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Vision and Mission of the IJODeL

Vision

To be a leading international academic journal that publishes and disseminates new knowledge and information, and innovative best practices in open and distance e-learning.

Mission

The IJODeL shall publish and disseminate new knowledge and information based on original research, book reviews, critical analyses of ODeL projects and undertakings from various researchers and experts in the Philippines, the ASEAN Region, and the world, and concept articles with the intention of presenting new ideas and innovative approaches to interpreting and implementing best practices in open and distance e-learning as alternative delivery mechanisms for quality education.

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Editorial

Extending Realities in Open Distance e-Learning

Our society has been rapidly evolving as innovators continue to introduce various forms of emerging technologies. We also recognize that open distance e-learning (ODeL) has been enabled, benefited, and driven by rapid advancements in technology. A recent example is the multifaceted impact of artificial intelligence (AI) applications like ChatGPT and Quillbot on teacher and learner interactions in both in-person and online learning environments. Similarly, immersive technologies like virtual reality (VR) and augmented reality (AR) have been reshaping educational landscapes leading to increasing interest in what is called the metaverse. These technologies allow teachers to tap into the power of extended reality (XR) while being guided by time-tested instructional design principles resulting in immersive learning.

Immersive learning makes use of technology and interactive environments to create engaging and realistic learning environments. It is a highly effective method for promoting active learning and improving learners' understanding and retention of concepts. Immersive learning has the added benefit of providing a sense of presence and connection in a virtual learning environment, bridging the gap between distance learners and their peers and instructors in ODeL.

This special issue aims to explore what it means for educators to extend reality and expand possibilities in ODeL through immersive technologies while not neglecting general pedagogical concerns that need to be seriously considered in their application.

The concept paper of Eric Hawkinson introduces us to the various issues surrounding digital twins and their relevance to ODeL. In his paper, he comprehensively describes their key features according to the literature. He emphasizes the value of digital twins in distance education by citing cases involving virtual tours and simulations for STEM courses before enumerating their benefits and implications in the future of education. He also discusses cases in the music and movie industry as well as in higher education while unearthing ethical issues that may have significant implications for adopting digital twins in ODeL.

Adam Dabrowski's case study investigates the potential of augmented reality (AR) as a tool for deliberate vocabulary acquisition. As revealed in reflective interviews, the participant found the AR methods engaging and motivating. The study's findings have significant implications for language pedagogy, particularly in distance education. Furthermore, his article adds evidence to the claim that AR provides a novel way to make language learning more immersive and interactive, and its ability to improve vocabulary retention suggests that it could be a useful tool for second language acquisition. He adds that AR also

has the benefit of being accessible via smartphones, tablets, and head-mounted displays, making it an ideal tool for distance learning. This article concludes the section that largely tackles immersive technologies.

The last three articles cover the human dimension of teaching and learning which I strongly believe is relevant to implementing immersive learning programs in online learning environments. April Leaño investigates the behavior of faculty in the College of Education (COE) at the University of Makati in using the Technology Based Learning Hub (TBL Hub) as the official Learning Management System (LMS) during the COVID-19 pandemic in her case study. The study's goal is to assess faculty acceptance of the LMS using Fred Davis' Technology Acceptance Model (TAM). Although the study reports concerns about the LMS based on their personal experiences, the faculty's positive technology acceptance of the TBL Hub indicates that they are e-ready. The faculty made recommendations to help the LMS maintain and improve its positive technology acceptance. Leaño's case study emphasizes the importance of evaluating faculty behavior when using LMSs during the pandemic. This research adds to the ongoing debate about the challenges and opportunities of e-learning during the pandemic. It adds significant value to this issue as it echoes the importance of ensuring readiness and support among teachers in ODeL institutions when implementing innovative interventions like immersive technologies.

James Michael Pablo's article "Assessing the English Grammar Proficiency of Online Filipino English Teachers" presents a case study that investigates the English grammar proficiency of Filipino English teachers. The research was carried out in response to recent literature indicating a decline in Filipino English proficiency, even though many English language schools in other countries continue to hire Filipino teachers due to their perceived cost-effectiveness. These findings are concerning because they imply that the decline in English proficiency among Filipinos may be influencing the quality of English language education provided by Filipino teachers. According to the study, if Filipino English teachers want to remain competitive and rebrand themselves, they must conduct a self-analysis of their English skills to identify their weak points and participate in a training and development program, either on their own or with their current employers. This is an important recommendation because it serves as a reminder of the importance of continuous professional development for teachers in their field of study beyond technological competence.

Finally, Sally Gutierez highlights the importance of teachers' epistemic understanding in supporting students' engagement in argumentation. The study found that teachers' levels of epistemic understanding were aligned with their use of dialogic scaffolding to encourage student participation in argumentation. Gutierez's article provides valuable insights into the role of epistemic understanding in promoting argumentation and inquiry-based teaching and learning in the classroom. The findings suggest that teachers' epistemic understanding and dialogic scaffolding can play a critical role in promoting student engagement and achievement in science education. This supports the two previous articles in building a human-centric perspective on the use of tools, including immersive technologies.

I hope that the special issue provides useful insights into how immersive technologies can be used to improve student learning experiences and educational outcomes in Open and Distance e-Learning (ODeL). The articles cover a wide range of topics, from conceptual discussions of digital twins and virtual reality in education and empirical studies on the impact of augmented reality-based interventions on learning to studies related to the human dimension of teaching and learning. I am one with the authors of this issue in hoping that these articles would be useful in providing guidance in effectively implementing innovative interventions like immersive technologies in teaching and learning contexts, especially in ODeL.

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Automation in Education with Digital Twins: Trends and Issues

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Abstract

Digital twins are now being envisioned as digital representations of living and nonliving organisms that will allow data to be effortlessly exchanged between the physical and computer-generated creations, in addition to optimizing manufacturing processes. Because they allow for the monitoring, analysis, and optimization of physical functioning, digital twins can give constant input for enhancing quality of life and general well-being in humans. As part of the literature review, the following icons were used as case studies: ABBAtars and Queen, Carrie Fisher of Star Wars, and Dead Professor. It was concluded that the use of digital twins is growing and becoming more widely implemented and discussions on its implementation in educational contexts have begun to surface. This study looks at emerging trends in the use of digital twins and relates these trends to recent use cases of digital twins in educational contexts. The result is an understanding of both risks and potential of this technology for teaching and learning moving forward.

Keywords*: digital twins, edutainment, augmented learning, virtual performers, virtual teachers*

Introduction

Global economic growth rates have been impacted radically by the introduction of Industry 4.0 across many countries and sectors. Emerging technologies determine how competitive companies are in the technology market. There are many distributions and innovations around the creation, coping, and distribution of digital goods to that of physical ones. Books, music, videos, and games that are now predominantly digital were once physical products sold in brick-and-mortar stores. This trend is shifting with the emergence and availability of technologies like augmented and virtual reality, making the digitization of goods and services more possible. The concept of the digital twin is one of the breakthrough technologies resulting to a significant impact on growth in many more industries (Kamble et al., 2018; Xu et al., 2018).

In the early 2000s, when manufacturing machinery and production systems were being digitized, digital twins began to gain popularity (El Saddik, 2018). By using artificial intelligence, physical modeling, and data analytics, General Electric (GE) makes digital twins of its machines to improve machine management through sensor data. By serving as a virtual replica of what was created, digital twins can improve efficiency, reduce costs, stimulate innovation, and ensure

quality by serving as a part of an enterprise-wide closed-loop product lifecycle (Tao et al., 2019).

Digital twin is a term used to refer to a variety of technologies that relate to the process of using digital copies of physical objects, places, people, environments to run virtual simulations. In manufacturing, digital twins have been used to analyze supply chains and other processes in factories (Jaensch et al., 2018). Digital twins of places have been used to study urban planning, simulate traffic, and analyze the harvesting of crops (Li et al., 2022). In learning, digital twins have been popular to help run simulations and experiments on a variety of things from the design of rockets to the layouts of classrooms (David et al., 2018).

In the future, digital twins will likely disrupt industries beyond manufacturing since they can be applied broadly to many technologies. Extending the definition of the concept is therefore critical. Data may be effortlessly transferred between the physical and virtual worlds, allowing all living and nonliving elements to be monitored, understood, and optimized.

An example of the jump from digital media to digital twins is the digitization of not only music but of the artists themselves. Swedish supergroup ABBA has enjoyed digital sales of their music over the world since originally putting out music to be sold in stores and broadcast on the radio from the 1970s. ABBA was a Swedish musical phenomenon, winning the Eurovision Song Contest in 1974 and breaking numerous worldwide sales records. From early on in their career until the band's final album in 1981, their music became known and loved around the world, being adopted into Broadway musicals, theatrical movies, and other forms of digital media. The next step for ABBA is to digitize themselves as humans to tour the world once again on stage as holographic superstars.

Digital twins of humans can be used to gather and analyze physical, physiological, and contextual information to get a better understanding of the human body and well-being. Digital twins can improve quality of life and well-being (El Saddik, 2018). The ability to forecast the onset of a stroke, for example, could allow for the implementation of prophylactic measures. Machine learning and deep learning could be effective for forecasting health concerns based on lifestyle habits (Ravì et al., 2017). Contextual data, such as information on the user's environment, age, emotional state, and preferences, could be utilized to characterize the user's holistic condition in addition to demographic data.

Features of Digital Twins

There are some common emerging features of digital twins across context and implementations. Others have implicated likely features of digital twins in the future (Rosen et al., 2015; Stark et al., 2019; Tao et al., 2019; Van der Valk et al., 2020). Many of these features and issues represented in virtual worlds now can be observed, such as the high level of data collected about user behavior and physical attributes leading to privacy and security concerns. The introduction of

digital twins in educational contexts has the potential to bring several benefits and implications for the future. Some of these include:

- *Real-time data synchronization:* Digital twins continuously receive and reflect data from their physical counterpart, allowing for real-time monitoring and analysis.
- *Advanced modeling and simulation:* Digital twins utilize complex mathematical models and simulations to accurately represent the physical object or system.
- *Interconnectivity:* Digital twins can interact with other digital twins and systems, providing a unified view of multiple physical objects and their interrelationships.
- *Predictive analytics:* Digital twins use data and analytics to make predictions about the behavior of the physical object, system, or process they represent.
- *Remote monitoring and control:* Digital twins allow for remote monitoring and control of physical objects, systems, or processes, enabling organizations to respond quickly to issues and optimize performance.
- *Dynamic updating:* Digital twins can be updated in real-time as new data becomes available, providing organizations with up-to-date information about the physical object, system, or process they represent.

As the technologies around digital twins advance, such as 3D mapping, data visualization, 3D modeling, graphical processing and more, both the ability of digital twins to match more closely than that of its physical version and to simulate how a digital twin would behave in the physical world are obtained. These combine to increase the predictive power of digital twins which increase their value over many uses.

Digital Twins in e-Learning and Distance Education

Digital twins are already employed in a variety of ways in distance education. In the field of tourism and hospitality, virtual tours are produced to allow students to travel for study in digital copies of historical and culturally significant places. One example is *My Hometown Project* (Alizadeh & Hawkinson, 2021). Digital twins are used in the STEM fields to simulate engineering and biology concepts and facilitate a deeper understanding (David et al., 2018).

All of this is to say that digital twins are already present in various fields, and the more we use them, the more accurately we might build a better digital twin in the future. The trends in technology use are folding in on themselves to accelerate the blending of the digital and the physical, leading to more ethical and even existential questions (Hawkinson & Klaphake, 2020). The introduction of digital twins in educational contexts has the potential to bring several benefits and implications for the future. Some of these include:

- *Personalized learning:* Digital twins can provide a customized learning experience by analyzing students' strengths, weaknesses, and learning styles.

- *Enhanced virtual reality experiences:* Digital twins can enhance virtual reality experiences, enabling students to interact with realistic simulations in a variety of educational contexts.
- *Improved assessment:* Digital twins can provide real-time feedback and data analysis, allowing teachers to assess students' progress and identify areas where they need more support.
- *Collaborative learning:* Digital twins can facilitate collaboration and teamwork by enabling students to work together in virtual environments.
- *Enhanced accessibility:* Digital twins can make education more accessible, especially for students with disabilities who may have difficulty participating in traditional classroom settings.

Use Cases of Digital Twins in Education

A pilot study examined the design and implementation of a digital twin of a real location for leadership and diplomacy training in the form of a virtual learning environment (VLE) for Model United Nations (MUN) simulations. The VLE was designed as a highly customized WebVR experience and was created as a digital twin of the United Nations Security Council Chamber in New York. Seven students participated in a series of simulations in virtual reality to simulate a session for the UN Security Council. The study aimed to explore the affordances of WebVR as an online collaborative tool. The design of the VLE was documented, including the training and onboarding of participants, customizing simulation parameters, and observing and polling participation for acceptance and reactions. The study analyzed both the perspectives of a veteran MUN facilitator and an educational technologist to identify best practices and design principles for MUN simulations in VR. The findings highlight the need for iteration or re-design of activities from traditional MUN facilitation to align with the capabilities of VLEs (Mcgregor & Hawkinson, 2022).

Recreating digital twins of important historical artifacts is also a known popular use. VR Ban Dainagon Emaki, was developed to give access to Japanese Emaki (Panoramic Picture Scrolls) and address the challenge of students' low interest in Japanese literature and to expose students to the world of classic literature. The authors aimed to enhance students' learning experience by making use of VR technology to provide a more immersive and interactive environment. The VR app allows students to view the whole scroll, animate the characters, and view the Emaki together in a multiplayer experience. The authors used photos of the Emaki from the National Diet Library Digital Collections (Hawkinson et al., n.d.).

Methodology

To help gather signals to gain insights into possible trends of the use of digital twins, especially in educational contexts, three use cases from movies, music, and higher education were contrasted and compared.

An extensive literature review that compared three use cases of digital twins was conducted. Likely trends and issues in using digital twins in educational contexts moving to the future were highlighted.

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ABBAtars

The Swedish group ABBA was formed by Agnetha Fältskog, Bjorn Ulvaeus, Benny Andersson, and Anni-Frid Lyngstad in Stockholm in 1972. Their album sales were in millions, and they toured the world but eventually split up in 1982. In 1989, Polygram purchased the ABBA catalog following ABBA's break-up. A compilation album containing the group's greatest hits was released in 1992 by the label. The album has sold over 30 million copies worldwide. They have used a variety of tools ever since to keep the band's activity alive, such as musicals, movies, video games, or expositions, to keep people interested in the band and its brand. Over the years, they have become one of the best-selling bands of all time by maintaining their reputation and influence (Johansson, 2010).

The latest tool for ABBA to keep income flowing is the use of digital twins. The ABBA Voyage, a digital concert experience, will incorporate captured performances of ABBA while wearing a mocap suit. Virtual avatars will be accompanied by a 10-piece band performing in real-time remotely. Motion capture technology like that used in films like *Star Wars* and *Lord of the Rings* was used by the band to create their digital variants. ABBA used a picture of themselves in their motion capture suits to boost their press coverage. ABBA has created digital twins of themselves as they looked in their music prime and can now appear in concert in perpetuity and posthumously.

Carrie Fisher in 'Star Wars

Star Wars, a series of very popular science fiction films starting in 1977, starred Carrie Fisher as Princess Leia. In December 2016, a prequel to the first 1977 movie was released, unfortunately Carrie Fisher had passed away prior to filming and could not reprise the role, so a digital twin was created to simulate the actress for a short appearance in the film. CGI has been used to animate dead celebrities in the past, but often to fill in a few scenes for films that had already begun shooting. As in the case of Carrie Fisher, the scenes were fabricated using existing footage. In the 2016 prequel called *Rogue One,* a digital twin was created using existing film of Carrie Fisher and motion capture of another actor was used to animate it. The result was a performance in film released after death, leaving questions to her estate about royalties and content rights (Naruniec et al., 2020). This has helped prompt legal questions about post-mortem publicity rights. Moreover, questions about the need for protection against digital resurrections that this technology invites, and its possible misappropriation have surfaced (Fontein, 2017).

Dead Professor

Students' shock was displayed when it was found that a professor that had passed away was 'teaching' an online course with previously recorded lectures (Elks, 2021). This was discovered when a student at a Canadian university tried to email this professor, only to find a link to a memorial web page. In this example, a university's online course materials, including video lectures, were used without informing students. This leads to questions about the ownership of

lecture recordings or likeness rights for those in semi-public life (Brown, 2021). Some researchers have suggested that this may be the beginning of the end of the lecture and the lecturer as universities are seeking to leverage recorded lectures for online learning. As digital twins are introduced in lectures and classrooms, the exploitation of these digital versions may be more prevalent in the future, and ethical and legal issues around using these twins are yet to be worked out. Other perspectives include the eventual obsolescence of analog people in a digital university and a fear of teachers slowly being replaced with digital copies of themselves.

According to Hassan (2018), "We have unleashed a technological force - digitalization - that is inherent to what it means to be human because we have embraced digital technology so quickly and enabled it to pervade our university so fully."

This trend may challenge the use of lectures by teaching staff and exacerbate the trend pushing teachers from delivering information to supporting or facilitating the understanding of it. Lectures are described as an anachronistic practice of a bygone age as a teacher-centered method of transferring knowledge from one human to another. This could imply that as these automated systems using digital twins as teachers become more prevalent, student-active engagement in collaboration, discussion, investigation, practice, and production will become more pronounced. The increased use of immersive technologies like augmented and virtual realities only points to making learning content and the teachers who deliver them immortalized with ever-so-detailed accuracy (Hawkinson et al., 2017).

Confidentiality Statement

No data from human participants were directly collected as a part of this research; therefore, no risk and liability is incurred in pursuing ethical human-based research. Instead, the methodology involved comparing a series of case studies with other prior research.

Discussion

To fully exploit the potential of digital twins, the above technologies will have to be converged. There will also be a need to address the rising issues of data collection, privacy, and digital rights poised to inform how tangential technologies are developed. To attain these objectives, more study into traditional data gathering and processing technologies, as well as the implementation of a digital twin communication interface, is required. To ensure user confidentiality and protect their private information, systems need to have security mechanisms that detect failures and incorrect data as well as provide recovery capabilities, all of which still need to be improved. Because there will be different realizations of a digital twin, interoperability of the technologies on a long-term basis will be imperative. Furthermore, digital twins must accommodate diverse cultures to facilitate worldwide collaboration. Legal issues must also be addressed, such as who is responsible for any wrongful activities attributed to digital twins and how much responsibility should be assigned to digital twins.

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The digitization of the world could mean a digital twin of reality itself, allowing experimentation and simulations for learning like never before, but the ability to copy people, things, and places from the real world has educational merit. There are still many legal, ethical, safety, and privacy issues to be worked out. This study suggests that the benefits have great potential and should continue to be explored, but proceed with caution, especially with student use.

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A Case Study in Tablet-Based Augmented Reality Vocabulary Acquisition

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Abstract

Augmented Reality (AR) is a novel technology capable of embedding digital objects within a user's experience of reality via a smartphone, tablet, or head-mounted display. AR offers interesting pedagogical applications and research possibilities in the field of Second Language Acquisition, particularly in the deliberate study of vocabulary. Such applications also offer implications for distance learning. This case study examined a 25-year-old Japanese language teacher in her deliberate acquisition of three sets of 15 vocabulary items selected from the first 1,000 most frequent words of Basque. A word card study method was compared with two AR vocabulary study methods. One AR study method involved the study of physical objects and their signifying Basque vocabulary items within a context-independent scene which was unknown to the participant. The second AR study method similarly involved the study of physical objects and their signifying Basque vocabulary items within a context-dependent scene which was known to the learner. In terms of vocabulary retention as measured with meaning recognition, form recognition, and form recall tests, both AR methods of study appeared to be as effective if not more so than word cards. The study of vocabulary items represented by physical objects in a contextualized environment with the use of a tablet-based AR application was beneficial in leveraging the recall of meaning and form of those items. During reflective interviews regarding the use of AR, the participant indicated that she found the novel method of vocabulary study to be engaging and motivating. The findings of this study also indicate that mobile AR applications have potential pedagogical uses relevant to distance education practices.

Keywords: *augmented reality, deliberate vocabulary learning, tablet-based AR, visuospatial bootstrapping, distance learning*

Introduction

Vocabulary study and acquisition in a second language is a well-established and researched area within the field of Second Language Acquisition (SLA). The use of word cards in the study of vocabulary and the opportunities they offer for retrieval, spacing, and feedback have been thoroughly examined by Nakata (2020). The use of word cards is touted for its efficiency and effectiveness in the four strands of language curriculum development proposed by Nation (2013).

In the last 50 years, computers have become smaller, faster, and more accessible. People can be seen operating handheld touch screen devices in both urban and rural settings. There are many applications that can be accessed using smartphones and tablets that replicate word cards and can be applied to language study. Entering the search terms *word cards* or *flashcards* in your mobile device's application repository or marketplace application returns hundreds if not thousands of word card applications.

As technology development advances and allows for more powerful computing possibilities, new modalities of technology known broadly as *immersive technologies* capable of providing access to *immersive realities* are becoming more popular. Virtual Reality (VR), which refers to an entirely immersive computer-generated environment, is now an accessible technology and head-mounted devices such as the Oculus Rift S, Meta Quest series, or HTC Vive series which allow users to play video games, communicate with other users virtually, and watch movies in a VR environment have been released for public consumption.

Augmented Reality (AR) is another similar immersive digital technology that can be used to enhance the environments we experience in our real, day to day lives. AR differs from VR and this is discussed in the following section. AR devices are relatively new and offer opportunities for research in the field of vocabulary acquisition in SLA and more generally in the field of education.

Literature Review

This literature review focuses on a selection of studies which have been conducted to understand how AR might aid in education and in the acquisition or study of vocabulary in a second language, and what are its implications to distance education.

AR technology refers to an emerging set of technologies that allows users to experience additional digital information which is overlaid onto the reality experienced by the individual in their current bodily capacity. Such additional information could be visual, auditory, or sensed in another way (e.g., haptic feedback, shifting masses, or supplemental fragrances). AR technology allows for real and virtual objects to be interacted with in real time (Azuma, 1997). AR differs from virtual reality (VR) in that VR engulfs the visual field of the user to provide a completely computer-generated environment, whereas AR technology aims to enhance what can be experienced rather than obstruct and replace. The objects that can be experienced in AR and VR exist on the Reality-Virtuality Continuum, a theorized scale that encompasses all possible physical, real-world objects and virtually experienced objects (Milgram et al., 1994).

AR devices come in a variety of different shapes and sizes. It is likely you have a device capable of providing an AR experience in your pocket right now. Any smartphone can be used as a device capable of overlaying virtual objects, labels, or other AR experiences into reality. Tablets, haptic feedback bands, and headsets are other devices which can also offer AR experiences.

With the development of these new technologies, many novel applications are emerging. The application of AR in pedagogy and education contexts is of growing interest. AR allows for the creation of new integrated and immersive spaces by educators (Squier & Jan, 2007). Previous research has shown that AR use in the classroom can help to boost student motivation (Billinghurst & Dueser, 2012). It can be used to gamify learning and encourage student-to-student interaction (Liu et al., 2016). AR can also support many pedagogical approaches such as constructivist learning, situated learning, games-based learning, and enquiry-based learning (Bower et al., 2014).

Vocabulary Study: AR Technology versus Traditional Methods

A common theme in the very few studies published currently about AR use in vocabulary acquisition is the comparison of AR technology use, either with an AR mobile handset or a head-mounted display, with word cards and teacher fronted lessons.

