self-efficacy for learning and performance	-3.64	1.03	.20	-4.06	-3.21	-17.56	24	.000
	Test anxiety	-3.28	1.06	.21	-3.71	-2.84	-15.45	24	.000
Flipped	Intrinsic goal orientation	-3.44	1.12	.22	-3.90	-2.97	-15.34	24	.000
	Extrinsic goal orientation	-3.20	.86	.17	-3.55	-2.84	-18.47	24	.000
	Task value	-3.12	.92	.18	-3.50	-2.73	-16.82	24	.000
	Control of learning beliefs	-3.20	.81	.16	-3.53	-2.86	-19.59	24	.000
	Self-efficacy for learning and performance	-3.20	1.00	.20	-3.61	-2.78	-16.00	24	.000
	Test anxiety	-3.52	1.04	.20	-3.95	-3.08	-16.83	24	.000
Microflipped	Intrinsic goal orientation	-3.44	1.08	.21	-3.88	-2.99	-15.87	24	.000
	Extrinsic goal orientation	-3.56	.91	.18	-3.93	-3.18	-19.42	24	.000
	Task value	-3.40	1.11	.22	-3.86	-2.93	-15.20	24	.000
	Control of learning beliefs	-3.40	1.04	.20	-3.83	-2.97	-16.33	24	.000
	Self-efficacy for learning	-3.28	1.02	.20	-3.70	-2.85	-16.05	24	.000

and performance								
Test anxiety	-3.24	1.05	.21	-3.67	-2.80	-15.39	24	.000

5. Discussion

In this study, it has been found that the microlearning method, the microlearning method in the flipped learning environment, the flipped learning method, and the teaching activities in the grammar curriculum have a significant effect on the academic achievement level of students. The group with the highest score and the highest effect size in the academic achievement test average was the group in which the microlearning method was applied in the flipped learning environment, and this result was statistically significant when compared with the other experimental groups.

The results of this study showed the flipped learning method positively affected the achievement level of students in the EFL grammar course compared with conventional teaching methods. One of the reasons may be the students' interest in using technology in the teaching method because nowadays technology is a necessary tool in people's lives. Another reason possibly is changing homework and lecture time. This is because in flipped learning instruction the students can watch a lecture at home, learn the skill, and in a classroom can apply what they learn and solve their grammar learning problem. Those results are consistent with the findings of the effects of flipped learning on academic achievement in the L2 context (e.g., Liu, Sands-Meyer, & Audran, 2018; Webb & Doman, 2019). On the other hand, the results showed that the microlearning instruction improved the grammar skill of EFL students more than traditional lecture-based teaching. The reason may be the application of technological tools, the limited time of learning (only 10 minutes every day), and the availability of the lecture whenever needed. These results confirmed the Khong and Kabilan's (2020) theoretical model of microlearning which demonstrated significant benefits for EFL/L2 students. Furthermore, Nikou and Economides (2018) confirmed the effectiveness of microlearning on high school students' achievement. Moreover, the results showed that the microlearning method when used in combination with the flipped learning method has a positive impact on the academic achievement of students in the grammar course. The reason possibly is the use of technology and active learning in both methods. In addition, cooperative learning in microflipped learning may be another reason for the student's improvement. Numerous studies in various areas on cooperative learning support this finding (Erbil & Kocabaş, 2018; Hattie, 2009; Johnson et al., 2000; Kyndt et al., 2013).

Therefore, one conclusion is that using two methods together will provide important benefits to students (Lai & Hwang, 2016).

Comparisons between experimental groups were made in terms of motivation levels based on subcomponents. According to the findings of the analysis; the microlearning alone, the microlearning method used alongside the flipped environment, and the flipped learning method used alone all positively and significantly affected the motivation levels of students as per the grammar course curriculum. When the flipped learning method is applied both by itself and alongside the microlearning method, it improves the students' intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for learning and performance, and test anxiety beliefs in the sub-dimensions of motivation. The reason may be the application of the environment of flipped and microlearning which helped the students to learn in the self-space (through video), facilitated their question generation through the app without worrying about the limited time of the class and allowing them to repeat the lecture whenever they need to learn it completely. This result is consistent with the findings of other studies in the literature on the effect of the flipped classroom on motivation (Abeysekera & Dawson, 2015; 2017; Sergis et al., 2018; Zainuddin, 2018; Chang & Hwang, 2018; Hwang et al., 2019).

6. Conclusion, implication and limitation

In summary, the findings of this study revealed that using a microlearning, flipped learning, and microflipped learning strategy can significantly improve skills of using grammar by students in the EFL classroom compared with the traditional lecture-based teaching. The analysis of data, also, revealed using these methods improved the motivation of the EFL students.

This study has some implications for language teachers and researchers. First, the findings of the study show that the way language teachers present classroom activities could have a differential effect on engaging students in learning. Therefore, it is suggested that teachers be careful about how they plan and sequence their classroom strategies. For researchers, in the future, more practical pedagogical approaches both for out-class and in-class activities can be implemented in the microlearning, flipped learning, and microlearning process in other parts of EFL, such as writing, reading, and oral comprehension, and it will also be possible to develop new digital tools or utilize other existing instruments to accelerate active learning in students' learning.

This study has some limitations. First, this study is limited by the participants' gender. This study was conducted only with male participants. It is suggested that similar studies should be done with male and female participants before any generalization is made about the findings. Second, this study is limited to quasi-experimental research (using intact groups). Further research can apply true experimental research by applying systematic sampling.

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LEXICAL COLLOCATIONAL INSTRUCTION IN EAP WRITING VIA COCA

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Abstract

This study investigated the efficacy of explicit lexical collocation instruction via the Corpus of Contemporary American English (COCA). To improve competence in lexical collocation and writing performance and to examine whether collocational competence and writing performance have a linear interrelation, 16 international English for Academic Purposes students received training on the use of the COCA interface. They were asked to first analyze the lexical collocations used in an academic paper, then search COCA for collocations to see how they are used pragmatically, and, finally, write an academic research paper on their own. A dependent *t*-test measured significant differences in performance, and the Pearson product-moment correlation coefficient identified the strength of the correlation between lexical competence and writing performance and their association with each other, respectively. The results showed that when students are given explicit instruction on how to utilize COCA to identify lexical collocations and their use in various contexts, both their lexical collocational competence and writing performance improves and, furthermore, these improvements correlate with each other. Implications for teaching lexical collocation are also discussed.

Keywords: English for Academic Purposes (EAP); explicit instruction; lexical collocations; academic writing

1. Introduction

Lexical collocations (e.g., *recommend highly*, *thick fog*, *bee stings*, *closely related*) and their cohesiveness play a critical role in academic writing because they affect the clarity and readability of a text (Mahlberg, 2006; Vyatkina, 2016). Second language (L2) learners, particularly those enrolled in English for Academic Purposes (EAP) courses, need to be made aware of the use of lexical collocations in academic written texts and be able to employ these collocations themselves. The ability to incorporate lexical collocations in a passage should help both L2 and EAP learners achieve fluency similar to that of native English writers (Bahns, 1993; Saito, 2020). Because collocational competence is neither natural nor can it be developed and acquired without explicit instruction, L2 learners must be afforded targeted opportunities to learn how best to employ English lexical collocations productively. Learning lexical collocations can also aid L2 learners avoid misunderstandings, as lexical chunks are usually fixed, which require less decoding (Wray, 2012).

Lexical collocations, according to Howarth (1998), have “a syntactic function as constituents of sentences” (p. 24), which helps “in the process of composition at clause level” (p. 24). Using a phraseological approach, Howarth (1998) divided lexical unit combinations into two categories: (1) free or open and (2) restricted. The free lexical collocation combinations convey literal meanings, and their elements are freely substitutable (*carry a trumpet*, *blow a trumpet*), while the restricted lexical collocation combinations contain specific collocates whose meaning can only be discovered from contexts (*blow a fuse*). The categorization is parallel to Walker (2011) who asserted that “a collocation will typically exhibit a degree of fixedness” (p. 293). This implies that the collocation combinations are non-arbitrary and, furthermore, that their co-occurrences can be either semi-fixed or fixed.

Similarly, Gablasova et al. (2017) posited the relationship of collocation combinations based on three collocational properties: (1) frequency, (2) exclusivity, and (3) directionality. *Frequency* refers to “counting the co-occurrences of word forms” (p. 159) that is structured from noticing, representation, access, and production of language (*risk issues* and *moral issues*). *Exclusivity* is defined as “the extent to which the two words appear solely or predominantly in each other’s company” (p. 160), characterizing collocational combinations to be more easily recognized, acquired, and stored as a unit, to have stronger priming effects, and to be positively correlated (*nuclear energy* and *global warming*). Closely related to priming is *directionality*, the

third property of collocation combinations. According to the authors, directionality is “a concept that postulates that the components in a collocation do not attract each other with equal strength” (p. 160). For example, “decorations” in *Christmas decorations* may prime language learners for “Christmas,” but *Christmas* will not prime speakers for “decorations.” In like manner, language learners may prime “extenuating” in *extenuating circumstances* when they hear “circumstances,” but not *circumstances* when they hear “extenuating.”