He et al. (2014) conducted research on the promotion of vocabulary study with the use of a smartphone-based AR application among EFL learners in a Chinese preschool. They investigated how an AR software application designed for fetching images and pronunciation of vocabulary performed as compared to teacher-centered vocabulary lessons. The researchers concluded the mobile based AR treatment appeared to be far more helpful in teaching the vocabulary set as compared to the traditional teacher-centered lesson. The teachers shared comments on their perceived benefits of the tactile, auditory, and visual elements that the technology was able to provide. They also shared concerns about the distracting nature of such devices used in the classroom.

Chen and Chan (2019) investigated the vocabulary learning and acquisition through an AR system among kindergarten-aged English language learners in Macau. The researchers were interested in understanding if the use of vocabulary word cards in instruction via an AR software, which was smartphone and tablet based, would yield significant improvements in performance between a pretest and posttest. They also wanted to understand how and if the students instructed with the AR based word cards would significantly differ in their ability to acquire vocabulary as compared to a traditional paper-based method of instruction. They investigated what the teachers involved thought about the use of the AR technology in pedagogy. The researchers concluded that both the AR technology treatment group and the paper-based groups made significant gains over the course of the treatment when pretest and posttest scores were measured against each other. They also found that there were no statistically significant differences between the two groups in terms of their learning gains. Both groups performed similarly to each other in their ability to acquire the instructed vocabulary.

Ibrahim et al. (2018) assessed the use of head mounted AR technology in the study of a set of 30 Basque words at a university in California. The researchers sought to understand if there was a benefit to using AR for vocabulary learning over the use of electronic word cards. They also investigated if vocabulary recall varied from vocabulary recognition. Their third interest was how users

perceived the language learning experience with the AR technology as compared to the traditional method. Participants studied the vocabulary set by viewing real-world items in a laboratory with a Microsoft HoloLens headset. The vocabulary set was from the Basque language, chosen for its isolated features and lack of homonyms in English. Participants took part in 90-second activities and then completed a distraction task before taking a posttest. The participants were tested with both recognition and recall tests. A delayed test, accomplished four days after the treatment, was conducted remotely to collect delayed posttest data. The results suggested that participants who studied with the AR system scored significantly better on both immediate and delayed posttests as compared to a word card control group. The paper suggested that a real potential exists for the use of AR systems in language learning, especially because of the observed sustained recall ability of the AR participants.

Geng and Yamada (2020) carried out research to better understand the effect of an AR vocabulary learning system on learners of Japanese in their acquisition of compound verbs. They investigated whether an AR system capable of displaying animations developed to exemplify compound verbs made a difference in their learning experience as compared to a paper-based treatment method, which made use of image schemas theorized to exemplify the compound verbs. They also sought to understand if the different methods influenced the participants perceived cognitive load and if the cognitive load perceived was related to their performance in each respective treatment. Both methods of study led to growth. They also found that intrinsic and germane cognitive loads experienced by the participants were higher for those in the AR group, while the extrinsic cognitive loads of paper-based groups were higher. Despite these descriptive differences, there was no significant difference in overall cognitive load experienced between the two groups, which the researchers noted was unexpected, and could perhaps be explained by a poor design in the application they used for the AR system. The researchers noted that lower intrinsic and germane cognitive loads of the AR group correlated with longer retention of knowledge and that perceived cognitive load was related to the participants' learning performance and likely had been affected by their motivation.

In a study by Larchen Costuchen et al. (2021), two vocabulary learning technologies were contrasted: AR under visuospatial bootstrapping (VSB) and the Quizlet method (electronic word cards). The researchers investigated whether the AR-VSB method could improve the retention of learners and reduce the rate at which learners forget when they are learning Spanish vocabulary within idioms as compared to study with Quizlet. The design involved a pretest, treatment session, posttest, and delayed test. The AR treatment group placed AR barcodes which triggered AR events around their living space on walls near objects which were familiar to them. The study discovered that the AR-VSB treatment was significantly more effective than the Quizlet procedure on both posttests and delayed posttests. This novel use of a visuospatial bootstrapping method for vocabulary language learning seems to have some implications for further research and offers many gaps to be researched. For example, what is the relationship between the study of vocabulary items via AR in a known environment and the retention of those items? Do environments which

are more familiar and personally known to the participant offer more leverage for retention in AR vocabulary study as compared with less contextually rich environments? In this study, the learners set up the system in their room or living space. Do variations in influence provided by the personal spaces in which learners studied vocabulary exist? Each of these questions are worthy of further investigation.

AR Vocabulary Study and Motivation

Another focus of existing AR vocabulary studies is the investigation of how the implementation of AR for vocabulary study in pedagogy affects the motivation of language learners. In a study by Solak and Cakır (2015), researchers investigated on the effect of teacher-directed AR EFL vocabulary activities and materials on language learners' motivation towards the materials as assessed with Keller's (1987) Material Motivational Survey. The experiment also focused on understanding motivational differences towards the materials based on gender or field of study. In this study, 130 'false beginners' (*false beginners* were defined as students who are made to study a subject again from a perceived beginning despite prior ability or knowledge) of English spanning four majors: Turkish Language Teaching, Computer and Instructional Technology, Psychological Counseling, and Theology Teaching, engaged with AR in lectures. Based on the results of the survey, the researchers concluded that the AR treatment had a positive effect on the motivation of the participants, and it encouraged the students to participate in AR vocabulary activities in the classroom. They found no statistically significant differences in perceived motivational benefits based on the participants' gender nor major. There also was a significant positive correlation between the academic achievement levels of the students and their motivation related to the use of AR in the classroom for vocabulary activities.

Chen and Wang (2016) investigated the effects of learning styles determined by the Group Embedded Figures Test (GEFT), a psychological test pertaining to field dependence, and prior English ability on performance in AR vocabulary study. They investigated the results of L2 vocabulary study and perceived motivation when AR technology was used for EFL vocabulary study among elementary school students in Taiwan. The researchers sought to understand if there was a significant difference in the motivation and/or vocabulary acquisition by students designated to two different learning styles, field independent (FI) and field dependent (FD), and based on their levels of proficiency, after learners took part in a vocabulary learning task which made use of an AR technology. The researchers concluded that FD participants made significantly higher gains on the vocabulary tests than FI participants indicating that learning styles might interact with an ability to learn vocabulary with AR. They observed that the motivation levels of the participants were relatively similar across both groups and noted that a higher proficiency in English was very likely to have a strong effect on learning achievement while using the AR treatment, though there were no statistical differences between the groups in terms of their motivation.

In a study on acquiring Arabic vocabulary with AR enhanced word cards, Zainuddin et al. (2016) explored the use of AR as a scaffold to support 24

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elementary-level students of Arabic attending a university in Malaysia. The researchers sought to understand what steps and procedures might be involved in the development of personalized vocabulary word cards in an AR application to provide scaffolding and help students retain the vocabulary. The satisfaction that students experienced when using personalized word cards in the AR application in their vocabulary studies was also explored. A procedure in which the students created personalized word cards with an AR application based on their own reading experiences while focusing on a text of Arabic was introduced. The students first scanned an image which served as a trigger image for one of the vocabulary items to be studied. The trigger image was uploaded by the students to the AR application *AURASMA*. The students then created a video which contained information about the vocabulary item the image served to trigger. The video was attached to the AR trigger. The students shared these augmented word cards to a directory and used them as group tasks for study. After a round of treatment, the students filled out a questionnaire adapted by the researchers from Martin-Guitarrez et. al (2010). These results were theorized to be a survey of the satisfaction levels of the participants.

In a study by Taskiran (2019), the use of AR gameplay and its motivating elements in an EFL context were examined. The researcher sought to know if AR games could help to motivate Turkish EFL learners. They also wanted to investigate the differences in interest/enjoyment and value/usefulness subscale scores. Four different AR games which employed a smartphone or tablet to trigger different AR objects embedded with English vocabulary were examined. These games were created and designed by the researcher using the application AURASMA. The four games were used in four separate classes. After gameplay, the participants were assessed using Ryan and Deci's (2000) Intrinsic Motivation Inventory to understand how the experiences of the participants affected their motivation. Forty-one low and 42 intermediate-Turkish EFL university students, ages 18-24, engaged in mobile AR vocabulary games. The researcher concluded that all students who participated in the study appeared to have enjoyed the AR games. Many of the participants found the activities to be highly motivating and rewarding. The games drew the attention of the learners and caused students to focus on the task at hand. The researcher also found that the positive affective results show that social aspects, cognitive aspects, and affective aspects could be leveraged by AR vocabulary games to create an environment conducive to language learning. The outcome of the value/usefulness subscale scores indicated that students thought that such games were valuable for their own language learning experience.

Mobile AR Applications: Practical Utility and Distance Learning Implications

When the reader thinks of an AR apparatus, the image of a bulky, head-mounted device that is similar in shape and form to current virtual reality headsets may come to mind. Currently, state of the art head-mounted AR devices are available for purchase. However, these devices are generally expensive and are therefore impractical solutions for most researchers, teachers, students, or independent learners who might want to engage in vocabulary study with the use of AR. A practical answer to the inaccessibility of these expensive AR products is the ubiquity of mobile devices (i.e., smartphones and tablets) which are readily

available around the world and allow users to engage in budget-friendly AR pedagogical experiences. The findings of the studies mentioned above that utilized mobile devices offer an implication regarding distance learning: deliberate vocabulary study with mobile devices is possible and practical; mobile devices are likely to meet the pedagogical needs of researchers, teachers, students, and learners, especially in distance education scenarios.

Gaps and Purposes

As AR technology continues to advance, it will likely present more applications and opportunities for research in SLA. One area worthy of research is the use of AR in deliberate vocabulary acquisition, specifically with the use of mobile devices. Smartphones and tablets are widely available and are currently capable of running AR software and applications. If novel AR study methods indeed compare to or exceed traditional methods in L2 vocabulary study, the ubiquity of smartphones and availability of AR software offer great pedagogical implications. Additionally, no previous studies have sought to examine how variations between AR study environments and scenes populated by realia representative of vocabulary items might affect their acquisition. As the scene or environment in which AR is used is a necessity and yet highly variable, the importance of the environment in which AR is used to study vocabulary is worthy of investigation.

Research Questions
1. How does a tablet-based AR method of vocabulary study perform as compared to paper-based vocabulary word cards in terms of vocabulary acquisition and retention?
2. How do context-independent AR environments compare to context-dependent AR environments in terms of vocabulary acquisition and retention?
3. How does the participant perceive the AR study method?

Methodology

Participant

The participant was a 25-year-old Japanese woman who lives in Tokyo, Japan. The participant is referred to with the self-chosen pseudonym Rachel. Rachel is a university graduate and works as a Japanese language teacher of foreign and exchange university students living in Japan. Rachel has a limited command of English and rarely uses English in her daily life. Rachel has lived most of her life in Japan but studied English intensively for a three-month period while in a university in New Zealand. Rachel has not had any exposure to the Basque language according to a preliminary interview and questionnaire. Rachel was oriented to the study with a consent form, which described her right to end her participation in the study at any time with no consequence, the removal of personal identifying information from the stored data, the consent to use data and photographs taken during the study in future academic manuscripts and presentations, and the storage of the data collected–all data collected was

stored in a password protected folder on an external hard drive kept in a locked drawer.

Instrumentation

Vocabulary Sets

Forty-five concrete nouns from the Basque language were selected for this study. These words were selected from the first 1000 most frequent words of Basque (Terminologia eta Lexikografia Zentroa, 2017). Concrete nouns of this level were selected for two reasons. First, they are capable of being embodied by commonly known, physical items which were placed into AR study scenes. Second, words from this band of frequency were deemed to be level-appropriate for a complete beginner to the study of Basque. Each of the three sets of vocabulary consisted of 15 concrete nouns.

Treatment Set 1: Paper-Based Word Cards

The first treatment method employed paper-based word cards on which 15 Basque concrete nouns were written. These word cards were created by the researcher. One side of each word card displayed the target word in Basque with the reverse side displaying the equivalent term in both English and Japanese. Figure 1 shows a sample of the word cards used in Set 1. A list of the words in Set 1 and their meanings in English and Japanese are in Appendix A.

Figure 1

Paper-Based Word Cards Format
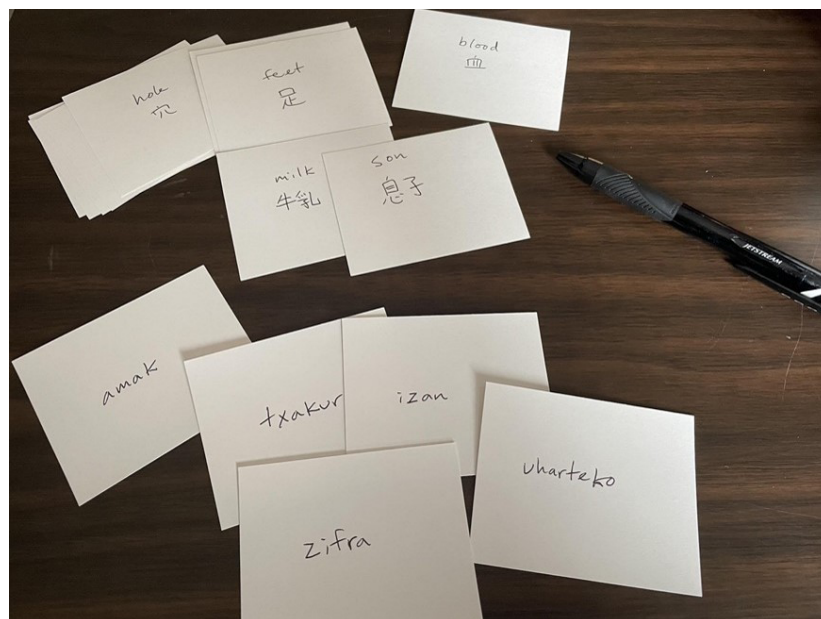
AR Application: ARIO

The second and third treatment methods employed an iPad to run a tablet-based AR application called ARIO (Ario Technologies Incorporated, 2022). ARIO is an application which allows the user to place a variety of virtual elements into a physical location which can be experienced and interacted with through the camera and screen of the tablet. Virtual labels containing the Basque target words and their equivalent meanings in English and Japanese separated by slash marks were anchored to real world items in a scene embodying those words. A 2018 10.5-inch iPad Pro was used. When creating an AR environment in ARIO, first a scene is captured with the camera. The information about the scene collected is processed automatically by the application which uses optical recognition technology to create a visuospatial map of the environment. The researcher prepared both environments with the application.

Treatment Set 2: Context-Independent AR Labels

Treatment Set 2 contained 15 Basque non-thematically linked concrete nouns. These items were anchored visuospatially in the AR application in a context-independent environment (see Figure 2). The context-independent environment was a table with white paper on top of it. Physical items which corresponded to each vocabulary item in Set 2 were placed onto the table and were tagged with an AR label. The items were arranged in the scene to keep thematic connotations to a minimum. A screenshot of the view of the scene through the AR application on the iPad which shows the visuospatially anchored labels can be seen in Figure 3. The items and corresponding translations of Set 2 are in Appendix B.

Figure 2

Context-Independent Environment Scene and Items

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Figure 3

Context-Independent Environment Scene and Items with AR Labels

Treatment Set 3: Context-Dependent AR Labels

Treatment Set 3 contained 15 Basque concrete nouns thematically related to a desk space. These nouns were anchored visuospatially in the AR application within a context-dependent environment, a desk space. The scene in which the vocabulary items were tagged via the AR application was known to the participant. She has used this desk space and is familiar with the items that populate it and their possible locations in the space. Figure 4 depicts the context-dependent AR treatment scene. The view of the scene through the AR application including the anchored vocabulary labels is depicted in Figure 5. A close-up view of some of the tested items in the AR application attained by moving the tablet physically closer to the desk is depicted in Figure 6. The set of Basque words and their English and Japanese equivalents used in Set 3 are in Appendix C.

Figure 4

Context-Dependent Environment Scene and Items
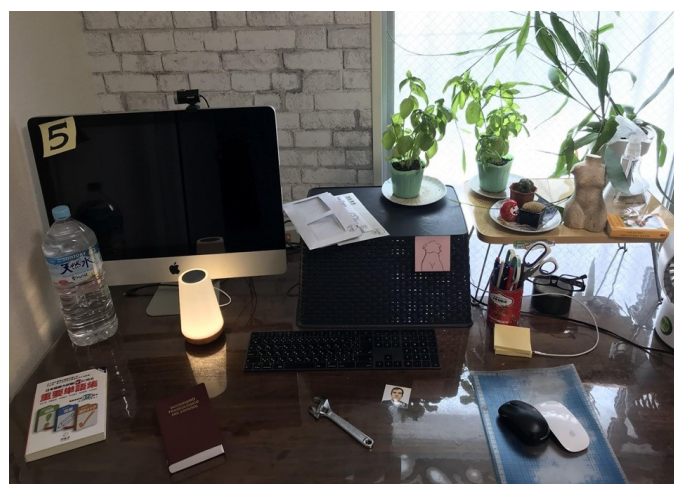
Figure 5

Context-Dependent Environment Scene and Items with AR Labels
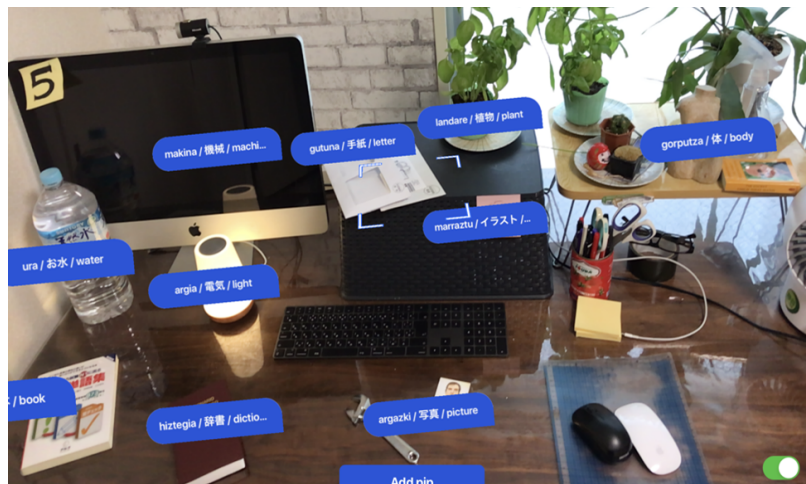
Figure 6

Context-Dependent Environment Scene and Items with AR Labels, Closeup
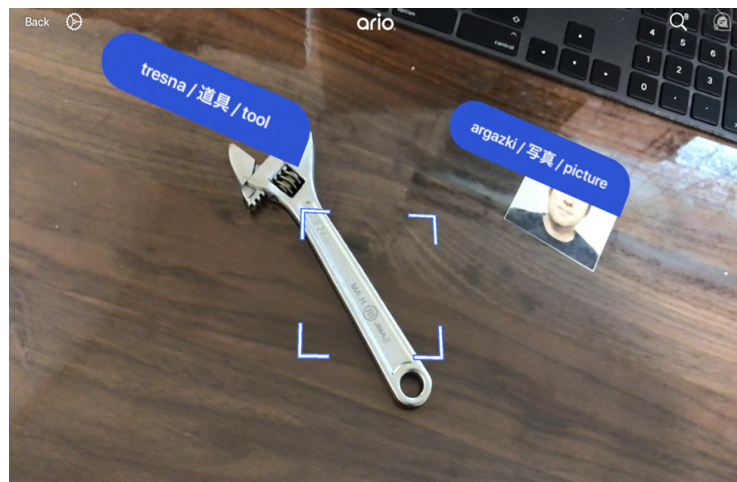
Pre, Post, and Delayed Tests

For each of the three vocabulary sets, a pretest, posttest, and delayed posttest were conducted using Google Forms. The format of each test was uniform except for the pretests. The pretests offered the option "I do not know this word" so that the participant could establish an accurate baseline of her knowledge of the words being tested. Each test contained three sections: meaning recognition tasks, gap fill form recognition tasks, and form recall tasks. Each meaning recognition task provided a target Basque word the participant was prompted to answer with the equivalent meanings in English and Japanese from five choices. Each gap fill form recognition task provided two sentences of the same meaning with a missing word, one sentence was provided in English and one in Japanese. The participant was prompted to choose the appropriate Basque word to fill the gap from five choices. For each form recall item tested, the meaning of the target word was provided in English and in Japanese. The participant was prompted to spell the Basque equivalent and only correct

spellings were scored as correct. Five of each of these three task types were included in each test for a total of 15 items per test. The orders of the test items were randomized across the pre, post, and delayed tests to prevent a possible ordering effect. Links to each of these tests are available in Appendix D.

Basque as a Target Language

Basque was used as the target language of study due to its low number of cognates and false friends shared with English and Japanese; this was in line with a similar study conducted by Ibrahim et al. (2018). In the current study, the participant was given a preliminary questionnaire to determine her exposure to a variety of languages and her attitudes regarding vocabulary study with new technologies. Although the participant had studied English as a foreign language, she indicated that she had not studied Basque or any Romance language. The participant was not made aware of the target language she studied until after the research project had concluded.

Procedure

The procedures followed a pretest, intervention, posttest, delayed posttest design for each set of words. Before the administration of each pretest, the participant was oriented to the format of the test. She was made aware that the Japanese and English equivalents of the target words would be tested in the meaning recognition section, that a cloze gap fill style sentence available in English and in Japanese would prompt a missing word in the target language in the form recognition section, and that the spelling of the target words would be tested in the form recall section. She was informed by the researcher to choose "I do not know this word" for the items on the pretest. The pretest for each set was administered to the participant. For all sets, the participant confirmed that she did not have any prior knowledge of any of the items in the sets. In one case, during the pretest for Set 2, she attempted to guess the meaning of one item in the set but was incorrect. The participant was not notified of the results of the pretests (or post and delayed tests) until after the research project had concluded.

The participant was oriented to the paper-based word cards and instructed that she would have 20 minutes to study the set of vocabulary items. She was instructed to remain on task for the entire 20 minutes. She was also instructed not to write anything on paper or use any resources outside of the word cards. She was made aware that she would be given a test similar in format to the pretest 15 minutes after her study of the word cards, Set 1. She was given the goal to make a form-meaning connection and to recall the spelling of the target words. The participant was provided with a timer to display the allotted 20 minutes. She was seated at an empty table and given the word cards. The participant studied the word cards for 20 minutes and was observed to remain on task for the entire length of time.

After her study of Set 1, the researcher set a 15-minute timer. The researcher held a conversation with the participant about topics unrelated to any of the vocabulary items or any topics related to language study in general. This

conversation served as a distractor task. The posttest was administered and timed. The participant was given five minutes to finish and submit the Google form.

The participant was then oriented to the ARIO application on the iPad. She was introduced to how she could view a scene on the screen of the device and that the scene displayed on the screen was a real-time view of the camera of the device. She was introduced to a training scene which included the type and format of the labels she would study for both AR treatment sets, sets 2 and 3. Five minutes were allocated to orientation followed by a 20-minute break.