In lexical collocational instruction, even though L2 learners tend to concentrate on learning single vocabulary items rather than word combinations, they are taught, nonetheless, to use word combinations, as such combinations do play a weighty role in assisting learners store and recall words (Lewis, 2001; Nattinger, 1980). And according to Thornbury (2005), instructors need to raise their learners’ awareness of this writing sub-skill, not least because learning collocation is a daunting task for language learners as there are so many of them. Chen’s (2019) findings also reiterated the importance of developing an awareness of collocation, as Chinese college EFL learners who failed to develop such awareness tend to produce and recognize almost all two-word combinations in their writings as creative and “freely grammatically correct combination of two words” (p. 65), which resulted in learners’ collocation errors. As most of the previous studies either only focused on the analysis of single-word units or rarely examined how collocations are being used in regard to L2 speaking proficiency, Saito’s (2020) study examined two different constructs of L2 speech, with *comprehensibility* being concerned with novice raters’ intuitive effort of understanding the L2 speech, whereas *appropriateness* dealing with how expert raters evaluate the accuracy and suitability of the collocation use. Results showed that comprehensibility and lexical appropriateness were strongly determined by the L2 speakers’ use of low-frequency combinations containing infrequent, abstract, and complex words.

Past studies have also considered university-level students’ collocational competence in relation to their overall writing performance. For example, Orenha-Ottaiano (2016) claimed that for collocational instruction to be effective, it should be conducted explicitly as collocations are set expressions and often restricted within the surrounding context. In a similar vein, Li’s (2017) study showed that corpora-based learning resulted in a significant improvement in EFL learners’ academic writing in comparison to the traditional, rule-based learning method. It is logical to surmise then that effective learning strategies need to be developed in an explicit manner, such as

teaching learners how to consult collocation dictionaries and computer concordancers (i.e., a computer program that automatically constructs a concordance).

Moreover, Liu and Zhong (2014) posited that synonyms become easily distinguishable when their typical collocates are presented. For instance, when discussing statistical results, *significantly different* rather than *importantly different* is used even though *significantly* and *importantly* are synonyms. Therefore, EFL learners need to be made aware of the present synonyms, so as to judge and select the more appropriate ones to collocate. To this end, Wongkhan and Thienthong (2020) stated that although words themselves do convey meaning, the actual meaning is more often than not determined by the co-occurred word combinations, as words that co-occurred together exert a heavy semantic influence on each other. In their study, 120 Thai EFL learners were recruited. These learners reported that they had never had academic collocations and synonyms being taught explicitly. They were given a forced-choice test, which featured 10 collocation questions with 3 synonyms as the collocate choices. The test contained four collocation types: adjective + noun (e.g., *important role*), verb + noun (e.g., *cause problem*), adverb + adjective (e.g., *vitally important*), and adverb + verb (e.g., *fully understand*) (p. 5). After analyzing participants' answers, the authors believed that the learners who were exposed to the synonymous pair lexical collocations were also the ones who were better at distinguishing and forming the correct judgment on their collocation choices.

Oakey (2020) added that while many researchers have claimed that explicit lexical collocation instruction has been proven to be effective, many EAP practitioners struggle to implement it in the classroom. The characteristics of the learners, the in-house textbook being used in the classroom, and the decontextualization of list of collocations were offered as possible reasons for this. However, the study's results suggested that EFL learners' frequent exposure to academic texts may indeed promote language learning. Even though EFL learners may not be taught lexical collocations explicitly, they can, nonetheless, acquire academic collocations both implicitly and incidentally. Khonamri et al. (2020) also argued the importance of explicit instruction in lexical collocation instruction for language learners and instructors alike. Being made aware of collocation knowledge, language learners were more likely to attend to words that usually co-occur together and even incorporate more collocations and write more complicated sentences in their writings. Conversely, language instructors found recycling to be an effective teaching strategy to help learners commit the newly learned collocations to memory. Said

strategy is achieved by revisiting the same knowledge points from a novel angle (Lewis, 1997; Harwood, 2002), explicit instruction notwithstanding. Finally, Skoufaki and Petric (2021) posited that providing a frequent input for word forms (definition, collocation, syntactic) implicitly is more effective than explicitly teaching the word forms.

Against the backdrop of such information, our study investigated the effectiveness of implementing explicit instruction to improve learners' lexical collocation competence and academic writing skills via the integration of the Corpus of Contemporary American English (COCA). COCA is a technological tool L2 instructors can employ profitably to make their collocational instruction explicit, thereby helping learners search for the most frequent English collocations within contexts displaying authentic language use. Concurrently, COCA can also be used to mediate lexical collocations in an academic writing class to maximize EAP students' acquisition of linguistic, cultural, and content knowledge, in addition to exploring the pragmatic use of lexical collocations. Following Lontas (2019), lexical collocations "refer to the combination of two (or more) content words such as nouns, verbs, adjectives, and adverbs" (pp. 64-65). Both the number and the type of collocations used in the written texts are indicators of the native fluency of the writers. To help students establish a holistic understanding of the possible word combinations, Benson et al.'s (1986) six categories were included in this study: (1) verb + noun (*inflict a wound, withdraw an offer*); (2) adjective + noun (*a crushing defeat*); (3) noun + verb (*lions roar*); (4) noun1 + noun2 (*a pride of lions*), (5) adverb + adjective (*deeply absorbed*), and (6) adverb + verb (*sincerely appreciate*). In terms of teachability, combinations such as verb + noun occur more frequently (Howarth, 1998).

2. Literature review

2.1. The use of COCA in an EAP academic writing course

Teachability considerations aside, we sought to heighten awareness of the ways by which instructors can achieve specific pedagogical ends without sacrificing in the process the contexts wherein all lexical collocations, irrespective of collocation type, ultimately attain their pragmatic use naturally. (For a more complete account of collocational competence, electronic corpora, web-based concordancing instruction, and collocation learning with a digital library, see Chan & Liou, 2005; Jaén, 2007; Laufer & Waldman, 2011; Lontas et al., 2020; Nesselhauf, 2005; Wu et

al., 2010.) Accordingly, our data collection and analysis are methodically related to how explicit instruction and the use of COCA in teaching lexical collocations and their pragmatic use can mediate the learning experiences of university-level students in EAP courses.

As noted already, this study integrated COCA as the prime reference tool. The choice to integrate an online corpus such as COCA was guided by the findings of several studies on corpus linguistics (e.g., Aijmer & Simon-Vandenberg, 2006; Belz & Vyatkina, 2005; de Kelrk, 2005), a great many of which explored pragmatic nuances of collocational knowledge use in naturally occurring data. LaCastro (2011) stated that corpus linguistics is a field of study that emphasizes the need for a collection of language learning materials and dictionaries on a body of data of pragmatically occurring written and spoken language use. As she concluded,

[c]orpora enable researchers to investigate a myriad of different phenomena including pragmatic functions and linguistics enactments in the large databases, thus providing results that may be viewed as more reliable, valid, and generalizable across populations without the lack of reliability that arises from the use of scholars' intuitions and created or self-reported data. (p. 329)

According to the lexical priming theory developed by Hoey (2005), each time an individual encounters a word, the retardation and acceleration of word association is primed for use in discourse through that experience. In other words, whenever an individual encounters a word or a combination of words, that individual also notes subconsciously how words interact with other words in common patterns of use. The cumulative effect of an individual's encounters with a word highlights not only the critical role lexical priming plays in language use, more importantly, it underscores a word's (textual) collocations/colligations, semantic/pragmatic associations, genre, style, or both, in which that particular word is naturally used. As a result, a word is primed to replicate these contexts in all subsequent encounters, which, in turn, explains how words are pragmatically used in the real world irrespective of the language modality (speaking, listening, reading, writing) in which the social or academic discourse is actualized. Node word frequency is perhaps the strongest predictor of receptive knowledge of collocation (Nguyen & Webb, 2016). In short: everything one knows about a word is a product of one's encounters with it in natural language use.

Containing more than 560 million words of text, COCA is the largest freely available corpus of American English, and it has long been considered a useful tool in promoting English learners' collocational competence. Tung et al. (2015) argued that training learners how to use

COCA is needed. In sharp contrast to those learners who frequently used COCA, the less frequent users were more likely to have negative feelings towards their experience with COCA. Indeed, they were even less likely to correct their lexicogrammatical errors despite the rich presence of authentic language, content, and structure in COCA. Among EFL learners specifically, improved collocational awareness and enhanced understanding of the target word through the in-depth knowledge provided by COCA (Chung, 2017) are but two notable benefits commonly attributed to the judicious use of COCA. Not unsurprisingly, COCA has been applied regularly in academic writing classes, as learners' collocational competence is closely related to their writing performance. The search for specific keywords in COCA can even expand learners' lexicon and underscore the language, content, and structure engendered in the writing assigned.

Alhusban and Vijayakumar (2021) posited that EAP learners must be given exposure to notice lexical collocations through frequent practice and extensive input. Such exposure will help learners notice and interpret lexical collocations using their lexical knowledge effectively. Already much research has been conducted to investigate the most effective approaches on English collocation instruction to L2 learners, one of which revolves around the comparison between the effects of explicit and implicit instruction. Previous research on this topic seemed to favor explicit over implicit instruction based on prevailing empirical evidence that explicit instruction significantly improves learners' collocational knowledge (El-Dakhs et al., 2018; Gheisari & Yousofi, 2016; Orenha-Ottaiano, 2016). Orenha-Ottaiano (2016), for example, suggested that instructors adopt explicit instruction as their presentation framework when teaching collocations precisely because they are so "highly specific" and "contextually restricted." By comparing post-test and delayed post-test scores among Iranian pre-university students from three groups (explicit instruction, implicit exposure, and control), Gheisari and Yousofi (2016) concluded that the group that received explicit instruction on collocations significantly outperformed the other two groups. A case study of Arab undergraduate learners' receptive and productive knowledge of verb + noun collocational type further corroborated the effectiveness of explicit collocation instruction to EFL learners. Said effectiveness, according to El-Dakhs et al. (2018) may even lead to both short-term and long-term learning gains. Based on Schmidt's (1990) *noticing hypothesis* that stipulates that input cannot be readily learned or stored in learners' mental lexicon unless it is noticed, exposure to a variety of resources provided additional opportunities for learners to notice target collocations in context, facilitated

understanding of these collocations, and consolidated even further their expanding knowledge base of collocations during the search for synonyms and antonyms. Additional explanations of the individual words that constituted the target collocations by teachers were found particularly helpful.

3. Methodology

3.1. The aim of the study

To investigate the effectiveness of explicit instruction on lexical collocations and their pragmatic use via COCA in EAP writing courses, we proffer three research questions (RQs):

1. Does explicit instruction of lexical collocations via COCA improve students' collocational competence in an advanced English EAP course?
2. Does explicit instruction of lexical collocations via COCA improve students' writing performance?
3. Does students' collocational competence correlate with students' writing performance?

To answer these research questions (RQ1, RQ2, RQ3), we utilized quantitative analyses of data. A dependent *t*-test measured significant differences in performance. The Pearson product-moment correlation coefficient identified the strength of the correlation between lexical competence and writing performance and their association with each other, respectively.

3.2. Participants and the context

The study's participants were sixteen international students enrolled in *Academic Writing for International Students II* - an advanced EAP course. This course was embedded in the curricular structure of an English Language Program of a large, public research university located in the Southeast of the United States. Participants' ages ranged from 20 to 40, and they all had already completed their bachelor's degrees in marketing, mass communications, business management, and education in their home countries (Brazil, China, Saudi Arabia, Taiwan, Thailand, Vietnam). They also had experiences writing academic English texts, but not in an EAP context that placed a major focus on improving knowledge of lexical collocations. A major component of the course was vocabulary instruction, reading academic articles, and writing a research paper. None of these participants had ever used COCA in any of their prior English classes, and all of them were

studying in order to enter a Master of Science program of study in marketing departments. Following institutional review board (IRB) approval, the study was conducted over a 15-week period (one semester), each week offering 6-hours of instruction.

3.3. Design and procedure

In *Academic Writing for International Students II*, the instructor, who was also one of the researchers of the study reported here, applied a linear lesson plan (see Appendix D). Throughout the semester, explicit instruction on the use of lexical collocations was implemented (see, for example, Gheisari & Yousofi, 2016). The use of COCA was also integrated as the primary technological tool to improve the participants' lexical competence and writing skills. Vocabulary Levels Test (VLT) at the academic level (Nation, 1983) was listed, and COCA was utilized to search for word combinations. Thereafter, these combinations were divided into six lexical collocation categories: (1) verb + noun (*design a method*); (2) adjective + noun (*scientific evidence*); (3) noun + verb (*evidence suggests*); (4) noun1 + noun2 (*a piece of evidence*), (5) adverb + adjective (*deeply absorbed*), and (6) adverb + verb (*sincerely appreciate*). However, only the first four categories were taught and assessed due to the unavailability of the last two subcategories in COCA (see Appendix A).

As already discussed, the study reported here used COCA for consultation purposes despite the fact that many different types of corpora are available for use today, such as the Wikipedia corpus, the British National Corpus (BNC), and the British Academic Written English (BAWE) corpus, all of which have been well documented and explored in facilitating English language learning in previous studies (Liu, 2010; Luzon, 2011; Marcus, 2019; Tung et al., 2015). Among them, COCA is the largest freely available corpus of American English, and its size, contemporariness, and inclusion of sentence examples are what English language learners of academic writing are likely to encounter in their current and future writings. Frankenberg-Garcia (2018) posited that only with practice in reading and writing in academic English may EAP writers be equipped with the accuracy and proficiency in the production of collocations in the academic English category.

By offering explicit instruction to EAP students on how best to utilize COCA to search for collocations and, furthermore, how to employ contextual clues to understand collocational meaning, these students were provided with targeted opportunities and the reference tool needed

to both build and strengthen their lexical collocational repertoire. They were also explicitly instructed to peruse several research articles to analyze the collocations employed therein (abstract, introduction, literature review, methodology, research analysis and procedural structure, conclusion). These two approaches combined may have helped these students improve not only their lexical collocational competence, but, more importantly, perhaps, their academic writing performance as well.

To utilize COCA in an EAP course when looking for collocations to see how they are naturally used in context, it is vital that students receive training on how to employ COCA *with a purpose* and *for a purpose*. To begin with, students need to first register and fill out a brief form at <https://www.english-corpora.org/>. Thereafter, they can log into their account and search for collocations and up to nine N-grams. In the collocates display, students are able to choose and read the word combinations, which provide insights into their meaning and usage within a particular context (<https://www.english-corpora.org/coca/>). These considerations aside, the study's participants received training on how to profitably use COCA to find the word combinations selected for learning. Before training could commence, participants were asked to register and fill out a brief form to maximize the usability of the site's functions. During training, participants were instructed to log into their account and search for the collocations of a particular word and choose up to two N-grams only before and after the word. From the list of available word combinations, they were then asked to click on the first five, read each collocation in a sentence, and share the collocational meanings while employing critical thinking skills and contextual clues. The participants completed this activity in the classroom using their own laptops.

Throughout the study spanning the lexical collocation competence pre-test, lexical collocation explicit instruction, and lexical collocation competence post-test (see Appendix B), we used the Vocabulary Levels Test (VLT) as a lexical source for the academic vocabulary. According to Nation (2001), the use of the VLT only indicates the magnitude of vocabulary knowledge; that is, the VLT does not reflect other aspects of word knowledge such as word combinations in collocations. The VLT was applied in this study because it is considered a valid and reliable diagnostic tool that can measure a learner's lexical weaknesses at a certain vocabulary level so that after the diagnosis, the student's lexical capacity may be improved (Enayat et al., 2018; Kremmel & Schmitt, 2018; Schmitt et al., 2001). And since previous studies

suggested that improved collocation competence resulted in improved writing proficiency (Li, 2017; Rahimi & Momeni, 2012; Reynolds, 2016), we surmised that by first exposing EAP students to academic level vocabulary from the VLT, then combining the vocabulary with its collocates on COCA, and, lastly, analyzing how the lexical combinations are used in authentic contexts as provided therein, the participants should equally be able to employ their knowledge of lexical collocation to improve their proficiency in writing.

Thus contextualized, our study focused solely on academic-level vocabulary (*coincide, coordinate, expel, frustrate, supplement, and transfer*) and excluded other vocabulary levels such as low-frequency level vocabulary (*blame, hide, hit, invite, pour, and spoil*) or high-frequency level vocabulary (*acquiesce, contaminate, crease, dabble, and squint*) (Nation, 1983).

3.4. Data collection tools and procedures

Referring to previous studies that utilized quantitative data to measure the effectiveness of corpora in collocation competence (Chen, 2011; Daskalovska, 2015; Gheisari & Yousofi, 2016) and writing proficiency (Li, 2017; Reynolds, 2016), in a similar way, the study reported here also employed such data, but with a control group only. While conducting a study with both a control and an experimental group is certain to uncover additional insights not captured in this study, the low number of convenience samples prevented us from having an experimental group. Moreover, our study does not have an experimental manipulation because all of the participants underwent the same experimental protocol. Instead, pre-test and post-test scores were used to quantify the effectiveness of COCA as the prime reference tool in an advanced English EAP course in improving students' writing performance and collocational competence.

To test the difference in means between two data sets from similar sources - students' pre- and post-collocation tests and students' pre- and post-writing assignments - a *t*-test was employed. The pre- and post-collocation tests employed the same set of researcher-made tests that had been adapted from the Academic Word List (V2AV level, academic vocabulary such as *coincide, implementation, and mediate*) in Vocabulary Levels Tests (VLT). The collocation test consisted of 30 questions, including 5 sentence completion questions, 10 multiple-choice questions, 5 paraphrasing questions, and 10 matching questions. Moreover, the pre- and post-writing tests were the students' writing projects on literature reviews that had to include such writing elements as (1) the title of the study, (2) the research question(s) pursued, (3) the purpose

of the project, (4) the research methods employed, (5) major findings, and, finally, (6) a list of sources. These writing projects were then graded based on the following points: introduction, body of the paper, conclusion, references and citations, quality of sources, writing style, and format (see Appendix C). Finally, to investigate the linear relationship between the two dependent variables - lexical collocational competence and academic writing performance - a Pearson product-moment correlation coefficient (Rodgers & Nicewander, 1988) was used to measure the normally distributed data (Table 1).