The participant was then oriented to the context-independent AR environment. It was explained that she would have a total of 20 minutes to use the AR application to study the AR labels available to her in the context-independent scene. A timer was set and made available to the participant. As with Set 1, the participant was instructed to make use of the entire 20 minutes for deliberate study and not to write anything or to use any other resources outside of the AR application for the study of the vocabulary. She was instructed that she would be given a posttest 15 minutes after her study session and that the test would be similar to the pretest format. She was again asked to focus on the meaning and form of the target words. The participant studied Set 2 in the context-independent environment for the entire 20 minutes and was observed to be on task for the entire 20 minutes. Figure 7 shows the AR application in use to study the target words of Set 2.

Figure 7

Participant Use of AR in Context-Independent Environment
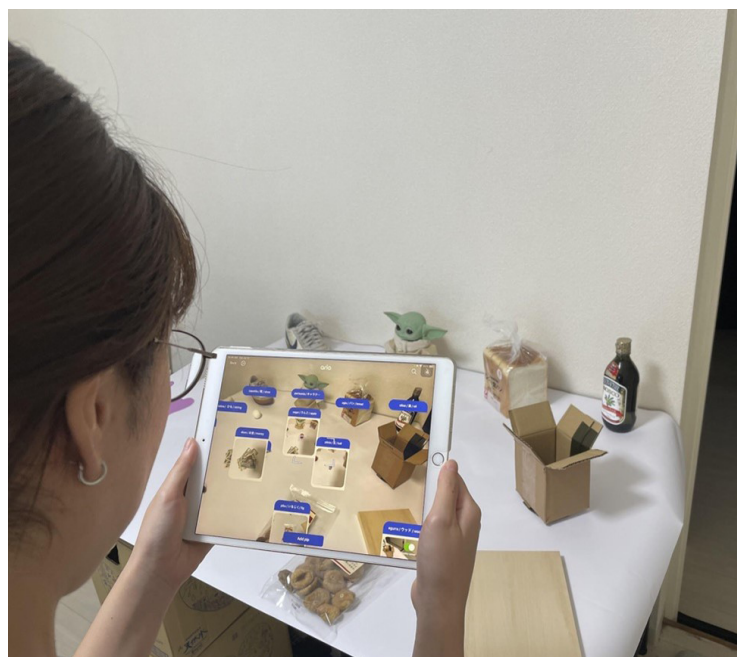
Following her study session, the researcher held a 15-minute distractor conversation. Afterwards, the posttest for Set 2 was conducted. The participant was given five minutes to finish and submit the posttest Google form for Set 2.

The participant was given a 20-minute break.

The participant was then oriented to the context-dependent AR environment with the AR application. She was again given 20 minutes, visible on a timer, to study the words in the scene with the AR application without writing anything or making use of any other resources. She was again instructed to focus on the form and meaning of the target words. She was again informed that the posttest would be similar in format to the pretest. The participant was observed to diligently make use of the entire 20 minutes for deliberate study of the target words. An unrelated 15-minute conversation was held with the participant after her study of Set 3. She completed the Set 3 posttest on Google Forms within a five-minute time limit. Figure 8 depicts the participant studying the context-dependent scene with the AR application.

Figure 8

Participant Use of AR in Context-Dependent Environment
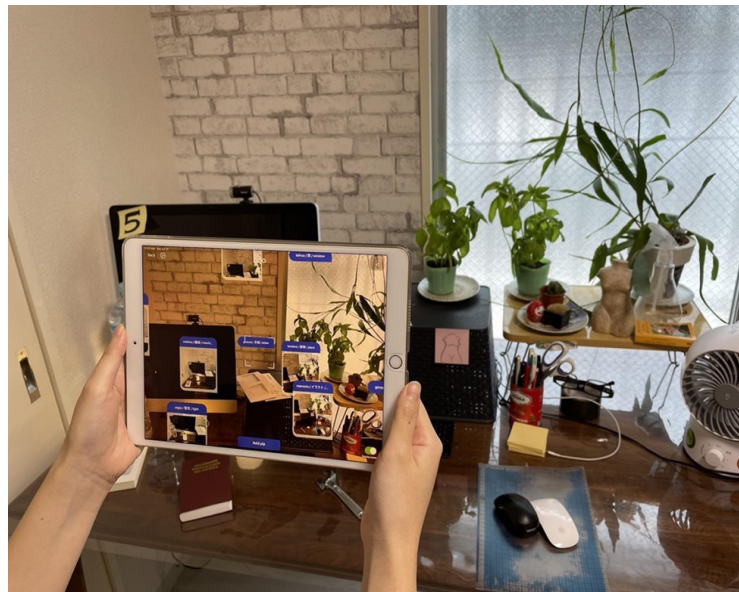
The following day, roughly 24 hours later, the participant took each of the delayed posttests via Google forms. The participant was given a 20-minute break between each delayed posttest. She was not given any access to any AR resources or the environments in which she had studied.

On the same day, the participant was interviewed in Japanese regarding her experience and feelings toward the study. This interview was recorded and transcribed. The interview was conducted before the participant was made aware of her performance on the pretests, posttests, and delayed posttests to help ensure that the information gathered in the interview was not influenced by the results.

Results and Discussions

Table 1 shows that the pretest established a baseline for each of the vocabulary study sets; the participant did not know any of the Basque words. For Set 1, the

word cards set, the participant made a gain on the initial posttest, answering 8 out of the 15 questions correctly for a total of 60%. She answered all meaning recognition questions correctly, two of the form recognition questions correctly, but none of the spelling tasks correctly. On the delayed posttest for Set 1, the participant answered 10 out of 15 questions correctly, a larger gain than that on the initial posttest, for a total of 66%. She answered all meaning recognition questions correctly, all form recognition questions correctly, but not any of the spelling tasks correctly. For Set 2, the context-independent AR scene, the participant made a gain on the initial posttest, answering 12 out of the 15 questions correctly for a total of 80%. She answered all meaning recognition questions correctly, all form recognition questions correctly, and two of the form recall tasks correctly. On the delayed posttest for Set 2, the participant answered 13 out of 15 questions correctly, for a total of 87%. She answered all meaning recognition questions correctly, all form recognition questions correctly, and three of the form recall tasks correctly. For Set 3, the context-dependent AR scene, the participant made a gain on the initial posttest, answering 13 out of the 15 questions correctly for a total of 87%. She answered all meaning recognition questions correctly, all form recognition questions correctly, and three of the form recall tasks correctly. On the delayed posttest for Set 3, the participant answered 10 out of 15 questions correctly, for a total of 66%. She answered all meaning recognition and form recognition questions correctly but did not answer any of the form recall tasks correctly.

With respect to RQ1, which asked how tablet-based AR technology performs as compared to paper-based vocabulary word cards, both AR treatment methods were more effective than the word cards on the immediate posttests, and the delayed posttest scores of the AR treatments matched and exceeded the word card treatment.

With respect to RQ2, which asked how context-independent AR environments compared to context-dependent AR environments, the initial posttest data showed the context-dependent AR scene to be more effective than the context-independent AR scene. However on the delayed posttest, the participant's score on the set studied in the context-dependent AR scene decayed, and the participant scored higher on the set studied in the context-independent AR scene. This change in score might suggest that the context-dependent AR scene might have offered the participant temporary resources that benefitted her performance on the immediate posttest with access to those resources quickly decaying by the time she took the delayed posttest.

Table 1

Descriptive Statistics

Set / Study Mode	Pretest	Posttest	Delayed Posttest
Set 1 Word Cards	Total - 0/15 - 0% M.Recog. - 0/5 F.Recog. - 0/5 F.Recall - 0/5	Total - 8/15 - 60% M.Recog. - 5/5 - 100% F.Recog. - 2/5 - 40% F.Recall - 1/5 - 10%	Total - 10/15 - 66% M.Recog. - 5/5 - 100% F.Recog. - 5/5 - 100% F.Recall - 0/5 - 0%
Set 2 AR: Context Independent	Total - 0/15 - 0% M.Recog. - 0/5 F.Recog. - 0/5 F.Recall - 0/5	12/15 - 80% M.Recog. - 5/5 - 100% F.Recog. - 5/5 - 100% F.Recall - 2/5 - 40%	Total - 13/15 - 87% M.Recog. - 5/5 - 100% F.Recog. - 5/5 - 100% F.Recall - 3/5 - 60%
Set 3 AR: Context Dependent	Total- 0/15 - 0% M.Recog. - 0/5 F.Recog. - 0/5 F.Recall - 0/5	Total- 13/15 - 87% M.Recog. - 5/5 - 100% F.Recog. - 5/5 - 100% F.Recall - 3/5 - 60%	Total- 10/15 - 66 % M.Recog. - 5/5 - 100% F.Recog. - 5/5 - 100% F.Recall - 0/5 - 0%

Note.
> M.Recog.= meaning recognition tasks
> F.Recog.= gap fill form recognition tasks
> F.Recall= form recall tasks.

With respect to RQ3, which asked how the participant perceived the AR study methods, the participant offered positive and enthusiastic reviews of both modes of AR. During the delayed interview with the participant, Rachel remarked on how the word cards mode of study was the most familiar to her and that she had studied similarly when she studied English in high school and university. Because of this experience with word cards, she predicted that this method of treatment would be the most effective in helping her to remember the meanings and forms of the target words in this study. Regarding the AR treatment method, she expressed that it was *"interesting and entertaining"* and *"a new idea"*. Rachel expressed that if she could use the application on her own, she would like to try to study vocabulary using this method so long as it could be considered an *"effective method"* of study. Rachel said that the AR study generally made her feel motivated to resume her study of English vocabulary and caused her to think of ways in which she might employ AR technology in her own classroom.

Discussion

All treatment modes helped the participant establish a form-meaning link between some of the vocabulary words tested in each set. Out of the three

initial posttests, the participant performed the best on Set 3 (87%), similarly on Set 2 (80%), yet somewhat lower on Set 1 (60%). These data indicate that both AR treatment methods were more effective in helping to establish a form-meaning link than the word cards. As compared with the scores of the immediate posttests, the participant made unexpected gains on the delayed posttests for Sets 1 and 2, by 2 points and 1 point respectively which indicate a test effect. Her score decayed by three points on the delayed posttest for Set 3, as would be expected.

Similar to the findings of Chen and Chan (2019), both the word cards and AR-based treatments appeared to be similarly effective in helping the participant to recall the vocabulary items on a posttest. Unlike the findings of He et al. (2014) and Geng and Yamada (2020), though the AR treatments of the current study appeared to be more effective in recognition of meaning, recognition of form, and limited recall of the target words on the initial posttests, the delayed posttests seem to indicate that the AR treatments and the paper-based treatments performed similarly. In the scene that He et al. (2014) investigated, the researchers were comparing a teacher-fronted vocabulary lesson with the results of AR vocabulary word card study. Perhaps their results were affected by a moderating variable such as teaching styles and differences between the teachers who were involved in their study. As for the discrepancy with the findings of Geng and Yamada (2020) (and is relevant with He et al. (2014)'s findings as well), the current study is a case study involving only one individual and might not be comparable. Furthermore, Geng and Yamada (2020) investigated compound Japanese verbs whereas the current study only focused on Basque concrete nouns.

Ibrahim et al. 's (2018) study was perhaps the most influential in terms of design on the current study in that Basque was used as the target language of the vocabulary sets. The participant in the current study is also of similar age to the participants examined in Ibrahim et al.'s study. The current study also investigated reception as well as production with the use of a spelling test. However, Ibrahim et al. (2018) found promising indications that their AR treatment performed significantly better than the traditional word card group - a finding that was not echoed in this case study. Again as noted above, there might indeed be moderating variables present in the current study. The difference in findings could be the result of the limitation presented by a n size of one. The current study should be conducted again on a larger scale with a larger sample size.

The current study was also influenced by Larchen Costuchen et al. (2021), in that an element of visuospatial bootstrapping was tested by placing physical items and their signifying vocabulary items into environments and scenes known to the participant with the use of AR. Larchen Costuchen et al. (2021) found that the AR treatment group performed significantly better than the electronic word card group. The results of the current study appeared to show that AR treatment was initially better than paper-based word card treatment, but delayed posttests showed that all treatment modes performed relatively equally. Larchen Costuchen et al. (2021) conducted the delayed posttest a

week after treatment whereas the delayed posttest was conducted after 24 hours in the current study.

In He et al.'s (2014) study the teachers involved remarked that the tactile and visual elements of AR could potentially benefit pedagogy. Similarly, in Chen and Chan's (2019) study, one of the teachers who was interviewed indicated that one of the benefits of AR was the power to draw students' attention to vocabulary in a lesson. While Rachel was a participant in the capacity of the current study, she is herself also a language teacher. In our interview, she discussed how the development of AR technology could be promising for her own pedagogical use, echoing some of the points made by the instructors surveyed in the research of He et al. (2014) and Chen and Chan (2019).

A handful of studies have gathered information and the perspectives of the participants and students in terms of their motivation and feelings about using AR to study vocabulary, to supplement materials in the classroom, to create personalized vocabulary study sets, and to gamify learning (Chen & Wang, 2016; Solak & Cakır, 2015; Taskiran, 2019; Zainuddin et al., 2016). While the current study set did not dive deeply into the motivation orientations or other individual differences of the participant, it did examine the perspective of the participant through an interview to better understand her feelings about the study. During the interview, the participant remarked that by using an iPad for the current study that it "felt like I was playing a game". She also stated that it was an overall entertaining experience, and that she felt motivated to study vocabulary after the experience.

Finally, the finding that the participant in this study was able to make relatively lasting form-meaning links between many of the target Basque items and their Japanese equivalents with a tablet-based AR application is a finding that reinforces the call for more research of mobile AR technology as applied to deliberate vocabulary study and in wider SLA contexts. Also, while expensive head-mounted AR devices are attractive and have been successful in previous studies of AR as applied to deliberate vocabulary study, the current study shows that tablets which are currently available at a fraction of the cost are capable of being used for comparable pedagogical applications. Furthermore, this study indicated that such applications of mobile-based AR can be easily extended to distance education settings.

The current study makes a small contribution to the field of SLA in that at the time of writing this manuscript, AR assisted vocabulary study is a subject that has been very lightly researched. Based on the findings of this study and of previous studies mentioned above, AR appears to be an effective vocabulary study method for learners of a second language. The novelty and application of AR was shown to pique the interest of and motivate the participant. What is not yet clear is how the physical environment interacts with and leverages the retention of vocabulary studied in AR. More related studies which further investigate these areas are needed.

Conclusions and Recommendations

This case study observed a Japanese participant, a 25-year-old teacher, who used paper-based word cards and two modes of AR treatment to study a total of 45 Basque concrete nouns. The AR treatments were different in that one mode of treatment did not require that the physical items which corresponded to their AR vocabulary cards be contextually or thematically dependent, whereas the other AR treatment method required the items and their corresponding vocabulary to be relevant to the environmental scene. The participant was asked to complete meaning recognition, form recognition, and form recall tasks. The results of the immediate posttests appeared to show that both AR treatments were superior in their ability to help the participant learn and retain the vocabulary items, with the context-dependent AR treatment being slightly superior to the context-independent AR treatment. The results of delayed posttests of all treatment methods appeared to show that delayed gains were made in the retention of the paper-based word card set, and that the participant's ability to remember the vocabulary items studied in both AR treatment methods deteriorated slightly. The participant was generally motivated by the AR technology, commented on its game-like features, and considered how she might use AR in her own classroom. Finally, this study serves as an example as to how researchers, teachers, students, and self-directed language learners might practically implement readily available mobile devices to make use of augmented reality in vocabulary study.

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Adam Dabrowski

Appendix A
Set 1: Vocabulary List Studied with Word Cards
(Basque - English / Japanese)

etxea - house / 家
amak - mother / お母さん
egun - day / 日
zuhaitz - tree / 木
mendia - mountain / 山
haurrak - children / こども
oinak - feet / 足
txakur - dog / 犬
uharteko - island / 島
zifra - figure / 数字
izan - fact / 事実
odol - blood / 血
semea - son / 息子
esnea - milk / 牛乳
zulo - hole / 穴

Appendix B
Set 2: Vocabulary List Studied in Context-Independent AR Environment
(Basque - English / Japanese)

egurra - wood / ウッド
kutxa - box / 箱
dirua - money / お金
arrautza - egg / 卵
pilota - ball / 玉
bihotza - heart / ハート
olioa - oil / 油
giltza - key / 鍵
pertsonaia - character / キャラクター
katea - string / ひも
ogia - bread / パン
azukre - sugar / 砂糖
piku - fig / いちじく
sagar - apple / りんご
zapatila - shoe / 靴

Appendix C
Set 3: Vocabulary Studied in Context-Dependent AR Environment
(Basque - English / Japanese)

argia - light / 電気
argazki - picture / 写真
ura - water / お水
landare - plant / 植物
marraztu - drawing / イラスト
liburua - book / 本
gutuna - letter / 手紙
gorputza - body / 体
makina - machine / 機械
bost - five / 五
taula - table / テーブル
leihoa - window / 窓
horma - wall / 壁
hiztegia - dictionary / 辞書
tresna - tool / 道具

Appendix D
Pretest / Posttest / Delayed Posttest Google Forms Links

Pretests
Set 1: Paper-based word cards - https://forms.gle/CX2r8AFe63PEqvpRA
Set 2: Context-Independent Environment - https://forms.gle/
S7eDo7LvXZ7MfpzP6
Set 3: Context-Dependent Environment - https://forms.gle/
QayaLwNEQaQ9cNa17

Posttests / Delayed Posttests
Set 1: Paper-based word cards - https://forms.gle/FukvVqTXrRcmDHQFA
Set 2: Context-Independent Environment - https://forms.gle/
HWXhz5rN7hgSRrk5A
Set 3: Context-Dependent Environment - https://forms.gle/
pMqMjXe6DWT67CN3A

Is the University of Makati e-Ready? An Evaluation of Its Faculty's Technology Acceptance in LMS Utilization

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Abstract

Due to the spread of the COVID-19 virus in 2020, academic institutions worldwide including the University of Makati (UMak) shifted to the conduct of online classes through the Open Distance Learning Act of 2014. To do so, UMak introduced the Technology Based Learning Hub (TBL Hub) as the university's official Learning Management System (LMS) in the second semester of the school year 2020-2021. This study aims to evaluate the behavior of UMak's College of Education (COE) faculty in utilizing the said LMS based on Fred Davis' (2018) Technology Acceptance Model (TAM). This mixed methods research evaluated its respondents' behavior through a researcher-made questionnaire adapted from Alshorman and Bawaneh (2018) and Cunningham and Bradley (n.d.). The results of the study revealed that the respondents' perceptions of the TBL Hub's perceived usefulness in terms of course management and faculty-student and peer interaction have already somewhat met their expectations. In terms of the LMS's implementation of the process, they also agreed that the TBL Hub's perceived ease of use has already been established. This is despite some issues in learning and interaction reported by both the faculty and students. It shows that UMak's technology acceptance based on its use of LMS already acquired positive acceptance. Moreover, the respondents reported concerns about the Moodle system based on their personal experiences and provided recommendations that would help maintain and improve their positive technology acceptance of the LMS. Overall, the positive technology acceptance in the TBL hub's perceived usefulness and perceived ease of use indicates that the UMak-COE faculty are e-ready.

Keywords: TBL Hub, technology acceptance, online classes, learning management system

Introduction

Online teaching is a form of distance education in which a course or program is intentionally designed in advance to be delivered fully online (Bates, 2016). This form of teaching is not new in the Philippines as the country is acknowledged as a hotspot for English language learning. Companies like 51TalkPH, Weblio, English Mania, and many more are online English Teaching companies in the Philippines catering to primarily Asian countries (China, Korea, Japan, etc.). This is made possible using video teleconferencing applications and learning management systems designed explicitly to each company's needs and offers. According to Research and Markets (2021), the global online education market is expected to grow at a CAGR of 14.6% during the forecast period (2021-

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2026). In addition, the edtech industry is expected to grow from $227 billion in 2020 to $404 billion by 2025 (HolonIQ, 2022). The influx of enrollees and success in online teaching gave the current generation of school administrative officials an idea of how the academe could thrive in the middle of the COVID-19 crisis that halted academic institutions' operations. To alleviate the significantly volatile and vulnerable situation brought about by the global pandemic, most, if not all, sectors took a wide range of measures to help ease the effects of the unprecedented global circumstances. The measures included migrating face-to-face classes to the online learning modality just so teachers and students could continue their classes from the comforts of their homes.

Education is a necessity. The long-term closure of schools may have a broader range of significant impacts on society. As explained by Das (2020) in a webinar sponsored by The World Bank, "disruptions to schooling and the resulting learning losses— from shocks to schooling and incomes, from unequal access to remedial measures such as distance learning, and from subsequent inequalities once students return to school— could be large" (par. 1). To avoid the drastic impact of closing schools during the pandemic, the education sector opted to adopt the online learning setup that has already been utilized by English online learning companies for the past years. Besides, based on the report of Li and Lalani (2020) to The World Economic Forum, "even before COVID-19, there was already high growth and adoption in education technology, with global Edtech investments reaching US$18.66 billion in 2019 and the overall market for online education projected to reach $350 Billion by 2025" (par. 3). Thus, the migration from face-to-face to online classes is not new in the education sector. View Sonic (2020) claimed that this migration to online education is likely to have a lasting impact on the future of education since more students and educators have already recognized the flexibility and accessibility of online education through adaptive and social learning. In 2014, Executive Order 10650, or the Open Distance Learning Act of 2014, which aims to expand and further democratize access to quality tertiary education and technical educational services in the country through open learning services was released. However, it was only in 2020 that this executive order was fully enacted as the basis for implementing online classes. This situation has caught the teachers unprepared, considering that online teaching is the only viable way to continue their classes. Although the education sector regulates online learning, it resulted in various reactions from teachers and students, especially regarding the practicality, validity, and reliability of the said teaching method since this is an entirely new paradigm for most teachers, especially for seasoned ones. Their concerns regarding online teaching vary from their access and knowledge of the devices for online classes to their use and understanding of the learning management systems (LMS) that their respective institutions require (Brooks & Grajek, 2020).

The locally funded University of Makati (UMak) is among the universities that also embraced online learning. It utilized the online application Moodle as the official LMS of the institution. Moodle is a "learning platform which is considered an open-source software package designed to help educators, administrators, and learners with a single robust, secure and integrated system to create personalized learning environments" (Moodle, 2020, par.1). This Moodle app was customized to fit the UMak brand and was named Technology-Based

Learning (TBL) Hub. It features the same functions as the default Moodle app, such as posting modules, URLs, assignments, etc., creating quizzes/exams, attendance, forum, and quick messaging with students. The platform is only accessible to the members of the said university using their respective UMak-provided email addresses. The said LMS was first introduced to the UMak community in the second semester of 2020-2021 as a test run to see if it works efficiently. The university administration created a team that would supervise and coordinate the concerns of the faculty members and students on its use. Furthermore, the TBL Hub team conducted a series of webinars to address the challenges of the faculty members in terms of the use of the internet and other technologies in teaching.

Objectives of the Study

In this study, the College of Education faculty members, who use the TBL Hub daily, evaluated the said platform based on its usability and implementation. To fully identify usability, Ferguson (1954) in Martin et al. (2019, p.100) defined this as "the [teachers'] capacity to successfully perform" to use the application. On the other hand, the faculty's evaluation of the LMS's implementation is based on their perception of the system's performance. Various researchers may have studied the readiness and attitude in the use of online teaching in general; however, this study evaluated the behavior of the respondents regarding (1) perceived ease of use and (2) actual ease of use of the TBL Hub. The study aimed to bridge the gap between the implementers of the TBL Hub's objectives (the management) and the users' (teachers and students) concerns by understanding the latter's behavior regarding technology acceptance. Specifically, this study answered the research questions stated below.