4. Findings and discussion

The researchers computed the mean values and standard deviation of the pre-test and post-test for lexical collocational competence and academic writing performance (Table 1). In the former, students' post-test scores (M=74.38, SD=15.04) had improved from the pre-test (M=50.63; SD=16.82). In the latter, students' post-test scores (M=85.25, SD=7.55) had equally improved from the pre-test (M=79.00, SD=7.93).

Table 1. Simple descriptive statistics

	Number	Mean	Median	Mode	SD	Variance	Range
Collocation Pre-test	16	50.63	52.50	55.00	16.82	282.92	60.00
Collocation Post-Test	16	74.38	75.00	85.00	15.04	226.25	55.00
Writing Pre-test	16	79.00	80.00	88.00	7.93	62.93	24.00
Writing Post-test	16	85.25	86.00	76.00	7.55	57.00	20.00

Calculating the mean and standard deviation of the pre-test and post-test of both dependent variables, the researchers were able to confirm the hypothesis that EAP students performed well when lexical collocations were explicitly instructed through the use of COCA in an EAP academic writing course.

To answer RQ1 (whether explicit instruction of lexical collocations via COCA improves students' collocational competence in an advanced English EAP course), a dependent *t*-test was conducted. The analysis of a dependent pre- and post-collocational *t*-test showed that there is a statistically significant difference with respect to students' lexical competence in pre-test and post-test scores of M= 23.75, *t*-value= 7.71, *p*-value= <.05 (Table 2). The increase in scores is the result of improved students' performance. Their ability to use lexical collocations may be the result of utilizing COCA profitably to learn lexical collocations which correspond to the VLT

words at the preselected academic level. By explicitly teaching EAP students the different types of lexical collocations and how to systematically search for them utilizing COCA as a viable technological tool, these students were provided with rich opportunities to become all the more aware of the purposeful use of collocations in authentic contexts.

Table 2. Dependent t-test of pre- and post-collocation tests

N	Mean	Std Dev	Mean	95% CL	Mean	DF	t Value	Pr > t
16	23.75	12.3153	23.75	17.1876	30.3124	15	7.71	<.0001

To answer RQ2 (whether explicit instruction of lexical collocations via COCA improves students' writing performance), another dependent *t*-test analysis was conducted. The analysis showed that there is a statistically significant difference between the pre-test and post-test scores of $M = 6.25$, $t\text{-value} = 5.17$, $p\text{-value} = <.05$ (Table 3). The students achieved higher scores in their academic writing assignments. This difference may have resulted from the integration of the lexical approaches (see Appendix D) in the EAP academic writing class.

Table 3. Dependent t-test of pre- and post-academic writing assignments

N	Mean	Std Dev	Mean	95% CL	Mean	DF	t Value	Pr > t
16	6.25	4.8374	6.25	8.8276	3.6724	15	5.17	0.0001

To answer RQ3 (whether collocational competence correlates with writing performance), a Pearson product-moment correlation coefficient was computed. The analysis showed that there was a positive correlation between the two variables, $r = 0.985$, $n = 16$, $p = 0.002$ (Table 4). A scatterplot summarizes the results in Figure 1. A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association, that is, as the value of one variable increases, so does the value of the other variable.

Table 4. Pearson correlation of post-collocation test and post-writing test

Pearson Correlation Coefficients, N = 16		
	collocation_posttest	writing_posttest
collocation_posttest	1	0.68832
writing_posttest	0.68832	1

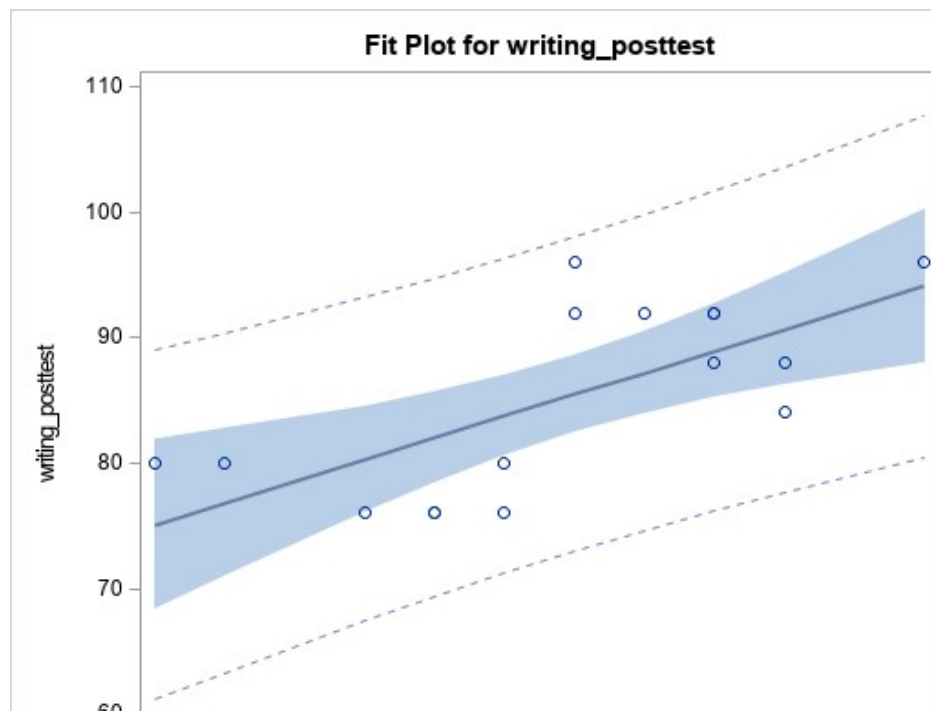


Figure 1. Scatterplot of correlation between academic writing and lexical collocation competences

The results of this study indicate that the change in pre- and post-lexical collocational test scores were statistically significant ($M = -23.75$, $t\text{-value} = -7.71$, $p\text{-value} < .05$). The increase in writing performance of the EAP students who were offered explicit instruction in lexical collocation was equally statistically significant ($M = -6.25$, $t\text{-value} = -5.17$, $p\text{-value} < .05$). In correlation terms, students' lexical collocational competence as a result of explicit instruction via COCA was positively correlated with students' writing performance. Thus, our study confirms that when lexical collocations are taught explicitly in a writing class that strategically employs COCA, there is a notable increase in lexical competence and academic writing performance. These results provide further corroborating evidence to the results already reported in the studies of Robins (1967), Thornbury (2005), and Orenha-Ottaiano (2016), all of which support the

proposition that collocational knowledge can indeed affect L2 learners' linguistic abilities to achieve native-like English proficiency, especially when such capability is contextually nurtured in instructional environments promoting authentic language use. Mahlberg (2006) equally stressed the importance of the cohesive use of lexical collocation in academic writing because it affects the clarity and readability of a text.

It is logical to surmise then that lexical collocations should be taught explicitly through the judicious use of a viable corpus. L2 learners, particularly those enrolled in EAP writing courses, need to become aware of the use of lexical collocations in academic texts and amass the requisite knowledge and skill to employ these collocations *with a purpose* and *for a purpose* within contexts supporting their natural use. Our findings clearly suggest that the ability to incorporate lexical collocations in a passage helped EAP students achieve near native-like fluency. Especially in instruction focusing on lexical collocations, L2 learners should be explicitly taught how to use these word combinations to express meaning in academic writing. Becoming aware of the pivotal role word combinations play in the expression of thought is a necessary first step toward attaining higher levels of lexical collocational competence (Lewis, 2001; Liontas, 2019; Nattinger, 1980). When lexical collocations are instructed explicitly, L2 learners may perform better than when the collocations are instructed implicitly (Orenha-Ottaiano, 2016). Raising learners' awareness of the various subcategories of lexical collocations is an equally important consideration here (Thornbury, 2005).

These pedagogical implications aside, our findings also show that an online corpus should be utilized in collocation instruction. COCA is one of many online corpora language instructors can use to offer their students explicit instruction in English collocation. Specifically, instructors should provide adequate training to their students on how best to search for the most frequent collocations while simultaneously developing a deep appreciation for their use in natural contexts befitting further analysis. As shown, COCA can be used as a suitable reference tool to mediate lexical collocations in an academic writing class. Not only does such a corpus play an essential role in helping L2 learners build their collocational repertoire, but it also helps maximize EAP students' acquisition of linguistic and content knowledge (e.g., Ackermann & Chen, 2013; Aijmer & Simon-Vandenberg, 2006; Belz & Vyatkina, 2005; de Kelrk, 2005). In short, corpora allow EAP instructors and students alike to identify the pragmatic functions lexical collocations serve in written and spoken language (Horváth, 2001; Merckle, 2008).

To sum up, the study reported here involved 16 participants who were majoring in the Master of Science in Marketing. It was conducted over a period of 15 weeks and participants met 18 hours per week. A larger number of participants and a greater length of study may indeed reveal greater improvements in students' lexical competence and academic writing and, conceivably, even show a stronger positive correlation between these two variables. Conducting a study with both a control and an experimental group is certain to uncover additional insights not yet captured in this study. Similarly, the researchers could collaborate with the other EAP instructors at the language institute to further investigate students' improvements in lexical collocational competence and overall writing performance, respectively. And the same reference instrument could again be utilized to gather additional output for another round of analysis likely to yield observations worthy of future investigations.

5. Conclusion

This study investigated the efficacy of explicit lexical collocation instruction via the Corpus of Contemporary American English (COCA). Results obtained herein show that there was a strong, positive correlation between lexical collocational competence and academic writing performances. This findings confirmed the hypothesis that lexical collocational competence as a result of explicit instruction via COCA correlated with academic writing performance. Indeed, as the participants improved their lexical collocational competence based on their pre- and post-test scores on the lexical collocational assessment, they also improved their overall flow and accuracy of their writing performance. There are thus several ways to improve the quality of EAP education, particularly in academic writing courses. Due to space constraints, we only present three such ways in closing.

First, EAP instructors are counseled to provide explicit instruction in lexical collocations. Explicit instruction has already been found to be more effective than implicit instruction as such instruction expedites the development of the four language skills, particularly the learning process of academic writing. Second, EAP instructors should seek creative ways to integrate into their teaching arsenal an online corpus such as COCA. Combined with instructional efforts highlighting lexical collocations and their pragmatic use, corpus-based learning has been shown to have an effect on how well L2 learners ultimately learn the lexical collocations in question. Most definitely, corpus-based learning can mediate the learning experiences of university-level

students enrolled in an EAP course that is exclusively focused on academic writing. Compared to traditional teaching and learning methods of lexical collocations, English-corpora learning has been shown to make students more aware of the ‘mistakes’ - the collocation errors - they commonly make in their writings. As a result of such awareness, they tend to self-edit and correct their mistakes, thereby further improving their collocational competence. Third, EAP instructors should give serious thought to the ways in which they provide feedback to students who tend to commit particular errors in English collocation. And while a corpus-based teaching mode may indeed improve learners’ lexical collocation, pragmatic application, and autonomous learning ability, ultimately, the feedback instructors provide is more than likely to influence the symbiotic relationship that exists between learners’ collocational competence and overall writing skills (Chang, 2018). In the end, lexical collocation instruction in EAP academic writing via COCA is but one way in which the quality of EAP education may be further improved in the years ahead.

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Appendix A. Words drawn from the V2AV level

VLT word: **evidence**

verb + noun	found evidence/provides evidence/indicates evidence
adjective + noun	no/any evidence/forensic evidence/scientific evidence
noun + verb	evidence suggests
noun1 + noun2	a piece of evidence
adverb + adjective	This subcategory for the word <i>evidence</i> was not available in COCA.
adverb + verb	This subcategory for the word <i>evidence</i> was not available in COCA.

VLT word: **method**

verb + noun	used a(the) method/developed a method/design a method
adjective + noun	scientific method/effective method/common method
noun + verb	This subcategory for the word <i>method</i> was not available in COCA.
noun1 + noun2	method of analysis
adverb + adjective	This subcategory for the word <i>method</i> was not available in COCA.
adverb + verb	This subcategory for the word <i>method</i> was not available in COCA.

VLT word: **implementation**

verb + noun	support the implementation/facilitate the implementation
adjective + noun	successful implementation/joint implementation/sustained implementation
noun + verb	This subcategory for the word <i>implementation</i> was not available in COCA.
noun1 + noun2	implementation and development/program implementation/fidelity of implementation/implementation strategies
adverb + adjective	This subcategory for the word <i>implementation</i> was not available in COCA.
adverb + verb	This subcategory for the word <i>implementation</i> was not available in COCA.

VLT word: **accumulation**

verb + noun	prevent the accumulation
adjective + noun	capital accumulation/private accumulation
noun + verb	This subcategory for the word <i>accumulation</i> was not available in COCA.
noun1 + noun2	wealth accumulation/snow accumulation
adverb + adjective	This subcategory for the word <i>accumulation</i> was not available in COCA.
adverb + verb	This subcategory for the word <i>accumulation</i> was not available in COCA.

VLT word: **phenomenon**

verb + noun	explain (this) phenomenon/describe (the) phenomenon
adjective + noun	cultural phenomenon/natural phenomenon/recent phenomenon/widespread phenomenon
noun + verb	phenomenon is known (as)/phenomenon called/phenomenon occurs
noun1 + noun2	weather phenomenon
adverb + adjective	This subcategory for the word <i>phenomenon</i> was not available in COCA.
adverb + verb	This subcategory for the word <i>phenomenon</i> was not available in COCA.

Appendix B. Sample collocational competence post-test questions

I. Multiple Choice Questions: Please choose the correct answer from the four options given.

1. Television news teams from around the world cover the event as Metropolitan Police officers lock down the **surrounding** _____ .

- a. place
- b. area
- c. space
- d. spot

2. The sketch comes nearly five months after the last **piece of** _____ was disclosed by a team of investigators comprised of local, state and federal authorities, including the FBI.

- a. information
- b. clue
- c. evidence
- d. trace

3. UNIDENTIFIED MALE: First off, I really, really enjoy having Mr. Trump here. As a 32-year-old businessperson myself, he is a tremendous _____ **model** for young people like me and that look at him and write down their goals and strive to be better, that is a comment.

- a. role
- b. inspiration
- c. action
- d. icon

4. At a recent colloquium on the New American History, my graduate students **vigorously** _____ a statement from one of their texts. Ann Douglas writes, "America is the only nation to exercise the dubious privilege of never seeing the world, or itself through anyone's eyes but its own."

- a. discussed
- b. critiqued
- c. debated
- d. judged

5. When it comes to protection from the sun, is your standby sunscreen doing the trick? 3.6 million cases of skin cancer will be diagnosed this year alone. Ninety percent of what you consider skin aging may actually be due to **sun** _____. Dermatologists recommend using a sunscreen with an SPF of thirty or higher to block ninety-seven percent of harmful rays.

- a. burnt
- b. light
- c. shine
- d. exposure

6. You do not have to do something if it doesn't relate directly to your primary goals. That's why a firm so important in the grand _____ **of things**.

- a. plan
- b. scheme
- c. devise
- d. plot

7. If a need is powerful enough within an individual, it can positively affect the **intrinsic** _____ of the individual to demonstrate behavior which leads to satisfaction to accomplish the need.

- a. action
- b. incentive
- c. boost
- d. motivation

8. In the end, we completed the project **ahead of** _____, and the trust built amongst the team was strengthened.

- a. intention
- b. schedule
- c. plan
- d. imagination

9. I was just thinking about, you know, I love Beyoncé. Remember she always talks about Sasha Fierce like a lot of, artists have this **alter** _____ where it gives them some oomph when go out on stage. It gives them this confidence.

- a. ego
- b. personality
- c. self
- d. identity

10. Many Japanese say nonchalantly that they are born Shinto, marry Christian, and die Buddhist. “Japanese don’t _____ **themselves** to a specific god or religious doctrine, but they pick parts of established religions and make them their own,” Dr. Yamanaka says.

- a. regard
- b. believe
- c. dedicate
- d. devote

11. Like Barkley, who announced his college choice with a simple **press** _____ and no news conference, Daniels followed suit in the era of social media, letting fans know with a tweet and no cameras and no fancy announcement.

- a. release
- b. media
- c. report
- d. announcement

12. During peak travel times, performance worsens—a fact at all major airports. Peak travel times _____ **roughly** to highway rush hours, although airport rush hours tend to start a little earlier.

- a. equal
- b. associate
- c. correspond
- d. accord

13. This war has nothing at all to do with any of that stuff. It has only to do with the impact of our policies in the Islamic world. And I would say until you get the enemies' motivation straight, it's impossible to have a strategy that will _____ **victorious**.

- a. ensure
- b. emerge
- c. cast off
- d. ray

14. The President's team fully was aware that the memo was going to be discussed and the conversations were going to be discussed at the hearing and had the opportunity when many reporters asked if they would _____ executive **privilege** to try to prevent some of that from being talked about, and they declined that opportunity.

- a. invoke
- b. prevent
- c. execute
- d. utilize

15. According to Sigmund, Freud's psychodynamic theory, an unsatisfactory outcome in psychological development during the first year of life can be a type of oral fixation in which the response to anxiety is to seek oral soothing. Naturally, babies seek food and comfort; in those first months of life, if they receive food and comfort reliably and lovingly, they learn that briefly waiting for food and affection does not mean terror and pain. If a baby never learns to _____ **between** despair over being neglected and accepting mild discomfort when there is a delay before needs are met, impulse control will be poor.

- a. balance
- b. intercede
- c. mediate
- d. resolve

II. Mix and Match Questions: Match each item with its correct collocation.

Group One:

- a. deny
- b. diminish
- c. highlight
- d. minimize
- e. identify

1. Strategies are used to help **accurately** _____ error patterns that are active in the student's speech.
2. This graph is used to _____ the **differences** found between the groups.
3. No one has the right to _____ the child's **access** to education.
4. Sheldon did not intend to _____ the **importance** of Geology.
5. To _____ **risk** of infection from dead birds, any employee who discovers any dead birds should dispose of them at will.