1. How efficient is the TBL Hub for the respondents in terms of course management and faculty-student and peer interaction?
2. What is/are the reported personal experiences of the respondents in their use of the TBL Hub?
3. How do the respondents evaluate the TBL Hub based on the implementation of its process and collaboration?
4. What is/are the recommendations of the respondents that would encourage them to fully accept the TBL Hub as part of the teaching and learning process?

Review Of Related Literature

The studies and literature in this section elaborate on the factors that reportedly influenced teachers' behavior toward online teaching.

Age and Online Teaching Experiences

Most seasoned faculty members have limited to no knowledge of most online applications, more so of LMSs such as Moodle and Google Classroom. On the other hand, most young teachers are more adept at using the computer and the internet in their classes, making the online teaching modality more convenient. Age may be a factor in the faculty members' acceptance of technology in

online teaching; however, this may not always be the case because some new-generation teachers also experience teaching difficulties in the online platform. Interestingly, embracing the online teaching modality may not be all about age, as Wray et al. (2008) in Martin et al. (2019) claimed that "a faculty member's past teaching experience serves as foundation to teaching online" (p. 97). Given this claim, it is assumed that seasoned teachers should not be adamant about embracing the online modality since it is just the same as classroom teaching, and they can use their teaching experiences in the face-to-face set up in the conduct of their online classes. This includes but is not limited to gamified learning activities, collaborative activities, teacher-student interactions, and assessments. These are usual activities in the face-to-face setup that can also be done via online teaching. The only difference is that, in online classes, teachers do this with limitations since social interactions are also limited as compared in the face-to-face classes. However, this should not be taken in general, regardless of age since a teacher's role in the classroom is different in online teaching. According to Easton (2003) in Martin et al. (2019), an "online faculty focus[es] on instructional time and space, virtual management techniques, and the ability to engage students through virtual communication" (p. 97). Therefore, the information and technology (IT) competencies of the teacher needed for this platform are much higher and are of utmost importance for them to succeed. In this regard, Berge (1995) categorized the necessary conditions for successful online tutoring as "(1) pedagogical, (2) social, (3) managerial, and (4) technical" (pp. 2-3). These categories may be similar to the face-to-face setup; however, the teacher's technical skills, wherein "the facilitator must make participants comfortable with the system and the software that the conference is using (p. 2)" is somewhat problematic for most teachers. If Berge's (1995) categorization of necessary conditions for successful online teaching was accurate then the fourth category, where the technical skills of the teacher are concerned, is indeed the main takeaway in the present situation.

Device and internet access

The online class modality has been an enormous challenge in the Philippine education sector. Many concerns among students and teachers alike flooded during the onset of online teaching in 2020. However, the most significant concern was the country's poor internet access to utilize the online modality (Bayagas, 2020, in Joaquin et al., 2020). According to the most recent survey conducted by the Social Weather Stations (SWS), only 39 percent of Filipino households that have family members engaged in online distance learning have reported having a reliable and stable internet connection (Valiente, 2021). That number is even far from half of the total population of Filipino families in the country. Although the survey was done nationwide, it is not evident if the data gathered reached the country's far-flung areas. Furthermore, the survey was done only with students; hence, the number of teachers affected by poor internet connection is not yet counted, both for those who were in the cities and for those who opted to stay in their provinces when the pandemic started. Despite this, the Department of Education (DepEd), Commission on Higher Education (CHED), and Higher Educational Institutions (HEIs) in the country still implemented pragmatic approaches to continue the education of Filipino learners through modified forms of asynchronous and synchronous online

learning that aim to facilitate student learning activities. Top universities in the Philippines which include the De La Salle University (DLSU), Ateneo de Manila University (ADMU), University of Sto. Tomas (UST), and University of the Philippines (UP), adapted to this approach. They all have specific LMSs partnered with video teleconferencing applications their teachers and students are using to fill the gap in education that the pandemic has brought. However, since all these applications used in online teaching are accessed online, the teachers' second concern is the devices they should use in their classes.

Experience in the use of LMS

Teachers were left with no option but to utilize online platforms to continue teaching their students during the pandemic. Some teachers may be well-versed in using online platforms but still have reservations about using these in their classes. The University of Kentucky teachers experienced the same dilemma regarding the online teaching system. According to Cunningham and Bradley (n.d.), it was discovered that "teachers were willing to integrate online learning tools into their classroom if certain requests were met concerning the system itself and its implementation process" (p. 2). In other words, although the teachers have a positive acceptance of their LMS, they would still like the management to consider their convenience in using their LMS for their classes. Hence, the data that Cunningham and Bradley (n.d.) gathered on the implementation of the system mainly concerns their teachers' request for support and more hands-on training. In his study, Gay (2016) in Martin et al. (2019) supported this when he examined online instructor e-learning readiness assessment before, during, and after course delivery. He found out that "the availability of online help desk services is [also] an urgent need of online faculty" (p.100). In an interview made by Amancio (19 June 2021) at the Sulu State College, a faculty mentioned, "… it is also important to listen to our faculty because when we introduced many tools to them, they had a hard time memorizing or doing their expertise on each tool" (par.3). In this regard, they decided to make their e-learning system explicitly designed for their faculty's needs after finding out that:

> "The first lesson we learned is we should always be flexible for faculty and students. One size fits all does not apply to us. We have to invest in our teachers. We need to train and listen to them. For the government, they have to address access to internet connection because this is our main problem here". (par. 5)

In a study on all the faculty members of the Abdulrahman Bin Faisal University for the academic year 2016–2017 regarding their university's use of a new LMS, Alshorman and Bawaneh (2018) found that the attitudes of faculty members toward the use of the LMS in teaching were positive. The most important reason for this is "the awareness of faculty members of the usefulness of electronic programs and their added value in teaching and the transfer of knowledge through the educational technology that has invaded the world of knowledge, especially university teaching" (Alshorman & Bawaneh, 2018, p.11). Their study may have resulted positively since they utilized their LMS more conveniently, contrary to the abrupt need for online classes during the COVID-19 pandemic. The drastic change brought about by the pandemic is a significant change

that members of the academe must endure. According to Bush (2006, p. 19), "cultural change is difficult and problematic"; thus, we can safely say that the attitude of teachers toward the use of online platforms is not only due to the unprecedented phenomena that did not give them much time to prepare but also because it is challenging to shake a culture that they have been practicing since time immemorial. Furthermore, Promethean (2020) in Wang et al. (2021, p. 1) reported that "fewer than 5% of teachers believe that they have received full training, and only 36% of teachers think that they have been adequately supported" after having been required to use the online platform during the onset of the pandemic. The reported figures are understandable due to the inability of most schools to give in-depth training to their faculty members. However, it is also worth noting that this inability to train faculty members entirely is because of the health protocols mandated in all institutions that there should be no face-to-face interactions at all costs to prevent the spread of the COVID-19 virus. This must have been added to the academic personnel's anxiety, which resulted in them being adamant about accepting the technology offered to them fully.

Synthesis

Implementing the policies in online teaching was forced on the academe without considering the readiness of the concerned individuals. In the study by Martin et al. (2019, p. 97), they mentioned that "technological developments require faculty members to consider new ways to prepare, organize, deliver, and assess courses and learning materials for online teaching". The online competencies of the teachers should have been given much consideration since not all of them are familiar with the use of online applications. The behavior of the teachers to determine whether or not to accept technology in their pedagogies may also be relevant. The age and online teaching experiences of a teacher may be significant; however, without the technical skills of the teacher, it could still be somewhat problematic not only for the teacher but also for the students. Secondly, mobile phones and laptop computers are already a part of people's everyday lives. However, some are still concerned with the capabilities of their gadgets, especially those in academia. Some devices are not designed for heavy use, such as long video calls, rendering of videos, and others as these shorten the lifespan of devices and require the purchasing of a new one. Besides, the teachers' limited experience using specific applications, especially on other online LMSs, makes them more adamant about using these in their classes. Lastly, the urgency of implementing the online classes made the teachers more anxious about using the online platform in general. This resulted in them using applications that they were most familiar with.

Theoretical Framework

This study also used the factors mentioned above to evaluate the behavior of UMak's College of Education faculty using the Technology Acceptance Model (TAM) by Fred Davis in 1989. The model posits the relationship between how the users come to accept technology (perceived usefulness) and how they use that technology (perceived ease of use) (Gordon, 2013). The perceived usefulness (U) is defined as "the prospective users' subject probability that using a specific application system will increase his or her job performance within the

organizational context" (Davis et al., 1989, p. 985). Hence, one of the indicators of the users' behavior is if they see that the use of technology innovation in an organization would result in maximum efficiency, regardless of whether it is a new system. Moreover, the perceived ease of use (EOU) is defined as "the degree to which the prospective user expects the target system to be free of effort" (Davis et al., 1989, p. 985). Ultimately, the non-acceptance behavior of the users would end if a particular technology was viewed as easy to use, uncomplicated, and efficient. Thus, this model included EOU in the framework to explain another contributing factor that affects user behavior.

Figure 1

Technology Acceptance Model
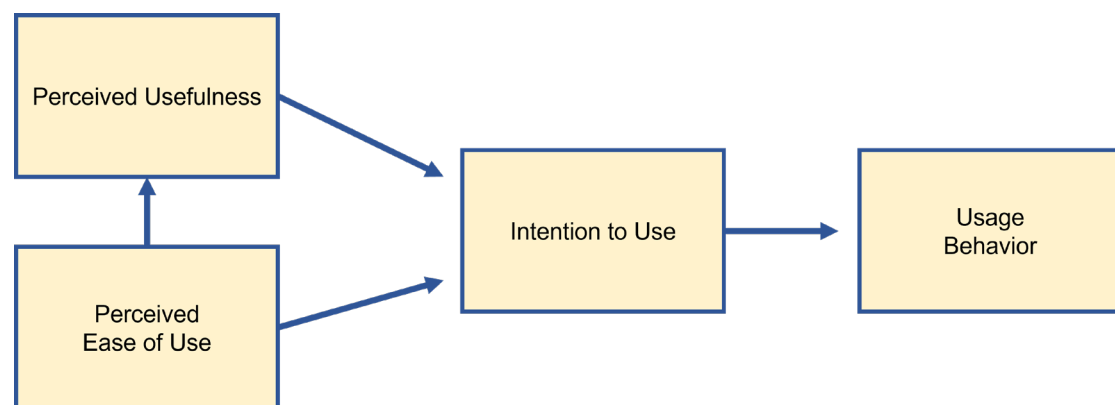
Figure 1 shows the framework of the Technology Acceptance Model (TAM) by Davis (1989). As can be seen, the perceived usefulness (U) and the perceived ease of use (EOU) affect a user's intention to use technology. It shows that the relationship between U and EOU and the users' intention to use technology is more significant than the users' experience, sex, or age. The perception of using a specific technology change not because technology is different but because each user is different (QUT IFB101, 2015). Thus, technology acceptance is possible if the users share those same beliefs.

Conceptual Framework

The framework below (Figure 2) is utilized to understand the variables employed in this study. It adopted the Technology Acceptance Model (TAM) by Davis, tailored to the objectives of this study.

Figure 2

Behavior of the UMak Academic Community in Utilizing the TBL Hub
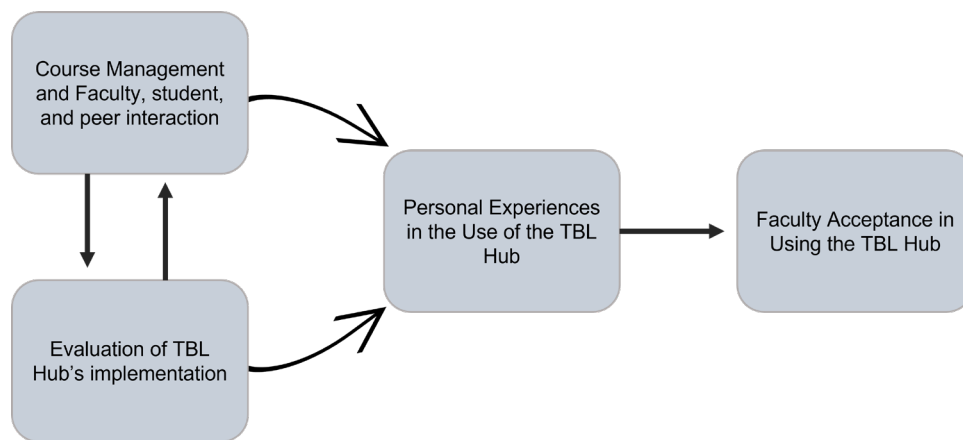
The Technology Acceptance Model would evaluate the UMak academe's use of the Technology-Based Learning Hub (TBL Hub). The perceived usefulness of the said LMS consists of the respondents' evaluation of the efficiency of its course management and faculty-student and peer interaction. This gives an idea of how the users come to accept the effectiveness of the TBL Hub in their online teaching experiences based on the perceived increase in their job performance. On the other hand, the users' perceived ease of use is measured using the respondents' evaluation of the TBL Hub's implementation of its process and collaboration. This would allow the researcher to evaluate the users' concerns regarding implementing the LMS in their respective classes based on its mechanism of process and collaboration. Their experiences using the TBL Hub were also gathered to understand the respondents' behavior. This will help the researcher validate the respondents' answers on the TBL Hub's perceived usefulness and ease of use and determine their intention and usage behavior in using the LMS. As mentioned by Asiri et al. (2012), "the faculty members' acceptance of technology also plays a key role in optimal utilization of LMS in higher education" (p.127). Therefore, understanding users' behavior would help create possible interventions to accept the new technology - the TBL Hub. Through this, "their ready acceptance of such a system would lead to an increase in usage and motivate [teachers] to use [the] LMS in their classes (Al-Busaidi & Al-Shihi, 2010, in Asiri et al., 2012, p.127).

Methodology

Research Design

This study follows an explanatory-sequential design, a mixed methods research where quantitative data is collected and analyzed first, then the qualitative data is collected and analyzed based on the quantitative results. Specifically, it utilized a present situation analysis, wherein the quantitative data gathered were described and interpreted to identify the behavior of the respondents in the use of the TBL Hub. The overall purpose of this design is that "the qualitative data help explain or elaborate the initial quantitative results" (Creswell et al.,

2003 in Creswell, 2006). This study evaluated the behavior of the respondents through their perceived efficiency of the TBL Hub in their course management and interaction with their students. Furthermore, the researcher also determined the behavior of the University of Makati's College of Education faculty members through their evaluation of the implementation of the TBL Hub - the learning management system utilized by the institution. To expand on the gathered quantitative results, the researcher employed the follow-up explanation model by collecting additional data from the participants. This was done by answering open-ended questions about the personal experiences and recommendations of the respondents using the said LMS. As a result, this study provided the institution's management with pertinent data that would possibly solve the respondents' reservations about using the LMS.

Locale

The researcher conducted the study at the University of Makati (UMak) located at J.P. Rizal Ext., West Rembo, Makati City. UMak is a public, locally funded university of the local government of Makati, which caters mainly to the less privileged citizens of Makati City. This institution is envisioned as the primary instrument in producing Makati youths into productive citizens and IT-enabled professionals. UMak aims to provide innovative and quality education to produce skilled and knowledgeable individuals of the 21st century. Thus, for this institution to inculcate these missions in its students, it trains its academic and administrative personnel to be adept at using technology.

Respondents

The study's respondents are selected through purposive sampling, specifically total enumeration. All the College of Education faculty members were invited to answer the researcher's instrument. These faculty members consist of (1) full-time and (2) part-time faculty members in the college of education, including (3) adjunct faculty members from other colleges who are teaching general education, professional education courses, and major subjects to the students at the college under study. Thus, it is a requirement that they are currently teaching the students of the College of Education and are using the TBL Hub as their learning management system.

Instrument

To gather the study's quantitative data, the questionnaires from Alshorman and Bawaneh (2018) and Cunningham and Bradley (n.d.) were adapted to identify the respondents' behavior in using the TBL Hub. The researcher-made questionnaire comprised of two sections: the respondent's perception of TBL Hub's efficiency and the respondent's perception of TBL Hub's implementation of its process and collaboration. These variables were answered using a 4-point Likert scale. The questions were customized to fit the objectives of the study. On the other hand, the qualitative data were gathered using open-ended questions used as follow-up questions for the respondents' answers. The researcher used Google Forms to collect both quantitative and qualitative data stated above from the respondents who are in work-from-home/ online

classes arrangement due to IATF's COVID-19 restrictions. All questions in the questionnaire were validated by experts in the field of psychometric analysis, linguistics, and technology.

Data Collection

Data collection took place from November 13-30, 2021. The gathering of data commenced after the researcher sought the permission of the Dean of the College of Education to conduct this study with the college's faculty members. Upon approval, the names of the faculty members endorsed by the dean were collected. Each selected respondent received an email containing the informed consent form which they signed before they answered the questionnaire. When their informed consent forms were already returned to the researcher, a copy of the survey questionnaire was sent to them via Google Forms. This was answered by the respondents and the results were gathered in the summarized data provided by Google Forms.

Data Analysis

The data gathered via the researcher-made questionnaire was analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics such as the mean and the standard deviation was used in analyzing the data.

Ethical Considerations

The respondents were asked to consent to the researcher with the collection, use, processing, storage, disclosure, and disposal of personal data following RA 10173 or the Data Privacy Act of 2012. Moreover, the respondents were informed that the researcher respects their anonymity and the confidentiality of their answers to the survey was ensured. Most importantly, all data and associated findings are real and were not fabricated. On request, the original data can be provided for inspection and validation of the findings.

Results and Discussions

Table 1

Respondents' Perception of the TBL Hub's Efficiency

Indicators	Mean	SD	Interpretation
1. To what extent are the students comfortable accessing the TBL Hub's attendance checker?	2.61	7.0	Somewhat Met Expectations
2. To what extent are you comfortable checking your students' attendance using the TBL Hub's attendance checker?	2.67	.69	Somewhat Met Expectations
3. To what extent are the students comfortable accessing syllabi, handouts, files, modules, links to materials, announcements, etc., on the TBL Hub?	2.83	.62	Somewhat Met Expectations
4. To what extent are you comfortable posting syllabi, handouts, files, modules, links to materials, announcements, etc., on the TBL Hub?	3.33	.49	Exceeded Expectations
5. To what extent are the students comfortable submitting their assignments and assessment tasks on the TBL Hub?	2.72	.57	Somewhat Met Expectations
6. To what extent are you comfortable checking students' assignments and assessment tasks on the TBL Hub?	2.78	.81	Somewhat Met Expectations
7. To what extent are the students comfortable tracking their progress using the Gradebook on the TBL Hub?	2.78	.65	Somewhat Met Expectations
8. To what extent are you comfortable using the Gradebook for keeping records on the TBL Hub?	2.67	.91	Somewhat Met Expectations
9. To what extent are the students comfortable learning online courses using the TBL Hub?	2.44	.65	Somewhat Did Not Meet Expectations
10. To what extent are you comfortable teaching online courses using the TBL Hub?	2.78	.77	Somewhat Met Expectations
11. To what extent are the students comfortable promoting interaction outside the classroom using the TBL Hub?	2.33	.70	Somewhat Did Not Meet Expectations
12. To what extent are you comfortable promoting interaction outside the classroom using the TBL Hub?	3.16	.94	Somewhat Met Expectations
OVERALL MEAN SCORE	2.76		Somewhat Met Expectations

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LEGEND		
Rating	Rating Scale Range	Verbal Description
4	3.26 - 4.00	Exceeded Expectations
3	2.51 - 3.25	Somewhat Met Expectations
2	1.76 - 2.50	Somewhat Did Not Meet Expectations
1	1.00 - 1.75	Did Not Meet Expectations

Table 1 reports the respondents' perception of the TBL Hub's efficiency. Regarding course management and faculty-student and peer interaction, the respondents perceived the TBL Hub's efficiency as Somewhat Met Expectations based on the overall mean score of 2.76. With this, it could be inferred that the TBL Hub has benefited the faculty members in conducting online classes. This is a good indicator that the respondents' perceived usefulness of the TBL Hub is positive, which could help in its complete and long-term implementation with or without the pandemic. In the study of Cunningham and Bradley (n.d.), their respondents also got the same perception of their proposed online tool when they gave the pre-test of their research. However, their post-test showed that "the faculty members, after implementation, were no longer willing to use online learning tools in their classrooms" (p. 13). This is somewhat contrary to this study's result since it is proven that after implementing the LMS, teachers are already learning to accept the use of the TBL Hub and may stay for good. This may be due to the current situation where the education sector has no choice but to conduct online teaching, contrary to Cunningham and Bradley's (n.d.) study written before the pandemic. Perhaps, if their research were written during the pandemic, their faculty members might have a different perception.

Based on the data above, the primary uses of the LMS, such as posting syllabi, handouts, files, modules, links to materials, announcements, etc., got a mean score of 3.33, which is interpreted as Exceeded Expectations. This is evidence that the COE faculty members utilize the TBL Hub at least by using this as a repository for the files they need in their classes. This is also observed in the studies of Cunningham and Bradley (n.d.) and Guillot's (2003), where respondents reported high comfort levels in using their online tools/LMS, specifically in posting their teaching materials. On the other hand, Somewhat Did Not Meet Expectations were reported on faculty-student and peer interaction indicators such as in (1) To what extent are the students comfortable learning online courses using the TBL Hub? and (2) To what extent are the students comfortable promoting interaction outside the classroom by using the TBL Hub. These are the same observations in both Cunningham and Bradley's (n.d.) and Guillot's (2003) studies. To add, Guillot's (2003) respondents also reported issues with having threaded discussions, which their teachers are using as a teaching tool. This same result was also observed in the teacher-student interaction function of the TBL Hub. Although the teachers are satisfied with the perceived usefulness of the TBL Hub as a repository of learning materials, they seem not confident using it in off-class interactions and communications. It can be deduced from this situation that the TBL Hub has limited capability for group chats and threaded discussions, features which can easily be found on most

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social networking sites. Hence, students may have insisted their teachers use other platforms or even emails for communication and synchronous threaded discussions instead of the ones available on the platform since the former seemed more efficient.

Respondents' Reported Personal Experiences in the Use of the TBL Hub

Based on Table 1, the TBL Hub has exceeded the respondents' expectations in using it to post or store teaching and learning materials for their students to access. Aside from these, other features of the LMS were also used by the respondents but did not get the exact extent of expectations: (1) attendance checker, (2) checking students' assignments and assessment tasks, (3) using the Gradebook, and (4) chat. The respondents shared some personal experiences using the TBL Hub, and below are some of their reported positive experiences.

> Respondent 8: *Above average to Excellence [sic] (85% positive experience)*
>
> Respondent 9: *So far when it comes to posting assignment/ activity and harvesting outputs, TBL helps a lot.*

Both Respondents 8 and 9's answers confirmed Cunningham and Bradley's (n.d.) report of their faculty's experiences using their LMS and the result from Table 1. This only proves that the TBL Hub serves its purpose as an LMS for the University of Makati. Although there may be many aspects where the LMS should improve, the data gathered confirms the latter's usefulness as an online class platform. On the other hand, below are some of their reported negative experiences.

> Respondent 1: *The hub is okay only to some extent…maybe due to their system issues...[sic] had trouble checking assignments in the early part of the semester; browsing and access issue.*
>
> Respondent 2: *There are times that it is difficult to access [sic] TBL Hub and their system[sic].*
>
> Respondent 5: *There are times I could not upload my materials.*
>
> Respondent 6: *It sometimes log [sic] down and students felt that Gmeet and Gclassrooms are more convenient for them.*
>
> Respondent 14: *Not comfortable in using it "mabagal" [sic] waste of time.*

Most of the reported issues of the respondents are in terms of system issues like error messages and lagging concerns. As a result, teachers and students alike experience problems logging in to their accounts, and uploading and downloading materials, especially in the early part of the semester, as reported by Respondent 1 . This also includes teachers having difficulty in checking their students' outputs. In addition, Respondent 10 claimed that the TBL Hub's

Gradebook feature is not user-friendly. This also results in teachers and students resorting to mainstream platforms that they find more convenient and easier to use. These respondents' experiences confirmed the findings in indicator 1. However, besides the system issues, the internet connection is another culprit in the error messages and lagging concerns. Respondent 17 has the same observation saying, "Some other features of TBL hub are not that easy to use when you do not have a stable connection according to students' experience." Therefore, certain features of the LMS may not be end user-friendly due to its complicated interface (according to Respondent 10, who is already a senior citizen) and need for a stable internet connection. This has been seconded by Respondent 15.

Respondent 10:	*It's not easy to track the progress of individual students.*
Respondent 17:	*At first, I am not comfortable using it since I am already using a Google Classroom but after attending trainings and watching videos on how to facilitate the LMS so far, I'm doing fine. My only concern was the error we are experiencing from time to time. Students are complaining that whenever they check attendance there's always an error. Some other features of TBL hub is [sic] not that easy to use when you don't have a stable connection according to students' experience.*
Respondent 15:	*Even [when] I appreciate and enjoy using TBL, but the student can't use it most of the time because it need [sic] high speed internet connectivity, and some students are only using their mobile data.*

Valiente (2021) states that more than fifty percent of Filipino families do not have a strong internet connection. Thus, unless the internet system in the whole country is improved, conducting online classes could continue to be burdensome.

The UMak administration assigned a team of experts - the TBL Hub team to supervise the successful implementation of the TBL Hub This team manages the process of its implementation by preparing the TBL Hub for teachers and students and solving the end-users' issues. To help the team, each college assigned coordinators who function as the first line of troubleshooters. If the coordinators cannot resolve the concerns on their end, they will seek the team's help. With this system, the TBL Hub team has a more systematic and pragmatic way of implementing the LMS.

Table 2

Respondents' Perception of the TBL Hub's Implementation

Indicators	Mean	SD	Interpretation
1. The integration of the TBL Hub meets my resistance.	2.33	.69	Partially Disagree
2. The integration of the TBL Hub increases my instructional preparation time.	3.17	.92	Agree
3. Because of the TBL Hub, teachers promote activities necessary to integrate technological goals into the existing curriculum.	3.11	.68	Agree
4. The TBL Hub Team is accepting of the preparation and training required to integrate the use of the TBL Hub in online classes.	3.22	.73	Agree
5. UMak's administration is accepting of the preparation and training required to integrate online learning tools.	3.33	.69	Strongly Agree
6. The learning process using the TBL Hub is met with resistance.	2.72	.57	Agree
7. The support provided for the TBL Hub team is sufficient for successfully integrating the LMS.	3.00	.84	Agree
8. Ongoing support (webinar series) is necessary for the integration process.	3.00	.69	Agree
9. The time and effort invested in the TBL Hub result in increased student achievement.	2.67	.91	Agree
10. It isn't easy to provide ongoing professional support for the successful implementation of the TBL Hub.	2.67	.69	Agree
11. Whenever I have difficulties with the TBL Hub system, I know whom to contact to receive support and report issues.	3.35	.49	Strongly Agree
12. When a technical issue arises with the system, I report the case to our college coordinator.	3.06	.87	Agree
13. When I recognize a weakness in the system, I report it to our college coordinator.	3.06	.87	Agree
14. Teachers are excited about the opportunity to be part of the TBL Hub implementation.	2.89	.96	Agree
15. UMak community support must be present before adopting the LMS.	3.44	.51	Agree
16. I discuss with my colleagues how to use the TBL Hub.	3.11	.76	Agree
17. The TBL Hub helps learners learn without coming to the university.	3.06	.73	Agree
18. Using the TBL Hub increases the interaction between teachers and students.	2.72	.67	Agree
19. Using the TBL Hub facilitates the teacher's role in the online teaching modality.	2.94	.64	Agree
20. Using the TBL Hub offers a significant benefit in online teaching.	2.84	.64	Agree
			to be continued on next page

Indicators	Mean	SD	Interpretation
21. The TBL Hub makes it easy for teachers to provide students with a unique learning environment.	2.83	.71	Agree
22. The TBL Hub increases the capacity of UMak as an educational institution.	3.17	.51	Agree
23. The TBL Hub helps to achieve effective and active teaching and learning.	2.83	.71	Agree
24. The TBL Hub helps to deliver information to students quickly.	2.78	.73	Agree
OVERALL MEAN SCORE	**2.97**		**AGREE**

LEGEND		
Rating	Rating Scale Range	Verbal Description
4	3.26 - 4.00	Exceeded Expectations
3	2.51 - 3.25	Somewhat Met Expectations
2	1.76 - 2.50	Somewhat Did Not Meet Expectations
1	1.00 - 1.75	Did Not Meet Expectations

Table 2 reports the respondents' evaluation of the TBL Hub's implementation. Regarding its process and collaboration, the respondents evaluated the TBL Hub's implementation as Agree based on the overall mean score of 2.97. With this, it could be inferred that the TBL Hub has been managed well, considering its end-users' needs, skills, and limitations. Table 2 also shows that the respondents have appreciated the administration's acknowledgment of the faculty members' need for the preparation and training required to integrate online learning tools and the UMak Community's support in the adoption of the LMS, which got a mean score of 3.33 and 3.44 respectively and both are interpreted as Strongly Agree. This is proven in Cunningham and Bradley's (n.d.) study, where "teachers were willing to integrate online learning tools into their classroom if certain requests were met itself and its implementation process "(p. 9). Indeed, conceding to the teachers' needs in using new technologies could motivate and improve their acceptance. Additionally, Respondent 17 claimed that she appreciated the TBL Hub more after attending webinars that the TBL Hub team had conducted and watching posted videos on how to improve the faculty's online classes using the LMS in the university's website social media platforms. Furthermore, the respondents also gave a 3.33 mean score to the indicator; *Whenever I have difficulties with the TBL Hub system, I know whom to contact to receive support and report issues.* This is a good indicator that the faculty members are confident in practicing the use of the LMS since they know that if they encounter a problem, there will be a support team to help them. Furthermore, as in Guillot's (2003) study, teachers may have been more comfortable using the tool since they must have realized that some technical skills are no longer necessary since a technical support team is there to assist them. Should a more advance technical skill be needed, the technical team would still be there to assist so the rest of the specialized knowledge and expertise required to perform specific tasks in the utilization of the TBL Hub should still be possessed by the teachers. Also, Alshorman and Bawaneh (2018) posited that

using the LMS decreases teaching roles since it increases students' autonomy in learning. Hence, a positive acceptance in the perceived ease of use category of the TBL Hub's implementation of its process and collaboration. Albeit the overall positive acceptance in Table 2, the indicator on the integration of the TBL Hub meets my resistance, received the lowest mean of 2.33, interpreted as partially disagree. The respondents may have already considered using the TBL Hub in their online classes; however, it may still need much improvement. Through the continuous professional support given by the administration and its perceived usefulness, many faculty members are already starting to see the benefits of using the TBL Hub in their online classes based on the Agree results in most of the indicators in Table 2.

Respondents' Recommendations for Faculty's Full Acceptance in the Use of the TBL Hub

With the positive acceptance result in the TBL Hub's perceived usefulness and its perceived ease of use, it can be incurred that the faculty members' full acceptance of the TBL Hub in the university as part of the teaching and learning process is on its way. To aid this, the respondents provided substantial recommendations to maintain and improve their intentions to use the TBL Hub and eventually have more positive behavior. The following are the respondents' recommendations in terms of improving the system:

1. Increase the capacity for uploading files.
2. Update the applications sourced in Moodle LMS v. 3.9.
3. Provide a bigger or larger server to be more efficient.

Since most of the respondents are concerned about the LMS's lagging and its accessibility, recommendations 2 and 3 are the possible solutions they expect. Furthermore, increasing the current file upload capacity which is only 20MB is a good recommendation, especially when specific applications are not read, or the file size does not fit the limit. The TBL Hub team has already worked out some of these recommendations, specifically in improving the system part. On the other hand, the following are respondents' recommendations that are not connected to the Moodle system.

1. Acknowledge faculty members who fully integrate the TBL hub in their classes.
2. Motivate one another in the faculty to continuously use the TBL Hub.
3. Improve training schedules.
4. Provide pocket Wi-Fis.

The service provider continuously improves the Moodle system, and the UMak management may consider the respondents' recommendations about technology culture through the TBL Hub team. According to Society for Human Resource Management (n.d.), "[a]n organization's culture is defined as the proper way to behave within the organization. This culture consists of shared beliefs and values established by leaders and then communicated and reinforced through various methods, ultimately shaping employee perceptions, behaviors and understanding". Therefore, to help mold an organization's technology culture,

developing a shared positive experience using the prescribed LMS is a good start. Based on the respondents' recommendations, acknowledging positive behavior, such as when faculty members have completed a task involving the use of the TBL Hub and motivating one another to use it continuously, could make a difference. Cheng (1993) in Rizk and Choueri (2007, p. 17) found that "educational institution culture correlates with teachers' attitudes toward their work in such a way that stronger educational institution cultures had better-motivated teachers". Understandably, when one group member motivates and inspires another member to use the LMS, this will snowball and result in more satisfied end-users. The respondents appreciate the training and webinars conducted by the team, but they have reservations about the schedules. Respondent 8 recommended improving these to apply the lessons learned since they could no longer manage their time teaching and doing paperwork while attending webinars.

> …trainings are necessary, but our Wednesdays are all spent [to the] webinars, such contents cannot be utilized for the obvious reason of the problems on the LMS…

On the other hand, a few respondents recommended that the university provide teachers and students with a stable Wi-Fi connection to compensate for the internet speed needed to run the TBL Hub smoothly. However, the SWS already reported that this concern is a national problem (Bayagas, 2020, in Joaquin, et al., 2020). Thus, even when pocket Wi-Fis are provided, internet connectivity may still be a problem. Instead, the City Government of Makati, through the Department of Information and Communications Technology (DICT), has provided all UMak faculty and students with tablet computers that they could use in their online classes.

Conclusion

The TBL Hub is an essential part of online teaching during the pandemic in UMak. It serves as a one-stop-shop for all the applications teachers and students need to conduct online classes. Although the TBL Hub is still relatively new (almost three years of implementation) and still has several areas to be improved on, the respondents already have a positive technology acceptance based on their evaluation of the perceived usefulness and perceived ease of use of the LMS. The perceived usefulness is acquired from the efficiency of the TBL Hub regarding its course management and faculty-student and peer interaction which received a Somewhat Met Expectations result. It implies that the faculty members' job performance improved when they started using the TBL Hub in their online classes. However, in terms of the students' convenience in using the TBL Hub in learning and interaction, the respondents believe that it somewhat did not meet their expectations based on the reports of their respective students. In the reported personal experiences of the respondents in their use of the TBL Hub, they confirmed the improvement in their online pedagogies. However, issues such as error messages, lagging concerns, and internet access are reported as their reservations in using the LMS, especially in its first year of implementation. Therefore, once the respondents' reported concerns are addressed, and their recommendations are considered, they will

have a more positive behavior in using UMak's TBL Hub. On the other hand, the respondents agree that the perceived ease of use in the implementation of TBL Hub's process and collaboration is somewhat free of effort, which could affect a user's intention to use technology. It manifests that the faculty members are provided by the UMak administration with the proper preparations and training needed to integrate this online learning tool and that they know whom to contact to receive support and report issues. This is proven by the Strongly Agree result of the said indicators. However, to ensure a continuous and improved positive acceptance of using the LMS, the respondents recommended improving Moodle's system so they could easily navigate and upload files. Additionally, developing a shared positive experience in using the TBL Hub, improving training schedules, and providing Wi-Fi connections were also recommended, which could help improve the technology culture in utilizing the LMS.

Recommendations

The researcher recommends that a policy guideline that promotes a strict utilization of the TBL Hub in submitting outputs and in off-class interactions with their teachers and classmates would address the faculty's concerns about their students not being comfortable using the TBL Hub. This would also help in a more efficient and safe output and message retrieval that would benefit both parties. Resistance may occur upon implementing this policy; however, this could be resolved by providing the students with proper preparations and training in integrating this online learning tool and letting them know who to contact for support and issues. This would also give the students more confidence in the LMS, just like the positive acceptance of the respondents in this study in the perceived ease of use of the TBL Hub's implementation. Promoting a behaviorist approach to establish a positive technology culture in the university to continue the legacy of the TBL Hub implementation is also recommended. The respective coordinators of each college who are assigned to become the ambassadors in the use of the LMS should facilitate a weekly session with their respective departments to acknowledge and talk about the best practices in the use of the TBL Hub in their online classes and sharing of other relevant experiences. Lastly, the researcher recommends conducting evaluative research on the students' technology acceptance of the TBL Hub. This will help assess if both the faculty members and students at the University of Makati are already e-ready for online teaching and learning.

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Assessing the English Grammar Proficiency of Online Filipino English Teachers

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Abstract

Recent literatures suggested that the English proficiency of Filipinos has been declining in the past decade. Despite this, several English language schools from countries like China, Japan, and Korea still hire Filipino teachers. Many of their stakeholders still believe that Filipinos are the most cost-effective option for their English language learning compared to their international counterparts. However, due to the expansion of the English language learning industry, competitors have started to challenge the affordability of Filipino teachers with native or native-like English teachers at a reasonable price. This study assessed the English grammar proficiency of 401 Filipino English teachers who are currently teaching online. Results showed that 90% of the respondents did not score more than 75% and that they struggled with basic grammar particularly in the use of verbs and adverbs. If Filipino English teachers want to remain competitive and rebrand themselves, they must undertake a self-analysis of their English skills to find their weak points and undergo a training and development program by themselves or with their current employers.

Keywords*: English grammar proficiency, online Filipino English teachers, English language tests*

Introduction

The value of the English language has never been so important due to its extensive use in almost all industries, academics, and politics. On top of that, it is now being amplified by the Internet that bridges the gaps and shatters the barrier of geographical locations among learners and teachers across the globe. Despite the global coronavirus pandemic, the English language market is expected to grow at a compound annual growth rate (CAGR) of 6.2% and reach $54.92 billion by 2027 worldwide (Meticulous Research, 2020). English language teaching has been an in-demand profession for many nations both with native and non-native English speakers. One of the leading competitors in this market is a Southeast Asian country, the Philippines, whose English proficiency is still under debate (Balgoa, 2019; Ozaki, 2011, 2021).

Prior to COVID-19, the Philippines had been a hotbed destination for Asian English learners such as Koreans, Japanese, Vietnamese, and Middle Eastern as it is relatively more affordable compared to its counterparts such

as Australia, the US, and the UK. The Philippines' Department of Tourism (DOT) once reported that the country has been gaining its ground to become a "study English" destination since the number of students from foreign countries studying English in the country has tripled from 2013-2018 (Saavedra, 2019).

Institutions from non-English speaking countries openly invite qualified Filipino English teachers to teach in their countries (Llurda, 2004), luring talented and skillful English teachers out of the Philippines. However, when the global COVID-19 pandemic struck, businesses all over the world shifted to working online, and the online English teaching industry has become more competitive for Filipino English teachers since employers are looking for more qualified candidates than ever before (Pontillas, 2021).

Obviously, Filipinos have been known to have excellent English language proficiency (Kobari, 2019; Tolentino & Santos, 2020) and therefore they are tapped by the global market not only to work in outsourcing (Lee, 2015) and hospitality industries (Greenfield, 2012) but also in the education industry specifically in the English language sector to teach grammar within the four macro-linguistic skills (Nikkei, 2015). However, the Philippines' English proficiency has been declining over the years and if not given a solution, opportunities for Filipino English teachers abroad may be jeopardized. In the TOEFL iBT 2015 results, the Philippines garnered a score of 90 over 120 but then in 2019, the Philippines' score declined to 88. Doubling down on the result, Education First's English Proficiency Index (EF's EPI) in 2015 placed the Philippines on the 13th spot over other non-native English-speaking countries in the world but just less than five years, in 2019, the Philippines found its spot on the 27th, a drastic drop from the 20th spot in the previous year— a far cry from its previous placements and recognition all over the world. Furthermore, Ateneo Center for English Language Teaching (ACELT), on the rationale of their institution's inception, cited that the state of the English and English language teaching in the Philippines is at a crucial point. The British Council held a roundtable discussion in 2015 and found that there is a gap among qualified ESL teachers and the quality of ESL schools (Cabigon, 2015). Though there are a few studies made to investigate the Philippines' general population's English proficiency (Arranz, 2019; Gomez & Gomez, 2021; Leyaley, 2016), fewer investigated Filipino professionals (Gaytos et al., 2019; Meniado, 2019; Oducado et al., 2020), but so far, as per the writing of this research, there was no empirical research proving the Online Filipino English teacher's English proficiency level. The first step in solving any problem scientifically is to find out where the problem lies. Therefore, this study used descriptive statistics to survey the grammar proficiency of currently employed Filipinos who are teaching English online. The study aims to discover the current standing of English proficiency among professionals and experienced Online Filipino English Teachers (OFETs). A mediocre score from an English teacher who spent time and money mastering the art of teaching the language plus their learning through experience will definitely affect or reiterate the diminishing image of Philippine English. The results could drastically affect their employability and source of income on top of their confidence to teach sceptical clients. More specifically, this research tried to answer the question, "What is the English grammar proficiency of the respondents based on a customized grammar placement test?"

The quality of students often reflects the quality of their teachers, which is why parents and adult learners would prefer to pay individuals and institutions that provide high quality of training. As suggested in Bandura's Social Learning Theory, Krashen's Comprehensive Input Hypothesis, and Schumann's Acculturation Model of Second Language Acquisition (Orillos, 1998), when teachers are proficient in English, it is more likely that students will also become proficient. Hence, if OFETs are keen to present themselves as still qualified and proficient enough to confidently teach the English language and command a stable income for themselves and their families especially nowadays that teaching English online has become more competitive due to the global COVID-19 pandemic then they should take into careful consideration and follow through the methodology and the recommendations of this study.

This study is essential to Filipino English teachers whether they conduct online or face-to-face classes or whether they handle non-Filipino or Filipino students because it will point out the errors that were overlooked or were not paid attention to. Teachers may have been oblivious of the errors as found in a study of faculty members in a higher education institution in the Philippines (Meniado, 2019) and observed in a much earlier case study about the language drift of the Philippines English (Malicsi, 2007). This study will also aid institutions in hiring and evaluating Filipino English teachers on their grammar proficiency to maintain teacher quality and to support what the DOT ESL Market Group aspired during their round table meeting hosted by the British Council in 2015. Finally, future researchers can benefit from these findings which can contribute to the body of literature in the fields of language assessment and teacher development. While this study investigated the English grammar proficiency of Online Filipino English teachers, it was delimited by the one-way approach of teacher's answering multiple choice questions under time pressure. The result may vary when given in an interview method but due to cost and volume, the study was limited to conducting the test online. Future researchers may pick up from where this study left off. One area is the segmentation based on where the teachers graduated from. The Philippines promotes the bilingual education system in the entire country, but not all regions are fully exercising the use of English language in their schools besides the National Capital Region and some regions in central and southern parts of the country.

The objective of this study is to assess the English grammar proficiency of online Filipino English teachers. It aims to discover the current standing of English proficiency among professionals and experienced Online Filipino English Teachers (OFETs) by surveying their grammar proficiency using a customized grammar placement test. The results could drastically affect their employability and source of income on top of their confidence to teach skeptical clients. The study also recommends that if OFETs want to remain competitive and rebrand themselves, they must undertake a self-analysis of their English skills to find their weak points and undergo a training and development program by themselves or with their current employers.

Related Literature

Grammar proficiency

Oxford dictionary defined *proficiency* as "high degree of skill" i.e., expertise. It is distinct from competence which is considered just a level below proficiency so when it comes to language proficiency, Chomsky (1965) placed a distinction between language *competence* and language *performance*. Competence denotes the person's mastery of the grammar rules of the language and ability to distinguish the meanings and ambiguities in an infinite number of sentences, while performance refers to the execution or application of the language comparable to the utterances of a native speaker. Canale and Swain (1980) took it a little further and differentiated language proficiency into linguistic, sociocultural, and strategic competencies. Linguistic competence refers to the knowledge of lexicon and the rules of morphology, semantics, phonology, and syntax, while sociolinguistic competence is the ability to appropriately use the language in social interactions. Strategic competence, on the other hand, is the ability to make repairs, to compensate communication breakdowns due to limited knowledge of rules, and to maintain communication by performing verbal and non-verbal mechanisms such as repeating, paraphrasing, hesitating, avoiding, guessing, and shifting registers and styles (Savignon, 1983). Shanklin (1994) regarded grammar proficiency as the ability to make judgments about the acceptability and appropriateness of an utterance with specific reference to grammatical concepts.

Rutherford (1987) emphasized the importance of grammar in the process of language acquisition since its significance has been overlooked in the age of communicative competence popularized by Canale and Swain (1980). In communication theories, Shannon and Weaver's (1949) Model of Communication illustrated the effects of an *internal "noise"* in the channel that greatly affect the receiver's interpretation of the message such as the misspelled words on text and when taken into the context of language proficiency is the persistent lexical and syntactical errors committed by the speaker which led to misinterpretation and misunderstanding. Native and non-native English speakers may be distinct in their utterances but the proficiency in grammar could absolutely place a distinction between the two.

English proficiency requirement for English teachers

A teacher is viewed as "an expert who is capable of imparting knowledge… provides to the learner's knowledge, skills" (Senge, 2000, p. 26). Therefore, an English teacher is an expert in the English language and capable of imparting the knowledge in the various levels of a language i.e., phonetics, morphology, syntax, semantics, and pragmatics. Grammar proficiency as discussed earlier will put a distinction between a native and non-native English speaker that is why English teachers are expected to be proficient and have a "good" sense of its complexity (Borg, 2006; Brosh, 1996; Murdick, 1996; Wichadee, 2010). Obviously, stakeholders implicitly expect and demand their teachers to be proficient in the subject matter (Kadha, 2009). A collaborative study at

Muhammadiyah Malang University in Indonesia found that students expect their teachers to possess sufficient level of English proficiency (Masduki et al., 2022).

Though it is greatly useful to make use of standardized tests for English as Second Language (ESL) learners, teachers need not or often are not required to take them in order to teach at various online English learning companies. For instance, NativeCamp Online English School based in Japan currently has over 13,000 teachers, most of them are based in the Philippines. They are in service to more than 110 countries with over half a million students (NativeCamp, 2022). Their website indicates that an applicant needs only to be 18 years old and with a stable internet connection. Teaching experience is not necessary and there is no English proficiency check prior to employment.