Group Two:

- a. professional
- b. rigid
- c. controversial
- d. neutral
- e. supplementary

1. This short lecture managed to cover the essential topics with brevity, and more information about the topics can be found in the _____ **materials**.
2. He never discloses his feelings which is probably because his childhood was overshadowed by his parents' _____ **rules**.
3. Even though everyone is gossiping about her, her expression **remains** _____.
4. The company received a series of complaints lately because one of the sales associates failed to behave in a _____ **manner**.
5. Although Mr. Thaksin is a successful and a billionaire businessman, he is regarded as a _____ **figure** in Thai politics.

Group Three:

- a. integration
- b. stability
- c. orientation
- d. exploitation
- e. termination

1. You will be subject to an early _____ **fee** if you want to quit early because you have already signed the contract.
2. Measures need to be taken to **prevent** over _____ of the natural resources.
3. **Providing** _____ for children is easier said than done.
4. The meeting is open to everyone, regardless of what their political or **religious** _____ is.
5. The co-existence and development of different cultures is the basic trend of **cultural** _____.

Appendix C. Research paper grading rubric

Name: _____

<p>Introduction</p> <p>Is the topic of the paper clearly and concisely introduced? Does the introduction include a clear and concise statement? Does the information forecast the remainder of the paper for the reader?</p>	<p>/ 15</p>
<p>Body of the Paper</p> <p>Does the paper summarize the articles individually, one at a time, or does it provide a thematic summary of the research drawn upon? Does the paper provide examples to help the reader understand points made? Does the paper synthesize the material reviewed into a few main points? Is all information factually correct? Does the paper provide excellent background, context, and idea development? Does the paper include an excellent discussion of detail?</p>	<p>/ 40</p>
<p>Conclusion</p> <p>Is there a conclusion? Does the paper provide a summary of what has been discussed? Is there an implication or future direction?</p>	<p>/ 15</p>
<p>References & Citations</p> <p>Does the body of the paper cite sources as necessary and have a minimum of 3 sources? Does the paper draw sources from at least 3 peer-review journal articles? Does the citation of all data obtain from other sources? APA citation style is used in both text and bibliography.</p>	<p>/ 6</p>
<p>Quality of Sources</p> <p>Are the sources relatively recent? Is there a variety of sources?</p>	<p>/ 4</p>
<p>Writing Style</p> <p>Is the paper well organized? Is the paper free from grammar & spelling errors? Are there smooth transitions between sections? Does the paper use proper lexical collocation?</p>	<p>/ 16</p>
<p>Format</p> <p>Does the paper follow the margin, font, and page specification found in the paper guidelines? (4-5-pages, 12-point font, 1" margins, double spacing)</p>	<p>/ 4</p>

Total Points: _____ / 100

Appendix D. Sample linear lesson plan

STEP 1 - Review Previous Lesson

Concepts	<ul style="list-style-type: none"> · Definition of lexical collocations · Types of lexical collocations · Definition of argumentative research paper
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STEP 2 - New Lesson Objective

Students are able to: <ul style="list-style-type: none"> · List lexical collocations in an abstract · Use COCA to look for collocations · Write an abstract 	Class: EAP 1851-Graduate Level (English for International Students II)
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Resources Needed	<ul style="list-style-type: none"> · Academic Writing Textbook by Marshall · COCA 	Estimated Time: 1:30
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STEP 3 - Warm-Up

Build Background Knowledge/Interest	Students will consider previous discussion on writing an argumentative research paper and their hypothesis for their paper.
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STEP 4 - Introduction

New Information/ Skills	Students will study the structure of several abstracts from Academic Writing Textbook by Marshall as samples of an argumentative research paper abstracts and search for lexical collocations and their pragmatic use.
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STEP 5 - Presentation

Whole Group Activities	Students will share the lexical collocations they have identified in a sample abstract in Marshal's textbook.
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STEP 6 - Small Group/Interactive Work

Pair, Triad or Small Group Activities	<ul style="list-style-type: none"> · Students will work in triads to look for 6 lexical collocations from a sample abstract, use COCA to look for authentic sentences, and use contextual clues to define the collocations. · Students will either create either a <i>Kahoot!</i> or a <i>Quizlet</i> game that includes the 6 lexical collocations, and engage their classmates in said web-based game.
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STEP 7 - Checking for Understanding

Summative Assessment	<ul style="list-style-type: none"> · Students will construct the abstract for their argumentative research paper. · Students will review the 10 lexical collocations they have learned in class on Google Classroom and do the assessment on Google Forms.
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INTEGRATING EPORTFOLIOS TO FACILITATE COLLABORATIVE LEARNING AND REFLECTION IN AN EAP CONTEXT

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Abstract

This article reports a study that examined the use of ePortfolios to facilitate collaborative learning and reflection in an undergraduate English for Academic Purposes (EAP) course at a university in New Zealand. The article offers new insights into the advantages of using a socio-cultural theoretical approach to the use of ePortfolios in an EAP context, with a particular focus on the assessments in the course. Drawing on online surveys, semi-structured interviews with students and ePortfolio analysis, the findings demonstrate that learners appreciate the affordances of ePortfolios and the collaborative nature of the assessment tasks in them.

Keywords: ePortfolios; collaboration; reflection; English for academic purposes (EAP)

1. Introduction

Portfolios have been used in education for decades. A portfolio is defined as “a systematic and selective collection of student work that has been assembled to demonstrate the student’s motivation, academic growth, and level of achievement” (Norton & Wiburg, 1998, p. 237).

Before the digital age, lecturers and students used paper-based portfolio systems in the form of files, folders, drawings and printed pictures to keep a record of their learning and achievements. However, this method has limitations in updating, sharing and storing portfolio collections. With electronic portfolios (ePortfolios), users can represent information in multiple formats and access their ePortfolios anywhere, anytime. Users can also share individual pages or the whole portfolio collection with anyone for a specified period. Thus, ePortfolios allow

learners to manage their own learning (Beckers, Dolmans & Van Merriënboer, 2016), keep track of their progress and actively engage in the learning process (Baturay, 2015).

There are a variety of purposes for incorporating ePortfolios in education: (a) to collect evidence of work/skills/achievements and goals, (b) to reflect on one's work and learning, and (c) to share one's work with different audiences and receive feedback. Accordingly, the type of ePortfolio depends on its purpose. Evidence portfolios, assessment portfolios, learning portfolios, academic portfolios, reflective portfolios and career portfolios are common types of ePortfolios. One crucial aspect of a good portfolio is that it is not simply concerned with focusing on the end product but also aims to get students to reflect on the learning process or the learning task.

This article describes the implementation and use of ePortfolios in a third-year credit-bearing English for Academic Purposes (EAP) course at a university in New Zealand. The main purpose of EAP courses is for students who are Speakers of Other Languages (SPOLs) to continue to learn the linguistically, disciplinary, and culturally suitable practices needed to study through the medium of English. At the University where the research was conducted, students who were SPOLs could choose to do up to three EAP courses (which focused on the four skills) as electives towards their undergraduate degree. The ePortfolio in the project elaborated upon here had a combined purpose of its use as an assessment portfolio and a learning portfolio where students engaged in collaborative and reflective learning.

The article begins with a literature review that explores the notion of a socio-cultural theoretical approach and the use of ePortfolios in English as a Second Language (ESL) and EAP contexts. A discussion of the methodology, process and implementation details follows this. The article then covers the key findings and discusses how various strategies, such as learning and assessment design and support processes, helped facilitate collaboration and reflection.

2. Literature review

Three central aspects relevant to the research will be discussed in this literature review: i) pivotal elements to a socio-cultural theoretical (SCT) approach, (ii) justification of the use of ePortfolios and the value they can bring to the learning environment and (iii) the use of ePortfolios and related aspects in education and ESL contexts.

2.1. Socio-cultural nature of learning with ePortfolios

The research described here is strongly supported by a SCT framework. The origin of the SCT approach to learning lies in the seminal work of Vygotsky (1978). The idea of socially constructed knowledge, whereby we create meaning and make sense of our experiences collaboratively, is a core tenet of the SCT approach (Vygotsky, 1978). Introducing the idea of the Zone of Proximal Development (ZPD), he described it as the distance between what we can learn alone and what we can learn with the help of capable peers or significant others acting as mentors or facilitators of learning. Aligned with the idea of ZPD, ePortfolios have the ability to facilitate collaborative learning, where students share their work in portfolios, provide feedback to peers and learn from one another.

There is a wide body of research literature on the socio-cultural nature of language learning using ePortfolios and their advantages for learners (Gánem-Gutiérrez, 2018; Lantolf & Poehner, 2014; Lantolf & Thorne, 2006; Van Lier, 2004). Some of the benefits postulated by these researchers include the motivation for collaborative activity, learner engagement in dynamic learning activities and reflection opportunities. While using ePortfolios, learners continuously engage in a dynamic learning process by updating their portfolios with new evidence of their learning or assessment outputs. Active learning occurs while planning, creating, choosing and uploading evidence of learning, working with classmates, and reflecting on learning experiences. In this learner-centred process, students construct knowledge and meaning individually and socially based on their prior knowledge (Lantolf & Thorne, 2006; Van Lier, 2004).