Another large online English learning platform based in Shanghai, China is iTalki. They cater to over five million students worldwide who are being taught by more than 5,000 teachers. Applicants should only be 18 years of age, native or near native language speaker, and enjoy teaching informally (Vesselinov & Grego, 2018). Language proficiency seemed to be less of importance than their communicative competence. Moreover, Dubinka and Dubinka-Hushcha (2021) claimed that the use of contemporary information and educational technologies in the development of communicative competences help to solve the problem of overcoming linguistic, ethnic, and cultural barriers. In addition, Krashen and Mason proposed that people acquire language through comprehensible input that is exposure to compelling reading and listening texts that are above a learner's current language ability as such will result to gradual language acquisition (Krashen et al., 1979; Krashen & Mason, 2020). Their hypothesis did not emphasize the other component of the learning process which is the teacher who is a source of superior language ability than the learner themselves.

Novakid, a Russian-based online English platform with branches in San Francisco, USA, and Krakow, Poland has immensely grown in just over five years. They now cater to over 50 countries serving 4–12-year-old learners with a 500% annual growth rate since its inception (Azarov, 2022). Besides a year of teaching children experience as a requirement, Novakid demands any international teaching certificate such as TESOL (Novakid for Teachers, n.d.), but such qualification can now be obtained by an asynchronous and unstandardized curriculum offered and issued by often questionable companies online.

In Korea, one of the most successful online English platforms is Skybel. The company mainly focuses on teaching IELTS specifically the speaking section. They have a preference towards native English speakers except for the Philippines though they make sure that the candidate can teach IELTS. Having a British accent is also a plus. The desire for Koreans to speak as native-English-like as possible has been ongoing for more than three decades. Parents pay through the nose in order to send their kids abroad as early as possible sacrificing family time just for the children to get ahead in life as reported in a Washington Post by Cho (2007) and echoed in research on the

language politics of "English Fever" in South Korea by Shim and Park (2008). Now, Koreans do not need to leave their country nor sacrifice family time just to acquire the coveted language proficiency. That said, companies like Skybel make sure that their clients get their money's worth. It was reported that out of 30 applicants, only one was hired (OET Jobs, 2022).

Methodology

Since the study is geared towards finding out the grammar proficiency of Online Filipino English teachers, descriptive research with quantitative approach was employed. In descriptive research, data are collected and analyzed to find the status of the current phenomenon being studied (Gay, 1992). Whereas there has been a tremendous gap between theoretical language specialists within the generative convention and those language specialists who work with quantitative data types, this gap is narrowing. There has been a revolution in the use of quantitative data in the study of syntax, i.e., grammar (Featherston & Versley, 2016).

The study involved 401 random Online Filipino English teachers who are based in the Philippines and are currently working in various online English school platforms. The minimum teaching experience is one year.

In order to find out the grammar proficiency of current Online Filipino English teachers, the study modified the online grammar exam of British Study Centres (2021), a training and educational institution based in England since 1930, for the purpose of identifying the proficiency on specific grammar elements such as tenses of verbs and prepositions of the respondents. The study based the question selection randomly from the book published by Marian (2014) about most common mistakes in English where the author divided the textbook into five categories (things, verbs, adjectives, prepositions, and commas) that English learners most likely commit mistakes in and that teachers should be adept in.

Through collaboration with an existing online English school, the researcher and the institution administered the modified grammar proficiency exam to the applicants who are applying for the position as an online English teacher. The test has 40 multiple choice questions on a Google form platform and was timed to 15 minutes to avoid cheating. Those who went overtime were discarded along with those who took the test twice or more. Only the first results were considered valid to prove the reliability of the test.

Descriptive statistics was used to analyze the data gathered.

Ethical Considerations

Research participants were informed about the purpose of the study and that their participation is voluntary. To ensure data privacy and confidentiality, no sensitive and personal information was gathered from the participants and their responses were treated with anonymity.

Results

The test was conducted for a period of three months between April-June 2022.

The scores clustered somewhere between 24 and 33 with 295 participants which account for 74% of the sample data. The distribution is skewed to the left with 15% of participants scoring 15-23. The remaining 11% scored 34 and above.

Most of the respondents scored high on adjectives, verb+ infinitives and past tense with 'did' and fairly scored on nouns. The respondents scored low for the rest of the grammar test parameters. Through frequency distribution, more than half of the respondents looked fair with their scores higher than 50% of the test emphasized by the modes 28 and 30 and the median score resting at 27.5.

Figure 1

Score distribution of the respondents in the grammar proficiency test
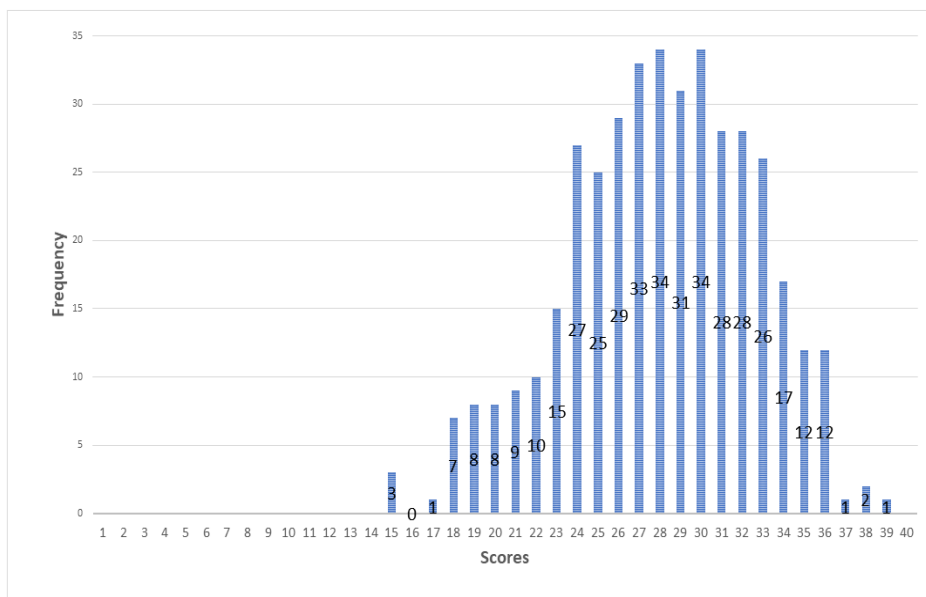
Looking at Figure 1, it can readily be observed that on average, the respondents are able to score an above average and that the mean score if ungrouped is 30.55 (76.3%) over 40 overall points. N= 401. However, on a closer examination, out of 401 respondents, no one had a perfect score, only one scored 39/40, then two scored 38/40, one scored 37/40, twelve scored for both 36/40 and 35/40, and seventeen scored 34/40.

Table 1

Frequency distribution of test scores of OFET

Group	Frequency
1-5	0
6-10	0
11- 15	3
16-20	24
21-25	86
26-30	161
31-35	111
36-40	16
	401

Table 2

Mean score of the respondents when grouped by specific grammar elements

Selected Grammar Element	Mean percentage
Verb	62%
Conditionals	74.3%
Perfect Tenses	73%
Prepositions	73%
Phrasal verbs	58.5%
Modals	36.5%
Verb + infinitive	80.5%
Adjective	95.2%
Nouns	75.5%
Past tense with 'did'	84.5%
Neither vs either	61%
Overall mean score	71.23 %

Table 1 suggests that the respondents struggled with verbs specifically modals and phrasal verbs. Several literatures found that students of English as a Second Language (ESL) have trouble with phrasal verbs (Alwreikat & Yunu, 2022; Imrose, 2013; Shareef, 2018;), also in learning modals (Erton, 2018; Nurlaila, 2019; Rasheed & Khudhair, 2018).

The online English school that we collaborated with acknowledged that an English teacher must at least score an "A" or the lowest limit of 85% (34/40) to show that they can set themselves apart from the students who would score below than the threshold set up. However, the teachers would then struggle when they need to handle higher level students who are not that rare these days since a lot of the students have studied abroad in English speaking countries like the US for years.

Given the overall score, an 85% lower limit will set apart 45 respondents who would be invited to the second stage which is an online interview. This means that only 11% of the respondents can go to the next phase of the hiring process.

Discussion

In the Licensure Examination of Teachers (LET) in the Philippines, a passing score of 75% is required to be qualified as a teacher in the country. Given the results of the grammar test conducted, 161 respondents scored 75% and above. A 40% passing rate which is fairly good compared with the actual LET exam. However, statistical principle dictates that the larger the population sample may not garner the same result as it is in smaller samples. Also, when certain parameters were examined such as modals, prepositions, verbs and conditionals, the respondents failed to reach the passing score of 75%. These parameters serve as the anchor of sound syntax among learners and therefore it is imperative for the teachers to know better.

The test results imply that the OFETs lack the mastery of the English language, which is expected by the learners, presumed by their employers, and will be demanded by their potential employers. According to Caena (2011), teachers are traditionally viewed as managers of instruction, caring people, expert learners, and cultural and civic people. Senge (1990) emphasized that teachers are experts and knowledgeable. In Japanese, the word sensei (先生) means "a person ahead" or someone who has mastered a certain skill and therefore even doctors, lawyers and artists are given such title. In Tagalog language, *guro* or *maestro/maestra* connotes authority and mastery of disciplines. Since the result of the grammar test says otherwise about the OFETs, employers such as ESL institutions and even the DOT of the Philippines can design a training program that will target the gaps in the English skills of Filipino teachers. This will in turn affect their employability since the market has become more competitive due to the COVID-19 pandemic. This global pandemic may have a lasting effect especially in the education sector wherein many public and private institutions have realized the value of integrating online learning into their curricula. Knowing where we stand is a key to any improvement. When one looks at a certain map to find where he wants to go, he needs to find first where he is at. The same is true with OFETs, knowing their English syntactical weak point may motivate them to pursue improvements to remain competitive in this hypercompetitive market.

In our societies, regardless of political or economic valuation of a teacher's job, the esteem that the position commands cannot be taken for granted. Though it does not mean that perfection is a requirement, teachers are expected to be answer givers. The customized grammar test shows that more than 90% of the respondents did not score more than 30 over the 40 questions. That is a 75% passing rate, an equivalent of B+ on a standard grading system used in traditional schools and only 12 scored 35 which is equivalent to A and a mere three respondents scored A+. This result coincides with the study by Meniado (2019) of faculty members of a Higher Education Institution (HEI) in the Philippines in which the respondents were found to be on B1 and B2 levels on the Common European Framework Reference (CEFR).

The respondents scored very poorly in some of the basic grammar concepts such as verbs and adverbs as seen on Table 1. This suggests that the teachers have not mastered these concepts yet despite the fact they have studied them in their schools and have been teaching them to their students for at least a year. A study of 400 South African English teachers and 400 students found that statistically, the proficiency of the teacher's English affected the acquisition of the second language amongst the learners along with the learning process itself (Nel & Müller, 2010). A recent case study of Bangladeshi English language teachers found that the teachers were poor in their grammatical structure and range in lexicon usage since they to switch to their native language (L1) while teaching the English language (Rouf & Mohamed, 2022), consequently affecting the learning language acquisition and the entire learning process. Therefore, we may deduce that the quality of English acquired by the students from the respondents in this research may have been as erroneous as the ones who taught them accordingly. Bandura, Krashen and Schumann's theories pinpointed that the quality of learning does not far exceed the quality of the teacher (Orillos,1998).

While this study found that the grammar proficiency levels of the Online Filipino English teachers are relatively lower than the desired or expected English language proficiency threshold for the teaching profession, it does not necessarily mean that they cannot generally and operationally communicate in English as they carry out their duties and responsibilities in teaching. It simply implies that there seems much to be done if the respondents of this study aim to be at par with their international counterparts in other parts of the globe.

Also, if the English language schools, whether that be online or in a physical school, that hire English teachers from the Philippines are concerned about the quality of the outcomes of their lessons, they will need to look into and establish a Continuing Professional Development (CPD) and other metrics for their current teachers. They may also need to set up a more stringent hiring process since the quality of the teachers reflects the quality of the school or institution as the quality of the students reflects their teachers.

Conclusion

Finding out where the problem lies is the first step in any scientific problem solving so knowing where OFETs stand on their grammar proficiency is the initial step in solving the concerning reports of the country's English proficiency global standing.

The study aimed to find out the current status of OFETs grammar proficiency since it is a measure of expertise and an expectation from their stakeholders.

Having proven that the diminishing English proficiency of Filipinos is now evident even among OFETs, a much stronger action to address this issue should be done particularly by DOT if it wants the Philippines to remain as an ESL destination for learners and bring in income for the country and employment to its citizens.

Secondly, ever since the global pandemic has wreaked havoc in all sectors around the globe, online jobs have become more competitive and learning English online has become even more cutthroat. Therefore, OFETs' clienteles have more options to choose from jeopardizing the source of income of many OFETs.

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Alignment of Teachers' Epistemic Understanding and Intended Dialogic Scaffolding of Classroom Argumentation: Implications on Face-To-Face, Open and Distance Learning Environments

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Abstract

Dialogic scaffolding has the capacity to encourage and sustain students' engagement in classroom argumentation. This study explored how the teachers' levels of epistemic understanding were aligned with their intentions for dialogic scaffolding to encourage student's participation in classroom argumentation. Using varied data-gathering procedures such as surveys, classroom observation guides, and interview guides, results showed that the teachers' varying levels of epistemic understanding are aligned with their dialogic scaffolding. Based on the criteria before the selection, each teacher was knowledgeable about the nature with significant exposure to inquiry-based teaching and learning, including classroom argumentation. Results showed that their rationale and nature of dialogic scaffolding were based on their levels of epistemic understanding. Results corroborate previous findings that explicit implementation of classroom argumentation depends on teachers' strong intention and foundation of science content to challenge and stretch the capacities of their students in grasping the meaning of the subject matter. The study foregrounds the possibility of implementing classroom argumentation in any classroom, provided that the teachers can dialogically scaffold the class and lessen the immediate evaluative responses to students' dialogues. The study, therefore, recommends teacher educators increase pre-service teachers' exposure to inquiry approaches to science education, such as argumentation, as an investment for developing their dialogic scaffolding for classroom argumentation.

***Keywords**: classroom argumentation, dialogic scaffolding, epistemic understanding, scaffolding*

Introduction

How teachers interact with students is a major factor in establishing a classroom environment that supports authentic inquiry and develops students' intrinsic motivation to engage in further learning. To understand the factors influencing their inquiry approaches, a wide array of research has focused on exploring the relationships between teachers' knowledge, beliefs, and practices about teaching and learning and classroom argumentation (Capps & Crawford, 2013; Chen et al., 2014). The study's rationale is grounded on the results of previous research, which claimed that there is a "strong relationship between teachers' educational beliefs and their planning, instructional decisions, and classroom practices" (Pajares, 1992, p. 326). According to Evagorou and Avraamidou

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(2011), teachers' beliefs can determine their focus on classroom argumentation by just transmitting information rather than allowing time for students to engage. Moreover, Louca et al. (2004) claimed that the context-dependent nature of beliefs is also a factor why teachers' claimed beliefs may not align with what is observed in their classes.

The hypothesis stated in this study was based on previous research which claimed that successful implementation of classroom argumentation requires teachers' constructivist beliefs, enough pedagogical content knowledge (PCK) on classroom argumentation, awareness of the nature of the students, and enough skills in inquiry-based practices (Beyer et al., 2009; Davis & Krajcik, 2005). Having constructivist beliefs, they are able to plan their lessons which would cater to the involvement of students in the construction and co-construction of knowledge. However, the literature shows no evidence of how teachers' different levels of constructivist beliefs are related to their dialogic scaffolding practices.

In a sound classroom learning environment, there exists reciprocity of ideas between and among the teacher and students who "construct the ecology of social and cognitive relations in which the influence between them is mutual, simultaneous, and continuous" (Erickson, 2010, p. 33). The interactions occur in a dialogue that exhibits fair play of discourse using the teacher's questions, verifications, and elaborations and students' extended responses, which support the social and cognitive learning processes. In particular, teacher's dialogic prompts are used as scaffolds tailored fit to the students' current cognitive levels to awaken their prior scientific knowledge and experiences (Muhonen et al., 2016).

Statement of the Problem

Pajares (1992) claimed that beliefs are not likely to change unless challenged. This is supported by earlier claims of McNeill et al. (2016), which state that as teachers strongly hold on to their beliefs, new ones can even be used to justify them. Simply, their beliefs may filter, amplify, or guide their instructional practices (Gess-Newsome, 2015). In terms of classroom argumentation, they may have knowledge of the components (claim, evidence, and justification) and how to promote dialogic discourse but may resist incorporating these when they believe that science involves factual learning that needs to be transmitted to students. On the other hand, their beliefs may guide student-centered engagement in the co-construction of knowledge when they believe that science teaching and learning require students' participation.

In this study, dialogic scaffolding for classroom argumentation is hypothesized to ensure a classroom interaction that sustains students' expressions of argumentative agency. Key to sustainability, however, is the teacher's dynamic assessment of students' responses which serves as cues to formulate dialogic prompts to ensure a sound exchange of ideas through the social process of collective negotiations. Thus, these were also explored for each teacher and were analyzed to understand their intentions for dialogic scaffolding.

Specifically, it aims to answer the following questions:

1. How do the teachers vary in their levels of epistemic understanding?
2. How does the teachers' epistemic understanding align with their intentions for dialogic scaffolding classroom argumentation?
3. What are the implications of teachers' epistemic understanding of their approaches to online and distance education?

Literature Review

Epistemic understanding of dialogic scaffolding

A growing body of research indicates that epistemological beliefs have an impact on teaching and learning approaches and practices in different ways. Literature shows empirical evidence about the consistencies and inconsistencies between science teachers' epistemological beliefs and instructional practices (Capps & Crawford, 2013; Mansour, 2013). This supports the arguments on how their epistemic understanding is related to or would influence teaching and learning processes (Deniz, 2011), especially in terms of their intentions to teach and learn through argumentation (Liu & Roehrig, 2019).

Sandoval (2005) argues that teachers' scientific epistemologies guide their learning and reasoning processes, which further influence their understanding of the process of argumentation, the nature of knowledge and knowing, and their practices. As players in the learning process, science teachers may incorporate argumentation into instruction by reforming their epistemological beliefs and developing their PCK for argumentation.

Previous studies recommend that it should be a norm for teachers to encourage interactions by giving enough dialogic scaffolding (McNeill & Pimentel, 2010) so they can actively share insights about the importance of scientific ideas in their personal lives. This is because, in a dialogic learning environment, students' responses are usually dependent on teachers' prompt statements. As they participate, they become agents of their learning as they participate in the construction and co-construction of knowledge through talk and inquiry (Howe & Abedin, 2013; Wells, 2007). According to Lefstein (2010, p. 10), due to the varying perspectives about dialogic inquiry, a critical argument can reach "competing understandings and further inquiry." Each speaker brings their own set of meanings, views, values, beliefs, and assumptions to the back and forth of discussion. As prime movers of the classroom dialogic interaction, exploring the effects of teachers' knowledge and beliefs on the nature of teaching and learning and on the nature and advantages of classroom argumentation can be explicated through their intentions for dialogic scaffolding for classroom argumentation.

Dialogic learning environment

Although generic principles underpinning the concept exist, such as posing genuine questions and transferring more of the responsibility of learning to the learners (Alexander, 2001, 2005) various aspects such as inquiry and pedagogy

were targeted as potential areas in which dialogue can transform and impact the learning environment. Considering the contemporary works of Vygotsky, it may also be useful to draw upon the works of Bakhtin (1982) who stressed that "the intrinsically dialogic nature of language is living, socio-ideological thing [which] lies on the borderline between oneself and the other" (p. 293). Moreover, as Wegerif and colleagues (2009, p. 185) call for dialogic education, the inquiry process is seen not as teaching *through*, but as teaching *for* dialogue so that students become "more open to other voices, more able to question and to listen and so more able to allow new unanticipated meanings to emerge."

Exploring various ways to improve students' classroom engagement is the central element of educational research in recent years. In as much as the dynamics of dialogue have the potential to increase students' active involvement, dialogic interaction and its practical application need to be explicated. According to Alexander (2001), dialogic teaching occurs when the teacher and students establish a coherent thinking and conceptual understanding through continuous interaction. Moreover, it is characterized by the teacher's use of authentic questions without pre-determined students' answers but rather develops into a series of dialogic responses that leads to a deeper course of interaction (Nystrand, 1997). In the process, students are encouraged to voice their opinions, consider counterarguments of their peers, and attempt to establish a compromise between others' perspectives and of their own. This happens because, during the interaction process, they share individual sociocultural values, prior knowledge, and pre-conceptions about the topic that are sustained with increasing levels of reasoning when teachers continue to formulate higher-level questions. As such, this study was therefore important as it explicates the teachers' intentions in utilizing dialogues as a scaffolding tool to increase students' agency to participate in classroom discussions.

Dialogic teaching classroom argumentation in online learning

Dialogic scaffolding is seen to be both necessary in face-to-face and in online and distance learning environments. In the face-to-face learning environment, students are allowed to physically seek help from peers and the teacher whenever needed. It may happen during the contingency and fading stages wherein the teacher is still actively involved in the dialogic exchange of ideas.

On the other hand, in online and distance learning, the teacher's scaffolding is mostly embedded in the asynchronous tasks and discussions which may be a source of challenges for students especially when they feel uncomfortable reaching out to their teachers (Cho & Jonassen, 2009; Lee & Choi, 2011). Thus, constant diagnosis of students' needs and learning demands should be done by teachers. A prerequisite to the conduct of this constant diagnosis is the teacher's belief in dialogic scaffolding.

According to Cho and Summers (2012), the usual method of dialogic scaffolding classroom in online and distance learning is posting regular argumentative prompts, responding to student's answers, and encouraging students to engage in written argumentation with each other. It may also be helpful if the teacher recognizes students' contributions, especially in those moments when

they show the initiative to start a discussion with their peers. It is the hypothesis of this study that when teachers possess constructivist beliefs toward dialogic scaffolding for argumentation, even learning via online and distance which is mostly asynchronous can still afford dialogic scaffolding similar to the face-to-face learning environment.

Methodology

Sampling and participants of the study

The purposive sampling technique was used in this qualitative study. The selection of samples was based on the purpose of inquiry in this study which is to understand the alignment of teachers' epistemic understanding and their intentions for dialogic scaffolding for classroom argumentation. Four teachers were selected to represent each of the four basic education programs in the two Philippine secondary basic science education curricula: DepEd Curriculum and DOST-Philippine Science High School (PSHS) Curriculum. Two teachers with assigned pseudonyms, Teacher Don and Teacher Mara, used the DepEd Curriculum, each teaching different programs: General Public High School (GPHS) and the STE-Biology Elective. The two other teachers (pseudonyms: Teacher Loida and Teacher Carlo) were using the DOST-PSHS curriculum with two different programs: PSHS-Regular Biology and PSHS-Biology Elective (Table 1). Except for the PSHS-Biology Elective teacher who is teaching Grade 10, the three other teachers were teaching Grade 8. Each of the curricula was represented by Regular Biology and Biology Elective Classes; thus, the teachers implemented classroom argumentation in two different methods: a content-based approach for the Regular Biology programs and a socio-scientific approach for the Biology Elective Programs. Their topics were also different from each other: basic taxonomy for the GPHS, Mendelian genetics for the PSHS-Biology, stem cell therapy and cloning procedures for the STE-Biology and Bioethics for the PSHS-Biology Elective.

Table 1

Demographic characteristics of the teachers involved in the study

Teachers	Highest Science/ Science Education Degree	Years of Teaching Experience	No. of trainings in science inquiry/ argumentation	Type of curriculum taught
Socio-scientific issues (SSI)-based classes				
Case1: Teacher Loida	MA Biology Education	35	More than 20	STE – Science Elective (DepEd)
Case 2: Teacher Carlo	MA Environmental Education/ Master in Bioethics	8	More than 10	Special Science – Biology Elective (PSHS-DOST)
Content-based classes				
Case 3: Teacher Don	BS Education (Physics)	5	5	GPHS – Regular Biology (DepEd)

Teachers	Highest Science/ Science Education Degree	Years of Teaching Experience	No. of trainings in science inquiry/ argumentation	Type of curriculum taught
Content-based classes				
Case 4: Teacher Mara	MA Biology Education	11	9	Special Science – Regular Biology (PSHS-DOST)

The teachers' demographic data (Table 1) were also gathered to assess how these affect their knowledge and beliefs of constructivist approaches such as classroom argumentation. Usually, their experiences in teaching and the professional development activities that they have attended are factors that determine their strongly held beliefs. The interview guide was used to understand the variables focused on in this study.

Data sources

Various forms of data, such as surveys, observation guides, and interview guides, were used to explicate the alignment of teachers' epistemic understanding and their dialogic scaffolding for classroom argumentation. These were iteratively analyzed qualitatively using the constant comparison method (Corbin & Strauss, 2014).

Merging the data obtained from the survey and interview with the iterative coding and recoding of classroom transcripts, the varying levels of teachers' knowledge and beliefs on the nature of teaching and learning and classroom argumentation were analyzed to formulate themes that align the teachers' epistemic understanding to their dialogic scaffolding.

Interview guides

Teacher's Beliefs on Teaching and Learning Interview (TBTLI). This instrument, which was adapted from Luft and Roehrig (2007), consisted of seven questions about teachers' beliefs about science teaching and learning. This instrument was used to assess the teachers' constructivist beliefs about teaching and learning. It was used to supplement the Teacher's Beliefs on Teaching and Learning Questionnaire (TBTLQ). This was pilot-tested and results revealed that it could be conducted within 40-60 minutes.

Teacher's Support for Classroom Argumentation Interview Guide (TSCAIG). This instrument was a researcher-constructed interview guide composed of two broad questions with three to four sub-questions to prompt the teachers for elaborate responses on how they dialogically scaffold their students' expressions of argumentative agency. Pilot-testing results also revealed using the TSCAIG, the interview could be done within 40 to 60 minutes.

Survey instruments

Teacher's Beliefs on Teaching and Learning Questionnaire (TBTLQ). This 27-item Likert instrument was adapted from Woolley et al. (2004) and was used to assess the teachers' beliefs on teaching and learning in science based on three aspects of their beliefs system, namely: belief in classroom management, belief on the teaching process, and belief on how to interact with students' parents.

Teacher's Knowledge and Beliefs on Argumentation Survey (TKBAS). This instrument is a 25-item researcher-constructed Likert survey with items categorized into any of the four components: 1) beliefs on the role of argumentation in science teaching and learning, 2) knowledge of the dialogic processes of argumentation, 3) beliefs on the students' argumentative abilities to engage in classroom argumentation, and 4) knowledge on the nature of classroom argumentation.

Both instruments were composed of positive and negative statements, which asked the teachers to indicate their level of agreement from *strongly disagree* to *strongly agree*. Ratings, therefore, yielded the highest on the *strongly agree* responses for the positive statements and on the *strongly disagree* for the negative statements. These instruments were pilot tested on 13 in-service science teachers and 12 pre-service science teachers for reliability and validity analyses prior to actual data gathering. Table 2 shows the acceptable Cronbach's alpha values for each of their respective components.

Table 2

Results of the reliability and validity analyses for the TBTLQ and the TKBAS

Aspect of teacher's belief system on teaching and learning for the TBTLQ	Cronbach's alpha
Classroom management	.732
Teaching process	.721
Interaction with students' parents	.710
Components of the teachers' knowledge and belief system for classroom argumentation from the TKBAS	
Belief on the role of argumentation science teaching and learning	.713
Knowledge on the dialogic process of argumentation	.709
Belief on the students' argumentative abilities	.724
Knowledge on the nature of classroom argumentation	.737

Classroom observation checklist

Teacher's Dialogic Scaffolding on Argumentation Observation Checklist (TDSAOC). This instrument was used to obtain data on how the teachers' dialogic scaffolding practices for classroom argumentation were evident in their respective classes. This was a researcher-constructed observation guide from a priori categories from literature (Gibbons & Hammond, 2005; Scott, 1998;

Songer et al., 2013) and contained indicators for the teachers' implementation of classroom argumentation using their argumentative dialogic prompts. Using these codes, the observers counted the number of times the teachers provided dialogic prompts, which encouraged students to engage in classroom argumentation supplemented by their respective evidence of occurrences. When some dialogic prompts were not specified in the set of indicators, written notes were provided, which were consolidated after every observed classroom session.

Data analysis

This study used the constant comparison method (Corbin & Strauss, 2014) to develop the themes and subthemes from the coded data transcripts. Inductive and template coding approaches were combined to constantly compare the a priori codes generated from literature and the data-driven codes. These codes were then merged to form the final codebooks that were utilized in the iterative coding. In the iterative coding, related codes were grouped to make a synthesis and finally establish the themes that represented and how the teachers' epistemic understanding and their intentions in dialogic scaffolding for classroom argumentation.

To characterize the teachers' knowledge and belief systems on the nature of teaching and learning, their responses on the six-level Likert scale (from strongly disagree to disagree) of the TBTLQ were assigned a sub-category from slightly traditional to highly constructivist. The subcategories were then merged into three as a general summary of the teachers' beliefs on the nature of teaching and learning. The final categories were traditional (highly traditional, traditional), transitional (slightly traditional, slightly constructivist), and constructivist (constructivist, highly constructivist). Since the number of items comprising the knowledge and belief systems in the TBTLQ was not equal, frequency counts of response data were converted into percentages and graphically presented. The presentation of these analyses was supplemented with verbatim responses from the interview to enrich the robustness of the data.

One of the criteria for the selection of teacher participants was their exposure to classroom argumentation as a teaching strategy in science classrooms mainly from direct experiences through formal and informal education, seminars, workshops, or conferences. Using the survey data from the TKBAS, their Likert responses were assigned with values ranging from 1 (strongly disagree) to 5 (for the strongly agree). Since this instrument was composed of both positive and negative statements, scores were reverse transformed for the negative statements; in this case, negative statements had the *highest score* for the *strongly disagree* and *lowest score* for the *strongly agree*. Moreover, since the number of items was not equally distributed, the percentage scores in each component were calculated and the general profile of the teachers' knowledge and beliefs on classroom argumentation were tabulated and graphed. Presentation and analysis of results were supplemented by their verbatim responses obtained from the informal interview using the TSCAIG.

Merging the data obtained from the survey and interview with the iterative coding and recoding of classroom transcripts, the varying levels of teachers' knowledge and beliefs on the nature of teaching and learning and classroom argumentation were analyzed to represent their epistemic understanding and intended dialogic scaffolding practices for classroom argumentation. To illustrate, a teacher with a constructivist view on the nature of teaching and learning and who is informed on the nature and processes of argumentation would frame his/her instructional practices towards classroom argumentation and would intend to scaffold students' towards presenting evidence-based arguments for their claims. This hypothesis was obtained from previous findings claiming that teaching argumentation requires teachers' understanding of their students, the unexpected events in the classroom, and enough knowledge and understanding of integrating argumentation into their classroom practice (Evagorou & Dillon, 2011).

Ethical considerations

The approval of the Seoul National University Institutional Review Board was sought prior to the conduct of the study which ensured that all information, data gathering and analysis procedure, data storage, and participants' welfare were ensured. Participants were then informed of the background of the study, the extent of their participation, and how the data that will be obtained from them will be kept and utilized. Their confidentiality was ensured by assigning them pseudonyms from the start of data analysis. Moreover, they were also asked to sign a consent form stating their voluntary participation in the research. In connection, they were informed that they could withdraw anytime they felt discomfort during the data gathering procedure.

Results

SSI-based implementing teachers

Two teachers, namely Teacher Loida and Teacher Carlo, implemented the Biology Elective classes from each curriculum using socio-scientific issues. Analysis of results showed that these teachers possessed the highest levels of knowledge and belief systems which were acquired from and/or products of experienced-based knowledge (Teacher Loida) and theoretical knowledge (Teacher Carlo). Thus, according to them, they explicitly framed their Biology Elective classes toward classroom argumentation using socio-scientific issues. They had similar regard for the effectiveness of classroom argumentation as an inquiry-based practice in science education.

The constructivist and experienced teacher encouraged collaborative understanding of concepts

Teacher Loida represented this level of epistemic understanding. Analysis of the demographic data showed that Teacher Loida was the most experienced among the teacher participants having 35 years of teaching and exposure to more or less 20 various inquiry-based teaching and learning seminar-workshops

and training including classroom argumentation (Table 1). During the interview, Teacher Loida regarded herself as a facilitator of learning. Having these views, she puts high regard on her students' abilities (*"I want to become the facilitator. You know, you become more effective if you allow students to take responsibility for their learning…they become empowered"*). In their classroom discussions, she usually acknowledged her students' efforts which served as motivation for them to achieve more. This was also her way to assess the varied learning abilities and their prior knowledge and efforts for their subject ("*there will always be students who are wide readers… they extend their efforts…So it's better to acknowledge them so that they will keep on doing the same. So, from there, I can gauge how much they have gone through their research*").

Teacher Loida's constructivist beliefs, experiences, and various exposures to inquiry-based instruction and argumentation played major impacts on her implementation of classroom argumentation. With her constructivist views, she was able to act as a facilitator and the interview results showed that she prioritized collaborative understanding of concepts through argumentation rather than focusing on the pre-determined sequences of instructions written in the curriculum materials. Through dialogic scaffolding, her students were enabled to relate their classroom topics to real-life scenarios by linking their socio-scientific topics to their daily lives.

Figure 1

Percentage distribution of the teachers' overall categorized responses for their constructivist levels
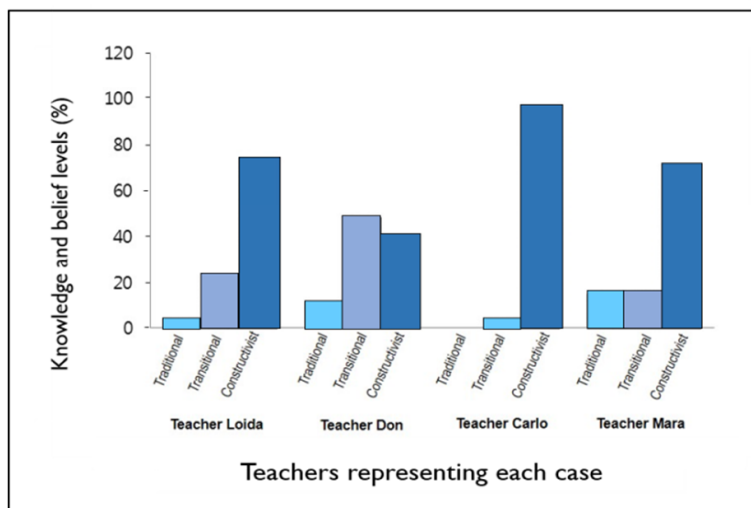
In terms of her knowledge and beliefs on classroom argumentation, she was dominantly knowledgeable and possessed informed views (Figure 2). While it can be observed in Table 3 that though she possessed informed views on the role of argumentation and was knowledgeable enough on the dialogic aspects of argumentation, she was not that confident in the abilities of her students and in the nature of the argumentative process. But these views were not noted during the interview when she acknowledged the role of argumentation in students' learning (*"I believe that teaching through argumentation in biology is one of the best methods since students are asked to express their opinions"*). Moreover,

she acknowledged the development of students' argumentative skills to be equally important to learning science content when she said,

> "What is the use of the content if the students are not able to apply those in their daily lives? For example, in my case, I didn't even recognize why I am studying Mendel's law in high school. I just knew it in college. See, because we are not exposed to issues at that time. So, for me, it is better to expose students with issues aligned to the content."

Figure 2

Percentage distribution of the teachers' overall categorized responses for their levels of knowledge and beliefs on argumentation
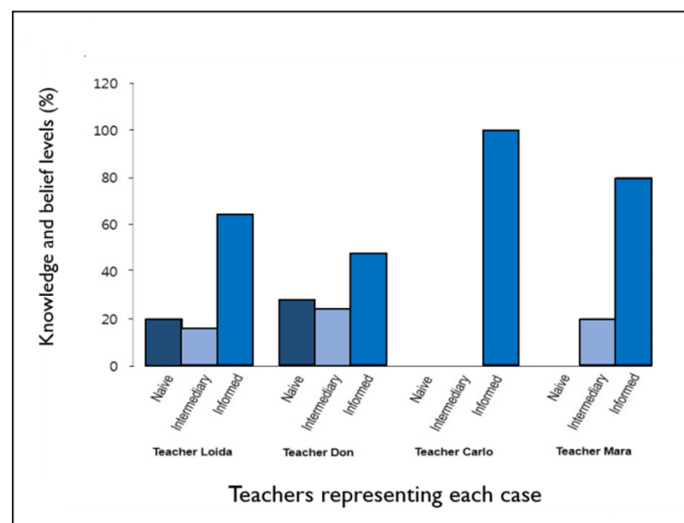
As a classroom facilitator, she said that *"I believe that students should initiate their own learning. We should only serve as facilitators. That's why what I do is to just open the topic."* To encourage participation, she usually asked the students to read about socio-scientific issues and prompted them with critical questions in preparation for classroom discussions. She took advantage of related news articles and used them as data sources to implement classroom argumentation.

> "I even ask them to read news related to the content. For example, the issue of the Dengvaxia vaccine which is very controversial now. So, they can relate this issue to the ethical considerations in doing science that we discussed before."

Table 3

Level of teachers' knowledge and beliefs on the nature of teaching and learning and the nature and advantages of classroom argumentation

Knowledge and belief components	SSI-based implementing teachers		Content-based implementing teachers	
Nature of teaching and learning	**Teacher Loida**	**Teacher Carlo**	**Teacher Don**	**Teacher Mara**
Management	Constructivist	Highly Constructivist	Transitional	Constructivist
Teaching	Highly Constructivist	Highly Constructivist	Transitional	Highly Constructivist
Parent	Transitional	Constructivist	Transitional	Constructivist
Classroom argumentation				
Role of argumentation	Highly Informed	Highly Informed	Highly Informed	Highly Informed
Dialogic process	Informed	Highly Informed	Intermediary	Informed
Student abilities	Intermediary	Highly Informed	Intermediary	Informed
Nature of argumentation	Intermediary	Highly Informed	Intermediary	Highly Informed

She mentioned some barriers to classroom argumentation, such as large classes and time constraints (*"large classes that we have here in the Philippines…and hmm…lack of time"*), but being an experienced teacher, her familiarity with the diversity of students' characteristics was instrumental to readily provide dialogic support (*"give them [students] questions that support or counter-argue previous student's opinions"*). She believed dialogic scaffolding "prompts the students the idea to speak up." She started the discussion with an overview of the topic *"so that students will have a background knowledge on the content related to the scientific issues."* Moreover, she mentioned that "giving them 'how' and 'why' questions will prompt them (students) to think deeper. With these strategies, she did not sacrifice the value of content knowledge when she said, *"it is really important to introduce content so that they know the concept."*

The highly knowledgeable and highly constructivist teacher employed a culture of negotiation

This category was represented by Teacher Carlo, a Junior Faculty member, with eight years of teaching experience who was already exposed to more than 10 training on inquiry-based teaching and argumentation. He holds a bachelor's degree in Biology and two master's degrees: a master's in education major in Environmental Science and a master's in Bioethics. At the time of the study, he was the head of the Biology Teaching Group at the Philippine Science High School-Main Campus which is in Quezon City, Metro Manila. According to him, during the time of the study, he just resumed teaching after graduating with

his master's degree in Bioethics from an Australian University. He was then assigned to teach Bioethics as a Biology Elective Class for Grade 10 students to which he was allowed to draft his own teaching sequence based on his academic exposure to the field. As the head of the Biology Teaching Group, he regularly observed classes of other biology teachers and did some post-instructional meetings for them after their observations. He mentioned that he also encouraged other teachers to implement argumentation as it is an effective instructional strategy in science.

Based on the survey, he was the most constructivist among the teachers in this study (Table 3; Figure 1) and his constructivist views were influenced by his academic exposures, especially in bioethics backed up by a solid foundation of biology content and his knowledge of pedagogy. He firmly believed that because his students were inclined to the science field, *"they should be exposed to how to exercise their decision-making since they [must] possess the innate sense of self-awareness towards ethical issues."* Since he also structured the class for argumentation, he did not follow a strict curriculum; rather, he utilized what the students brought to class related to their target socio-scientific issues.

Teacher Carlo's highly constructivist views were also manifested during the interview when he said that argumentation *"deepens students' content understanding"* as they are *"encouraged to communicate their opinions."* Therefore, he emphasized the importance of developing students' content knowledge along with doing argumentation because according to him, *"it is where students derive their claims."* Most of the time, he acknowledged the role of his argumentative prompts and the students' advanced reading tasks which served as guides *"for them to obtain arguable statements or [to formulate] their claims so that other students are able to counter argue or refute."* According to him, it was his way of motivating his students by utilizing their various opinions *"in a sense that when various claims are laid down, there are more areas for a counterargument."* As a facilitator, he said, *"I express my opinions too… especially when it is so hard to obtain other students' opinions. In this way, other students are able to frame their thinking because of my opinions."*

With a strong foundation of knowledge and beliefs on argumentation, he expressed his optimistic view of classroom argumentation as a *"very promising teaching strategy…if one only recognizes the importance of critical thinking."* Moreover, he believed that through argumentation, students are empowered to *"think and express themselves according to their capacities."* With these beliefs on classroom argumentation and students' capacities, he usually encouraged his co-teachers to implement argumentation so that students will not *"know so much with the 'what' and 'which' of their content"* but more so about how to evaluate issues related to these. He further emphasized, *"a class is really boring if you only teach information. Students tend to just stare at you while you are doing the talking."* Moreover, he claimed that all students can engage in classroom argumentation and that *"it's only a matter of how the teacher regulates the discussion in class"* and that *"personal decision to teach argumentation matters a lot."*

As a constructivist teacher, he established a culture of negotiation during their classroom argumentation through his short but open-ended dialogic prompts. Moreover, his explicit decision to implement argumentation, followed that his dialogic scaffolding practices established the classroom into a social and verbal activity which facilitated the development of students' reasoning skills during their expressions of argumentative agency (Osborne, 2010; Sampson & Clark, 2009). As he contingently and dialogically prompted the students to present their claims with evidence, they were able to identify the strengths and weaknesses of their insights which were later used to converge and achieve consensus.

Content-based implementing teachers

The other two teachers observed in this study implemented two different types of curricula, each from DepEd and DOST. Unlike the first two teachers presented, they taught the Regular Biology classes, one from the DepEd curriculum and the other from the DOST curriculum. These teachers also differed in their levels of knowledge and belief systems which influenced their rationale for dialogic scaffolding.

The teacher who is in transition from traditional to constructivist provides conceptual reflective questioning

Teacher Don is a teacher representing those with a transitional level of epistemic understanding. He holds a bachelor's degree in Education majoring in Physics and represented the general public high school (GPHS) curriculum under the new K to 12 curriculum in the Philippines (Table 1). According to him, he was exposed to more or less five training programs and/or seminar workshops on inquiry-based teaching which included argumentation, and these were primarily from the in-service training programs administered by his school as mandated by the Department of Education. He was in the same school as Teacher Loida but he belonged to the GPHS department which followed the general science curriculum implemented in the majority of the public high schools in the Philippines.

Results of the analysis showed that Teacher Don was the least constructivist among the four teacher-participants (Figure 1). However, his beliefs in the effectiveness of classroom argumentation and his desire to become a full practitioner of constructivist teaching were positive indicators for the improvement of his approaches to teaching and learning. In this study, his dialogic scaffolding for classroom argumentation served as evidence for his desire to gradually become a believer and an agent of constructivism. Much as his dialogic prompts were not as challenging as that of Teacher Carlo, he was able to generate student-centered questions which made his students his complimentary experts in knowledge construction (Jiménez-Aleixandre et al., 2000) rather than just repeaters of the factual knowledge to confirm textbook explanations (van Zee & Minstrell, 1997). Compared to the other teachers, students' responses in Teacher Don's classes were short and unelaborated. However, he was able to formulate and provide contingent dialogic prompts through his conceptual-reflective questions and utilize the few critical points

raised by some students to extend their discussions instead of providing evaluative prompts.

During the interview, he also mentioned that he managed students' laboratory activities by *"orienting them in what they are going to do"* in order *"to avoid them asking so many questions when they are already doing their activities."* In terms of his classroom instructions, he mentioned that he still considered himself a *traditional* teacher, but he acknowledged the effectiveness of constructivist teaching, especially when he observed the classes of Teacher Loida. Thus, he was optimistic about his aspiration to become a constructivist teacher when he stated,

> "Maybe in the coming years, I will learn how to teach biology in that way. But I am trying. Sometimes, in the higher sections, students are good at discussions, so I take advantage of it. I ask them to discuss by themselves and present their results in class. And I also allow others to comment so that they will know how to defend their answers."

His desire to slowly become a facilitator of learning in class was evident in his method of assessing his students. He said that he involved them (students) in assessing themselves, especially for their group activities by allowing them to *"rate themselves and their groupmates based on how they contributed to their activities."* Furthermore, he considered students' ratings in the final computation of grades in some of their outputs *"I allow them to compute the average of that (students' scores) and together with mine, that's their final grade."* In terms of his dealings with the parents of his students, his responses were all aligned with the constructivist views, and these were also supported by the results of his interview when he said that he is always open to clarifications and involved the parents in setting the rules, particularly in his advisory class.

In terms of his knowledge and beliefs on argumentation, he held transitional knowledge and beliefs in classroom argumentation (Figure 2). The interview results slightly contradicted his transitional views based on his responses to the survey instrument regarding the role of classroom argumentation in science learning. Analysis showed that he could be regarded as possessing naïve views on the nature of classroom argumentation when he said that it was more suitable in biology classes because of the ethical issues related to biology topics (*"it is recommended in Biology because of the ethical issues and not particularly in physics because of the "lesser socio-scientific issues"*). One factor that hindered him from implementing classroom argumentation was his limited knowledge (*"My only problem is I am not a biology major so I cannot do it. I will have to study content maybe so that I can implement it in class"*). Much as it was one of the recommended teaching strategies in the curriculum, he said, *"I don't know how to implement it."* Moreover because of *"lack of time and a lot of cancellations of classes during the school year because of natural disasters,"* he usually focused on teaching pure science content. However, with his desire to become a constructivist teacher, he said that he sometimes observed the biology classes of Teacher Loida where he observed that debate was used as a strategy to implement classroom argumentation.