In addition, Gánem-Gutiérrez (2018) elaborated on the collaborative activity potential of using a virtual digital world in language learning which is strongly underpinned by a SCT approach. Aligning with the SCT approach, the ePortfolio use in the study reported here encouraged collaboration, socially constructed knowledge and active learning.

2.2. ePortfolios in education and ESL contexts

A considerable amount of literature has been published on the use of ePortfolios in education (Beckers et al., 2016; Ferns & Zegwaard, 2014; Pink, Cadbury & Stanton, 2008). ePortfolios are intended to capture student progress and enable self-reflection on strengths and gaps in learning (Ferns & Zegwaard, 2014). In addition, ePortfolios improve engagement with reflective learning, and the reflective learning templates used with ePortfolios provide a useful framework for documenting the evidence of student learning (Pink et al., 2008).

Over the last couple of decades, a substantial body of literature on the use of ePortfolios in tertiary ESL environments has been published (Alawadat, 2013; Chau, 2011; Kessler & Bikowski, 2010; Yastibas & Yastibas, 2015). This suggests that ePortfolios are not new to the 21st century. However, what is new is the way ePortfolios are used as the nature of learning continues to change.

The literature on the use of ePortfolios in ESL learning relates largely to the development of writing skills. For example, Aygün and Aydin (2016) published a group of succinct articles on the use of ePortfolios to support writing development, covering such aspects as the literature on the formative writing process. Other studies on the use of ePortfolios focused on the facilitation of self-regulated learning, which is related to independent learning (Chau, 2011), the development of self-reflection (Alawadat, 2013), the development of self-regulated learning through assessments in English language teaching (Yastibas & Yastibas, 2015), and the use of an ePortfolio as a corrective platform for improving writing performance (Saeedi & Meihami, 2015).

Taking the above research into account, there appears to be a paucity of research focusing on the use of ePortfolios for collaborative learning and reflection in the EAP tertiary context. In particular, in Australia and New Zealand, very few recent studies have focused on the use of ePortfolios for collaboration or reflection. One study conducted in New Zealand focused on how an online learning environment can shape and reshape learner autonomy (Zhong, 2018). This study reported that a previously shy learner started to collaborate more in the online space and acknowledged the affordances of the online space. While this study mentions ePortfolio use in the study, the key focus of the article is learner autonomy. Another study by Zhong (2021) focused on building collaboration in online spaces to promote group autonomy. However, ePortfolios were not used for collaboration or reflection in the context of this research. Peer-moderated online discussions were used in this research.

Outside of this region, a more recent study conducted by Marin (2020) focused on the use of ePortfolios for researched-based learning (RBL) and investigated the potential of group e-Portfolio blog use. This study was conducted during an on-site course on theories and models of instructional design (ID) in the Master of Educational Science program at a German University. The findings show the possibilities and challenges of using ePortfolios based on blogs for RBL processes.

Another study conducted by Kessler et al. (2010) at a Mexican university explored students' collaborative autonomous language learning abilities. It should be noted that Kessler et al. (2010) looked at students' collaborative language learning skills in a wiki space, and they

did not use ePortfolios in their study. However, there are important implications that are relevant to the current study, which are listed below. Kessler et al. (2010, p. 49) highlighted three core requirements for learners to develop autonomously within a collaborative language learning environment:

- 1) the ability to use language independently to contribute personal meanings as a collaborative member of a group;
- 2) the ability to use appropriate strategies for communicating as a collaborative member of a group; and
- 3) the willingness to demonstrate these abilities within the group.

With the focus on collaboration, these suggestions by Kessler et al. (2010) supported the project reported here. Their findings have ramifications for how technological tools can be used to enhance language learning and assessment, and an ePortfolio is an excellent avenue to explore collaboration in an ESL/EAP learning environment.

It has been argued that ePortfolios provide excellent opportunities for students to develop reflection and learner autonomy (Doig et al., 2006). Reflection on work in portfolios enables students to see their progress over time and take advantage of opportunities to improve in the future. Taking the positive findings of Doig et al. (2006) into account, and to facilitate reflective writing skills in the study reported in this article, we provided several direct opportunities for students to focus on reflection in their assignments. Prompt questions are a common way to get students to reflect and make sense of their learning. Students in this study were provided with guided reflection question prompts. The questions focused on aspects of self-reflection and peer-reflection, as follows:

- 1) Self-reflection
 - Personal assumptions
 - How active you are as a reader
 - Strategies used in reading and writing and best fit
 - Cohesive devices used and effectiveness
 - Oral presentation delivery
- 2) Peer-reflection
 - Comparison between self- and peer-reflections for personal assumptions
 - Comparison of reading and writing strategies used
 - Comparison of strengths and areas for improvement in oral presentation delivery

In the students' responses in the interviews and survey (see below), they commented on the advantages of reflection that the ePortfolio afforded them.

3. Methodology

3.1. Research methods and data analysis

This qualitative research was conducted as a case study over one semester (12 weeks). The data was gathered via semi-structured interviews, an online survey, and document analysis (course outline, course page on Moodle Learning Management System and student ePortfolios). The semi-structured interviews took place at the end of the course, and the questions were related to the students' experiences of using ePortfolios in the course. Students completed the online survey during the last part of the semester, and the ePortfolios were analysed after grades were submitted for the course. NVivo was used as a data management tool to transcribe and conduct thematic analysis.

3.2. The participants

In this study, the participants were a small group of students enrolled in a third-year EAP undergraduate course at a university in New Zealand. In total, eight students volunteered to participate in the study. This was a generic cross-disciplinary course, as the students came from a range of programmes, including (but not restricted to), Screen and Media, Finance, Marketing, Education, Anthropology and Languages.

3.3. The context and assessment design

The course was delivered using a blended learning approach, and face-to-face lectures were supplemented with additional learning resources on Moodle LMS. For the face-to-face component of the course, the students had a 3-hour lecture and 1-hour tutorial/language lab session over 12 weeks. The course coordinator and an e-learning designer conducted this research.

Once the University's ethics committee approved the research, the e-learning designer created a Mahara ePortfolio account and an ePortfolio template to suit the course. Subsequently, ePortfolio accounts were created for each student. The researchers then redesigned several assessments, making the best use of the advantages of the ePortfolio system. The redesigned assessments provided students with more opportunities to collaborate with peers on learning and assessment tasks. These tasks also encouraged students to provide peer

feedback (audio and text-based) and reflect on their learning (both self-reflection and peer-reflection).

The oral presentation described below is an example of a redesigned assessment. In this assessment task, students were required to:

- i) deliver an oral presentation based on a research topic they had investigated;
- ii) provide a peer evaluation for a classmate's oral presentation;
- iii) prepare a self-reflection.

In previous iterations of this course, students presented in front of the class on a specific day and were assessed by the lecturer as they were presenting. With the revised assessment, the students had far more flexibility and control over this task.

- i) Using a screencast software tool, the students could video-record their presentations at a time they chose, in the presence of three peers and without the teacher's presence.
- ii) Students uploaded the video and their self-evaluation of the presentation on their ePortfolio page.
- iii) Students then shared their ePortfolio page with a peer and received feedback on their recorded video presentation.
- iii) Students submitted their ePortfolios for grading.

3.4. Process and implementation of ePortfolios

A critical element in technology integration is having a well-planned support process. Accordingly, students were offered on-going face-to-face and online support, including participation in three face-to-face computer lab workshops. In these hands-on workshops, students were introduced to the ePortfolio system, its main features, and how they would be using ePortfolios for learning and assessment. A sample contextualised ePortfolio was also shared that could be used as a guide. The sample portfolio (Figure 1) contained seven pages matched with assessment tasks.

The screenshot displays the user interface of an ePortfolio system. At the top, there is a dark navigation bar with the University of Waikato logo and name, a search bar for users, and the user's name 'Dilani'. Below this is a secondary navigation menu with options: Dashboard, Content, Portfolio, Groups, and Administration. The main content area features a light grey header with the text 'Collection: ESLA 301 sample ePortfolio' and a 'Navigate to page:' dropdown menu showing 'You are on page 1/7'. The central focus is the 'Personal Profile' section, which is titled 'Personal Profile' and attributed to 'by Dilani'. The profile is for 'Alex Wong' and is divided into three columns. The first column contains a profile picture of a young man wearing a red cap and sunglasses. The second column, titled 'About me', contains a short biography: 'Hi, my name is Alex Wong, I grew up in Shanghai, China, with my Mum, Dad and sister. I am currently a student at Waikato University. I consider myself a self-made, workaholic but down to earth person. I like to balance professional & family life. Professional life gives you exposure, confidence & sense of achievement. I believe the fulfillment one gets from one's work is very important for well-being. My favourite pastime is to watch English movies, reading fictions & cooking.' Below this is an 'Educational Summary' section. The third column, titled 'Professional Skill', lists several skills: 'Excellent commi', 'Computer Skills- Excel, SPSS, Nv', 'Proven ability to', 'Ability to learn n', and 'Strong commitm'. At the bottom of this column is a 'Contact Informati' section with the address 'Address: 45c Cameron'.