According to him, his reflective dialogic prompts were particularly focused on *"why and how questions so that they (students) can give explanations. These are questions on practical knowledge like how they apply their biology knowledge in their daily lives."* Moreover, based on the interview, he stated that most of his analytical prompts were focused on encouraging students to *"defend their opinions"* using their prior scientific knowledge, especially on how they *"make connections of the biology concepts to daily lives."*

The constructivist and knowledgeable teacher provided flexible affirmations of students' ideas

Just like Teacher Don and Teacher Carlo, Teacher Mara can also be considered a knowledgeable teacher who is in the same school as Teacher Carlo. With 11 years of teaching experience, she had a significant number of exposures to professional development in inquiry-based teaching which included classroom argumentation. She holds a bachelor's degree in Biology Education and a master's degree in Education specializing in Biology. According to her, she has been teaching genetics classes from the start of her teaching career to regular Grade 10 students but since the country's implementation of a new curriculum, her teaching loads included other branches of biology in other grade levels.

Analyses of survey data revealed that she was constructivist in her knowledge and belief systems and according to her, she usually involved her students in negotiating whatever decisions they have in class. According to her, when the students *"were involved in the setting of the rules, they will be responsible enough to obey those rules…"* and she can always *"remind them that they set their own rules, so they have to follow them."* Moreover, students were also involved in setting dates of their mini-exams and the deadlines for project submission but not usually on the lesson sequence. She also mentioned that her students did not have regular seating arrangements and regular group members for their short classroom activities. In terms of group compositions for laboratory works, she usually had permanent grouping for an extended period (one quarter [3-4 months] of the school year) and involved the students for necessary changes whenever they requested for regrouping together with her assessment of group performances.

She admitted being a bit strict but preferred to be a facilitator during class discussions because she believed that it is *"better and it is more effective when students are involved in their own learning."* As such, she believed in the capacity of her students to initiate their own learning by *"tapping their skills and providing them opportunities."* In terms of assessments, she used various methods of assessing student learning outcomes and allowed collaboration especially for performance assessments so that they *"can ask questions from each other before asking it (to her so they) all save time."* The parents of her students were usually involved in the learning process when she assigned tasks which required the students to *"interview their parents or professionals"* so that they are able to obtain primary data for classroom discussions.

She implemented argumentation by assigning the students some reading tasks related to their lessons. Reading topics usually included *"controversial issues that can be discussed in class"* and through these, students formulated their

arguments based on the information from their readings and *"their knowledge of content."* When asked about the advantages of implementing argumentation, she said that it helped the students to express themselves as they become more responsible for their learning (*"It is helpful coz the students think deeper, and they are able to express themselves… students become more responsible on their learning"*). Interview transcripts also showed that she was knowledgeable enough on the nature of classroom argumentation when she said that *"students have to present their claims and back it up with their evidence."* She also put high regard on her students' abilities by *"giving them opportunities to express their opinions."* She believed that through argumentation, classroom discussion became active, and the factual type of learning was minimized. She exclaimed,

> "I just came to realize that I can have active participation in class if you do argumentation and the class will not be boring. If you just teach the content, they will just answer the 'what' and the 'which' so it becomes boring… very factual."

In the interview, she mentioned that she specifically implemented classroom argumentation because she recognized the importance of student interactions and through her dialogic scaffolding, their argumentative discussions revolved around reorganization and integration of students' prior knowledge for use in articulating the current information of their new content knowledge. Her dialogic scaffolding aligns with the previous study which claims positive results when students are provided with the opportunities to be involved in accomplishing the objectives of their lesson in an interactive environment where they jointly clarified and resolved their differences in understanding of science content (Levitt, 2002). Her responses to the interview about changing her role from a sole transmitter of knowledge to a facilitator of learning and her instructional practices were aligned with the current recommendations of reform-based instructions. Moreover, despite content-focused topics, she was able to show flexibility by establishing meaningful inquiry opportunities as she gave her students the initiative to either accommodate or reorganize their knowledge frameworks.

Her dialogic prompts were mostly framed to elicit her students' responses with the goal of a collective consensus in their construction and reconstruction of prior and existing knowledge. Moreover, it was observed that despite the dominance of constructive argumentative agencies of her students, she prevented herself from attempting to provide immediate evaluative prompts. Also, in some instances when students directed their clarification questions to her, she was responsive enough to recast and recapitulate these clarification questions and gave other students the opportunities to express personal insights related to these questions.

The advantages of dialogic inquiry were implicated in the expressions of argumentative agency in this group of students. They were able to configure their learning of content when they were responsive to their teachers' provision of autonomy in discussion in the fading phase which encouraged them to question, propose, and challenge each other rather than simply assimilating facts (Engle & Conant, 2002). Learners' argumentative relationship changed

as they began to develop a sociocultural perspective and use the opportunities to generate more productive dialogic prompts with their peers and provide responses to queries for collective and dynamic thinking.

Discussion

The value of teachers' beliefs on dialogic scaffolding on their implementation of classroom argumentation

Capitalizing on language as an essential tool in meaning-making in the classroom, the results of this study showed that as teachers recognized the value of joint knowledge construction, they intentionally harnessed the power of dialogic exchange to scaffold the discussion. Their students' participation resulted from their dialogic prompts which created interaction space and gave direction for students' thinking. Dialogic prompts produced a discursive tool which enabled students to reflect, clarify, expand others' ideas (*Why do you think so, do you mean to say…*), establish collaborative thinking (*Can you add more?*), and negotiate differences in perspectives (*Do you agree/disagree? Why?*).

Results show that the four teachers involved in this study had different views on the nature of science teaching and learning. Based on the survey and interview data, Teacher Carlo had the most constructivist views on teaching and learning (Figure 1) and the most knowledgeable and most informed about classroom argumentation (Figure 2). These survey results align with the interview results when he mentioned that knowing the nature of his Bioethics elective class, he prioritized classroom argumentation as the most appropriate teaching method to encourage students' participation. These results align with previous research which claimed that teachers' constructivist beliefs are not associated with their skills but more so with their personal sense of the benefits of constructivism (Windschitl, 2002).

Combined analyses of all data confirmed that Teacher Carlo upholds his beliefs on constructivism by making his biology class a venue for students to engage as he scaffolded and encouraged them to be active agents in argumentative dialogues (Wood & Turner-Vorbeck, 2014). His views were also influenced by his academic exposures and experiences which supplemented his firm beliefs in the effectiveness of constructivist teaching. Holding on to the constructivist view, knowledge construction involved participatory and social negotiation among his students.

In the case of Teacher Loida, her experiences and various exposures to inquiry-based instruction and argumentation played a big factor in her implementation of classroom argumentation. Her dialogic scaffolding helped her students become active participants in knowledge construction. Moreover, she encouraged the students to relate their classroom topics to real-life scenarios making students become more aware of the direct implications of their scientific knowledge.

In the case of Teacher Mara, she recognized the importance of student interactions as she scaffolded the reorganization of their prior knowledge

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against their understanding of the new information. She gave her students the opportunities to be involved in accomplishing the objectives of their lesson in an interactive environment where they jointly clarified and resolved their differences in understanding of science content (Levitt, 2002). Her response to the interview about changing her role from a sole transmitter of knowledge to a facilitator of learning and her instructional practices were aligned with the current recommendations of reform-based instructions. Moreover, despite content-focused topics, she was able to show flexibility by establishing meaningful inquiry opportunities as she gave her students the initiative to either accommodate or reorganize their knowledge frameworks.

Results of the analysis conducted to show the overview of teachers' beliefs on the nature of teaching and learning revealed that Teacher Don was the least constructivist among the four teacher-participants in this study. Besides acknowledging the fact that he is a novice in the field of biology education, his pre-conception that argumentation is primarily suited to biology is a major factor in his decision to implement inquiry approaches such as classroom argumentation. Moreover, this was also a factor of having insufficient knowledge of biological concepts. He held the misconception that his knowledge would not suffice his skills to make decisions to create positive impacts on the learning process. As he mentioned in the interview, these inherent beliefs were translated into the major fallacy that some teachers' instructional approaches rely on the capacities of the students (Kirschner et al., 2006).

Putting all these data together conforms to the idea of Guskey (1986) who claimed the direct relationship between beliefs and behaviors. Moreover, the interview data showed that the teachers' ideas, beliefs, and practices determined their decisions in the classroom. Their perceptions of the advantages of constructivist teaching and learning shaped their dispositions and approaches to their teaching strategies (Richardson, 1996). Primarily Teacher Carlo and Teacher Loida framed their discussions for dialogic interactions which supported the students to link their scientific understanding to real-life experiences. As they facilitated their students' interactions, they allowed them to interact using what they already know which increase their interests and motivation (Forbes et al., 2001).

Based on the survey questionnaire and the interview, teachers in this study were asked about their beliefs on the capacities of their students to engage in classroom argumentation. It was found that Teacher Carlo and Teacher Loida strongly believed that all students can engage in classroom argumentation. Through these beliefs, they were able to frame their instructional strategies (Nespor, 1987) to provide enough opportunities for student-student interaction (Alozie et al., 2010). Having constructivist views who believed in 'knowledge construction,' they were able to harness the power of their dialogues to scaffold and engage their students in critical thinking (McNeill et al., 2016). Moreover, they did not sacrifice the significance of dialogic discussions in improving students' communication skills and reasoning abilities (Jiménez-Aleixandre & Erduran, 2007). Observation data show that students became "learners with agency" rather than passive ones (Polman, 2004, p. 463). In fact, they utilized conversational structures to extend the inquiry process in their dialogic

exchanges to assess the students' conceptual understanding (Polman, 2004). Taking into consideration Teacher Mara's case, her dialogic scaffolding leveraged the classroom talk not to evaluate students' responses. She utilized students' statements to expand and clarify their thinking using scientific terminologies as they processed their individual knowledge to support each other's articulation of the scientific facts (Kawalkar & Vijapurkar, 2013; Mercer et al., 1999). This simply means that given enough guidance, students are able to develop independent thinking which is shaped by their social experiences with their peers (Rogoff & Toma, 1997). Instead of the dyadic or triadic interaction, students became argumentative agents to lead the inquiry process, critique, support, and evaluate one another's lines of thought. Through dialogic scaffolding, each student's contributions were valued to possess unique perspectives with thoughtful consideration of finding solutions to existing problems (Bakhtin, 1982; Higham, 2016; Kazepides, 2012).

Similar content-based argumentation was observed in Teacher Don's class and analysis revealed that most of his dialogic prompts were reflective statements which enabled the students to express their personal thoughts on the implications of their lessons. Much as his dialogic prompts were not as challenging as that of Teacher Carlo, he was able to generate student-centered questions which made his students his complimentary experts in knowledge construction (Jiménez-Aleixandre et al., 2000) rather than just repeaters of the factual knowledge to confirm textbook explanations (van Zee & Minstrell, 1997). As compared to the other teachers, students' responses in Teacher Don's classes were short and unelaborated. However, he was able to pick up and appropriate the few critical points raised by some students to extend their discussions instead of providing evaluative prompts.

Implications of the teachers' beliefs on face-to-face, online, and distance learning

Results show that teachers possess different beliefs on dialogic scaffolding for classroom argumentation. In science classrooms, scientific argumentation as a reform-based strategy that facilitates student engagement in epistemic practices relies much on the teacher's beliefs that reflect how they value learning (Osborne et al., 2004). In face-to-face learning, their beliefs determine how they structure their routines and in the case of classroom argumentation, they may implement dialogic scaffolding that is responsive to the moment-by-moment interactional needs of the students. On the other hand, for open and distance learning, they mostly implement dialogic scaffolding through the prompts that they post and how they sustain the discussion through their occasional involvement in the students' discussion. This dialogic scaffolding can be equated to the fading (van de Pol et al., 2019) stage of dialogic scaffolding where students are provided with the independence to learn by themselves, still with the involvement of the teacher when the need arises.

Based on the results of this study, the various dialogic scaffolding practices of the teachers support Alexander's (2008) recommendation of dialogic teaching wherein classroom interaction must be devoid of the recitation method. Through dialogic scaffolding, students are provided with enough opportunities to listen, question, and critique their viewpoints. This also supports previous claims that

teachers' provision and promotion of appropriate dialogues empower students to think and learn (Alexander, 2005). Thus "success at school may be more a function of the quality of dialogue with a teacher and the opportunities it creates for 'interthinking' rather than a function of the child's ability or the teacher's skill" (Sewell, 2011, p. 271).

This study hypothesized that traditional teachers have the tendency to formulate dialogic statements with predetermined answers and thus wait for students' responses with immediate evaluative prompts. As the teacher-participants possessed certain levels of constructivist views, their discussions were redirected from the usual factual cognitive to the social constructivist learning process and the students practiced their argumentative agencies in a more open and participatory discussion (Teo, 2016, 2019). The dialogue was used to foster responsibility and a scaffolding tool to increase the interactivity and dynamic exchange of ideas. While the teachers allowed the spontaneous flow of ideas beyond pre-determined responses by not providing immediate evaluative prompts, they were able to initiate and steer the direction of the discussion.

Based on the results of this study, these teachers' beliefs on dialogic scaffolding to classroom argumentation in the face-to-face learning environment can also be applied when they shift to the open and distance learning environment. This is because, pedagogical beliefs are claimed to be stable and resistant to change (Pajares, 1992). Beliefs, which are said to be personal constructs can provide an understanding of teachers' practices, influence their instructional decisions and classroom management, and serve as a lens for understanding their classroom events (McNeill & Pimentel, 2010; Pajares, 1992). Moreover, they shape teachers' cognition and behaviour as well as guide their planning of classroom practices and activities (Calderhead, 1995).

Conclusion

To conclude, the study explored how teachers' epistemic understanding was aligned to their provision of dialogic prompts to scaffold the students' critical, agentive, collaborative, and reflective in evaluating and sensemaking their prior knowledge against new ones. Moreover, the study concludes that more than conceptual and factual knowledge; teachers' dialogic scaffolding for argumentation is a promising method for the gradual enhancement of students' communication skills and honing their reasoning skills. Finally, through dialogic scaffolding, students can be provided with a learning environment where they are fully allowed to develop communication skills with evidence-based arguments on their science topics.

However, with the limitations of the small sample size, these conclusions can only encompass the general characteristics of some of the teachers in this case study. The cases can serve as representatives to teachers with similar characteristics in terms of the length of their teaching career, the science field they are teaching, or the level of education they have attained which may influence their epistemic beliefs. Based on the results, this study recommends

continuously updating teachers' epistemic understanding of knowledge construction through inquiry approaches. In the case of the in-service teachers, these can be through regular exposure to emerging inquiry-based teaching approaches such as dialogic scaffolding. For pre-service teachers, the explicit inclusion of dialogic scaffolding strategies in their curriculum can be a potential factor for their enhanced exposure to this teaching pedagogy.

Limitations of the Study and Future Directions

As qualitative research, this study utilized thematic and exploratory analyses of the teachers' epistemic understanding and intended practices for dialogic scaffolding of classroom argumentation in high school biology. With the robust amount of data, the study still poses some limitations. First, despite the accuracy of the themes that were generated for each case, not all cases with similar teacher characteristics may be used to describe them. Second, purposive sampling may be appropriate to the nature of the study; however, it may not be used to present a general picture of all the Philippine schools represented by each case. Nonetheless, the cases in this study can share similar features, especially in the general public high schools in urban areas like Metro Manila where most of the large schools in terms of population are located. Future studies can therefore be done to explore more extensive data which may be quantitatively analyzed in terms of the variables presented in this study. Future studies can also explore students' argumentative agencies when they are being scaffolded by their teachers during their classroom discussions.

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Alignment of Teachers' Epistemic Understanding and Intended Dialogic Scaffolding of Classroom Argumentation: Implications On Face-To-Face, Open and Distance Learning Environments

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Call for Papers

We call on colleagues, such as academics, researchers, technology developers, and open distance e-learning experts to submit their articles for publication in the International Journal on Open and Distance e-Learning. The IJODeL is a bi-annual journal, hence it comes out every June and December of the year.

The preferred articles are those reporting original research, articles based on critical analyses of e-learning undertakings, book reviews, evaluation studies, and original think pieces such as concept papers.

Please visit the IJODeL website to familiarize yourselves with the author's guide and submission guidelines.

Template for Quantitatively-Oriented Articles

Title of Article

Author 1[1]and Author 2[2]

[1]Position, Institutional Affiliation, Country, Email address

Abstract

Abstract in 150-250 words.

Keywords: No more than five (5) keywords.

Introduction (Center Heading 1)

This section contains a clear historical background of the study, showing why the research had to be undertaken. In this section, the author(s) shall have the opportunity to expound on what the research says about the research problem, and show clear support for the need to undertake the research, through appropriate research gap analysis.

Objectives (Center Heading 2)

This section provides a clear statement of the goals and objectives of the research.

Conceptual/Theoretical Framework (Center Heading 3)

The conceptual or theoretical framework would be expected for research studies that dealt with empirical procedures and methodologies. A framework of this nature would provide for clear interrelationships and direction of interactions of variables which the researcher expects to show by his/her data and data interpretations. It should be noted that variable interactions may be easier to understand if they were to be presented in illustrated model formats.

Methodology (Center Heading 4)

This section includes brief discussions of data collection procedures and analyses. Data must be presented in appropriate tables.

Results and Discussions (Center Heading 5)

Analytical discussions must present possible relationships of the results of the study and the findings from other studies specifically reviewed for this purpose. Post analysis data may be presented in both statistical tables and appropriate models and figures.

Include subheadings as are necessary.

Conclusions and Recommendations (Center Heading 6)

Conclusions must be according to the objectives of the study.

Recommendations must reflect the objectives and conclusions of the study.

References

General format must follow the suggestions for authors, but generally must follow the APA Style for publications. (As of writing, APA's publication manual is in its 7th edition.)

Template for Qualitatively-Oriented Articles

Title of Article

Author 1[1] and Author 2[2]

[1]Position, Institutional Affiliation, Country, Email address

Abstract

Abstract in 150-250 words.

Keywords: no more than five (5) keywords

Introduction (Center Heading 1)

This section contains the historical background of the study, including specific reports and studies that provided direct support to the research problem. Some relevant part of the literature shall be included in the discussion of the research problem to establish more strongly the need to undertake the study.

Objectives of the Study (Center Heading 2)

This section contains both the research over-all goal and the specific objectives to be attained.

Relevant Studies or Review of Related Studies (Center Heading 3)

Review of studies that are highly related to the current study. After the relevant studies have been presented, a synthesis of these may be presented and the relationship of such synthesis must be related to the study under consideration.

Subheading may be determined as necessary. In these subheadings, specific observations may be noted and statistical tables presented as well as figures and models.

Discussions (Center Heading 4)

In this section shall be inserted full discussion of results and finding, discussed

more deeply in relation to the related studies already reviewed. Subheads may be determined and included in the discussions.

Conclusions (Center Heading 5)

The conclusions of the study must reflect the objectives of the research.

Recommendations (Center Heading 6)

All recommendations must appropriately correspond to the conclusions, and therefore the objectives of the study.

References (Center Heading 7)

Follow the APA Style Guide (As of writing, APA's publication manual is in its 7th edition.)

Style Guide for Full Paper Submission

The paper should be 15-25 pages long (including tables, figures, and references) and prepared preferably in Microsoft Word format. The author(s) should provide a title, the name(s) of the author(s), position(s), institutional affiliation(s), institutional address(es), email address(es) and key words (no more than five). You may make use of the template for preparing your paper: Journal Article Template (Qualitatively-Oriented); Journal Article Template (Quantitatively-Oriented). Detailed guidelines are as follows:

1. **Font type**
   The whole text should be in Arial.

2. **Margins**
   The paper should be A4 size (21 x 29.7 cm). All margins (top, bottom, left, and right) should be 1 inch.

3. **Line Spacing**
   The whole text should be single-spaced.

4. **Title**
   The title of the paper should be 14-point, bold, in capital and lower case letters, and centered.

5. **Author Information**
   Use 12-point and centered for the author name(s). The Western naming convention, with given names preceding surnames, should be used.

   The author name(s) should appear below the title, with one blank line after the title.

   Use 10-point for author(s)' position(s), institutional affiliation(s), country, and email address(es).

   The author(s)' position(s), institutional affiliation(s), institutional address(es), and email address(es) should appear below the author name(s), with one blank line after the name(s).

6. **Headings**
   • Heading font (with the exception of the paper title and the abstract) should be 14-point Arial and in bold.
   • Headings should be centered and in capital and lower case letters [i.e. nouns, verbs, and all other words (except articles, prepositions, and conjunctions) should be set with an initial capital].
   • There should be two blank lines before each heading and one blank line after it.

7. **Subthemes**
   - Subtheme(s) should be 14-point Arial, in bold capital and lower case letters, and flushed left.
   - There should be one blank line before and after each subtheme.

8. **Abstract**
   - The abstract heading should be 14-point Arial, bold, centered.
   - The abstract should be in **150-250 words.**
   - The main text of the abstract should be 12-point Arial, italicized.
   - Alignment of the main text of the abstract should be justified, no indent.

9. **Key Words**
   - Include **at most five** keywords.
   - Use 12-point Arial. The keywords should appear below the abstract, with one blank line after the abstract.

10. **Main Text**
    - In general, paragraphs should be separated by a single space.
    - All paragraphs must be in block format.
    - Text font should be 12-point Arial, single-spacing. Italic type may be used to emphasize words in running text. Bold type and underlining should be avoided.
    - The first line of each paragraph should not be indented.

11. **Tables and Figures**
    - Tables and figures should be numbered and have captions which appear above them.
    - Graphics and pictures should not exceed the given page margins.
    - Captions should be 14-point centered.
    - The tables and figures of the paper should follow the APA citation style.
    - There should be no space between the caption and the table/figure.

12. **Footnotes**
    - Footnotes may be used only sparingly. A superscript numeral to refer to a footnote should be used in the text either directly after the word to be discussed or – in relation to a phrase or a sentence – following the punctuation mark (comma, semicolon, or period)
    - Footnotes should appear at the bottom of the page within the normal text area, with a line about 5 cm long immediately above them.
    - Footnotes should be 10-point and aligned left.

13. **References**
    - The author-date method in-text citation should be used. Following the APA format, the author's last name and the year of publication for the source should appear in the text.

    - All references that are cited in the text must be given in the reference list. The references must follow the latest edition of the APA Style

Guide (as of writing, APA's publication manual is in its 7th edition) and arranged alphabetically at the end of the paper.

Sample:

Surname, A. A. (year). Article title. *Title of Journal, volume number*(issue number), inclusive page numbers. URL/doi link

Surname, A. A. (year). *Title of book.* Publisher location: Publisher Name.

Surname, A. A., Surname, B. B., & Surname, C. C. (2000). Title of article. *Title of periodical, volume number*(issue number). URL/web address.

Surname, A.A. (Year, Month). *Title of paper.* Paper presented at name of conference, city, country.

14. **Length**
    The paper should be **3,000-7,000 words** including tables, figures, and references.

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The International Journal on Open and Distance e-Learning (IJODeL) welcomes original research articles, book reviews, theories, and best practices pertaining to ODeL worldwide. Articles should be 3,000-7,000 words including tables, figures, and references.

A publishable quantitatively-oriented paper should contain the following:
1. Abstract
2. Objectives
3. Conceptual/Theoretical Framework
4. Methodology
5. Results and Discussions
6. Conclusions and Recommendations
7. References

Go to: Quantitatively-Oriented Journal Article Template

A publishable qualitatively-oriented paper should contain the following:
1. Abstract (with keywords)
2. Introduction
3. Objectives of the Study
4. Relevant Studies or Review of Related Studies
5. Discussions
6. Conclusions
7. Recommendations
8. References
Go to: Qualitatively-Oriented Journal Article Template

To submit an article, the IJODeL website and follow the steps in the online submission system.