Figure 1. Sample ePortfolio profile page

4. Findings and discussion

4.1. ePortfolio features and affordances

All the students in this study reported that the ePortfolio was a new experience for them. A key theme that emerged from the data was the affordances of ePortfolios. Psychologist James Gibson coined the term 'affordances' in 1977 to refer to the actionable properties between the actor and the world. In relation to computer-human interactions (HCI), however, Don Norman explained in 1988 that the possibility of actions being perceived by the user depended on how the object was presented, which he referred to as perceived affordances (Gibson, 1977; Norman 1988).

Students in this study used various ePortfolio features in order to upload different file types, share components of their portfolios and provide feedback to each other. The specific ePortfolio features used by the students are shown below (Table 1). The students acknowledged that these ePortfolio features enabled them not only to build their portfolios easily but also to engage in collaborative learning.

Table 1. ePortfolio features used by students

Feature	Number of students used this feature
File upload	8
Sharing portfolio pages	8
Video upload	8
Creating a personal profile	7
Audio upload	1
Using the comment feature	1
Sharing URL links	1

As the students pointed out, with the affordances of ePortfolios, they were able to store all the evidence of learning in one place. Students had the ability to customise their portfolio pages based on their needs. Most importantly, they were able to keep track of their learning, as they could see their own work and tasks in front of them. Table 2 below summarises what the students perceived as the most useful affordances of ePortfolios.

Table 2. Affordances of ePortfolio in order

1.	Ease of use
2.	Ability to use different media
3.	Ability to customise content
4.	Ability to keep everything in one place
5.	Ability to keep track of learning
6.	Ability to share work with others
7.	Ability to store evidence of learning

4.2. Learning as a social activity/collaborative learning

In educational settings, encouraging learners to work together does not always guarantee that learners engage in collaborative knowledge construction. To ensure successful collaborative learning, it is vital to provide the necessary conditions and opportunities for collaboration and learner engagement to take place (Gedera, 2015). For instance, in implementing ePortfolios in this context, the redesigned assessment tasks provided the students with multiple opportunities to work together and learn from each other. Students were able to share their ePortfolio pages with their peers and the lecturer to receive feedback on their work.

Students commented:

I could get access to her page...It is nice to share with people and get feedback (P1)

It was helpful. You could share your different pages with the lecturer (P4)

I can learn from others (P2)

I liked it (sharing ePortfolio pages) because sometimes there may be some errors that I don't know about.

I can learn from people who are more knowledgeable than me. Because I think people need to have a little push to learn (P2)

These findings are in line with the concept of the Zone of Proximal Development (ZPD) introduced by Vygotsky. These comments by the learners are in keeping with the social nature of learning, which allows us to create meaning and make sense of our experiences collaboratively (Vygotsky, 1978). The social interactions that took place within this process helped reinforce student learning.

In the context of our research, the learners had opportunities to reflect on their own learning process and create their own meaning. For each assessment task, the features of ePortfolios allowed students to create contextualised spaces where they could reflect on their learning and add multiple means/media to express their thoughts as they constructed knowledge. Students acknowledged that it was useful to be able to reflect on their own learning in a variety of ways.

The reflections helped remind me of what happened when I did the presentation. I can do better after doing the reflection (P3)

I think the way reflections could be recorded using audio or text was good (P2)

Based on the findings, the collaborative actions undertaken by students in this course can be grouped as follows:

- Technological support collaboration – students provided peer support while negotiating the ePortfolio space, uploading documents, and developing their profile page (both in the computer labs and after class).
- Peer evaluation feedback collaboration – as part of a couple of assessments, students were to critically evaluate a peer's assessment outputs, including concrete suggestions for improvement.
- Peer reflection feedback collaboration – part of one assignment encouraged students to reflect on a peer's critical analysis of a core article, compare that student's views with their own, speculate on why their interpretations might be different, and then comment on what they had learnt from the classmate's perspective on the same academic article.
- Audience support collaboration – one example was the feedback from their peers while students practised their oral presentations before the final recording was uploaded. They presented in small groups and felt more relaxed and supportive of their peers.

As shown above, in addition to encouraging the students to work collaboratively on the technical aspects of operating in an ePortfolio space, the design of some of the assessments promoted collaboration among students and maintained a student-centred approach.

From a socio-cultural perspective, it is important to consider the learners' culture and background during the process of learning. The literature suggests that Asian students, in particular, do not feel comfortable engaging in oral discussions or presentations, as it is not common for these to be part of learning activities in Asian culture (Gedera, 2015; Warschauer, 1996). Furthermore, because students differ in their language ability, they may not feel confident when presenting in front of a large audience. This was evident in the students' comments:

I am nervous with presentations, it is better if it's a small group as I know them and they are not strangers (P5)

There was a really big contrast for me. For my last presentation, my mind just died (P4)

I think it was (recording the presentation while presenting to a small group) fantastic. It was interesting ...with a whole class, I may be very nervous. I worry and panic. I like small groups because I can feel more relaxed (P2)

Recording their presentations using screencasting software and uploading it on their ePortfolio seemed an easy, simple task for the students, and those less capable were supported by their peers. The software allowed students to include their video and audio together with PowerPoint slides. The talking-head video and slides enabled the lecturer to easily assess the students' work and presentation skills (Fester & Gedera, 2018). Students shared how they found the video recording task:

The video recording is easy. You can see your face when recording. It helps when you do your presentation (P3)

I think that was very good. Yes, it's very useful. I loved that app. I really enjoyed using it. It's really convenient. You can have your PPT and then you can do your video at the same time (P4)

Working on their presentation with their peers brought the students closer, and it also helped them to build a community of learners. Garrison, Anderson and Archer (2001) describe three forms of presence in their Community of Inquiry (CoI) model: social, cognitive and teaching. According to Garrison (2007), social presence is the capability to form personal and purposeful relationships. Cognitive presence occurs through collaboration and reflection and is described as "the exploration, construction, resolution and confirmation of understanding" (p. 65). In our study, it was evident that the collaborative task not only brought the students together, but they also enjoyed being part of the learning community:

So I think with a small group, you've got to work with others. There are just a few of you and you always need to talk to each other, so we sort of became friends (P2)

It is a small group and you have met before, and then you do the presentation and communication with each other, you find you sort of know the people better. I did a presentation yesterday and I really enjoyed the experience (P4)

4.3. Challenges in using ePortfolios

As with integrating any technology, students highlighted a few challenges they faced in using ePortfolios in this context. These challenges were related mainly to the user interface and the functionality of the ePortfolio site. Due to their unfamiliarity with the new tool, students were not sure how to share their ePortfolio pages with their peers, even though this step was covered in the tutorial session conducted earlier. It seems they forgot how to do this. Students shared their views and said:

You still feel a little confused with sharing (P1)

Sometimes it can be complicated. If we want to share a file and you have to go into the page and share this page (P3)

The findings indicated that students needed technical and procedural assistance with the sharing feature of ePortfolios. It would have been useful if the researchers had conducted a tutorial towards the end of the semester, just before the students had to share the ePortfolio pages with their peers. This finding is also consistent with Marin's (2020) study, where the author recommends having a familiarisation phase and simple resources when students are introduced to new tools. This helps build students' digital competence.

Another area the students commented on was the user interface of the ePortfolio site. With the ePortfolio version used in this context, students were not able to edit their dashboard to organise their page. Thus, the page looked overcrowded.

There are so many things on the main page, and it looks so complicated (P3)

Since this research project, the interface of the ePortfolio system that was used has been improved.

5. Conclusion and recommendations

This article discussed how the integration of ePortfolios facilitated collaborative and reflective learning in an undergraduate EAP course. The findings of the study suggest that, overall, the students had a positive learning experience with the use of ePortfolios. It can be concluded that various features and affordances of ePortfolio aided in facilitating collaborative and reflective learning in this context. Although both the students and the lecturer showed positive dispositions towards the use of e-portfolios in enhancing collaborative and reflective learning, the findings highlighted the importance of continuous technical, procedural, and operational

support. Carefully planned assessment design was a key aspect in facilitating collaborative learning and reflection with ePortfolios.

From a process point of view, it is vital to offer hands-on sessions to introduce new technologies, follow up with the students and offer timely assistance when they need help both inside and outside the classroom. The findings also highlighted the need to provide students with both written and video instructions for ePortfolio use, particularly for sharing and tracking shared pages.

Students' experiences and views also suggested that it is useful to have direct access to ePortfolios, a button that you can click via the learning management system (LMS). This suggestion was taken on board and implemented as part of another project that focused on improving the university LMS. The students also suggested that there should be better integration between the LMS and the ePortfolio system so that ePortfolios could be used as an assessment tool. The point is valid but needs to be addressed at an institutional/systems level, as further development is needed to build a Learning Tools Interoperability (LTI) tool to integrate the two systems.

From an ESL and EAP teaching and learning perspective, whether the integration of ePortfolio enhanced students' ESL skills in this context was outside the scope of this article. It will be beneficial to see further studies on the use of ePortfolio for developing collaboration and reflection skills in ESL and EAP across all four skills (Reading, Writing, Listening and Speaking), especially through formative assessment tasks. For example, students could receive and provide peer feedback on draft summaries of reading tasks before submitting their work for teacher feedback. In addition, studies on the use of ePortfolio for facilitating collaboration in other disciplines might provide further insights into the integration of ePortfolios in socio-cultural learning contexts.

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