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Exploring implicit and explicit technology instruction in an L2 writing context

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Abstract: This article will explore implicit and explicit technological implementation of an iPad toolkit (an iPad pro, smart keyboard, and apple pencil) to better understand and support learners in two "Academic Writing in English as a Second Language" classes. Though objectives and goals remained consistent in both classes, technology implementation varied by means of implicit or explicit instruction. Drawing upon the ecological perspectives of linguistic holism, this article will follow my technology implementation journey from the fall '18 to spring '19 semesters, including first steps of implementation, adaptations to challenges, and solutions and pedagogical implications based on self-reflection and student processes and products. The exploration of implicit/explicit technology implementation into the L2 writing classroom can give many English language teachers valuable insights into how technology can be used to effectively promote a holistic linguistic approach, while supporting instruction to meet content, language, and technology objectives in various educational contexts.

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Introduction

The implementation of technology in pedagogy provides endless opportunities to engage in authentic language practice with the click of a mouse or the swipe of a finger, yet teachers often show uncertainty with actual implementation practices. Shaban and Egbert (2018, p. 235) found that teachers adopt technology based on "relative advantage, ease of use, compatibility, and trialability," and rarely take student feedback into consideration. Despite the pressure to incorporate technology in an effort to engage students in relevant and authentic content, teachers' use of technology is often seen as scripted and non-engaging to students. Teachers have expressed frustrations with their lack of familiarity with technology, their confusion on the necessity of technology, and their view of technology as merely a missing component for game implementation (Shaban & Egbert, 2018). Technology should not be seen as an afterthought addition to lesson planning but should be valued as an integral component of curriculum development, with thoughtful consideration as to the role technology plays in holistic learning.

Significant research points to a positive correlation between technology and student engagement (Heiberger & Harper, 2008), and recent trends see students become more tech savvy with each passing year. Traditional "pen and paper" methods of teaching are often seen as outdated, leaving students feeling unengaged. Particularly in English as a Foreign Language (EFL) contexts, the use of technology and multimodal instruction offers the strong potential for scaffolded and individualized instruction. To address concerns of low interest in EFL classes, Al-Bogami & Elias, (2019) explore the iPad as a pedagogical tool and innovative approach that meets students' needs while enhancing their engagement and improving their learning experience. While studies (Henderson & Yeow, 2012) demonstrate positive correlations between iPads and student engagement, few studies have explored iPad integration for literacy instruction, and even less have specifically focused on iPad for writing, -particularly in content-based higher education instructional settings.

Prior to researching technology implementation in an undergraduate, Academic Writing in English as a Second Language class, the researcher was enrolled in a university-sponsored iPad professional learning community that provided devices, professional training, and expert support for instructors interested in more robust integrations of technology into their courses. The ultimate goal of this training was to use technology in the classroom to support student success by pushing for

consistent, effective teaching practices that produce workforce-ready graduates. In this course, faculty and staff had the opportunity to incorporate more interactive learning opportunities and collaborative tools in teaching, research and other programs with the assurance that all students would have a common toolset to participate.

The university sponsored iPad training provided to the researcher included five weeks of professional development, and incorporated education in both digital theory and practice. Key theoretical elements included a brief overview of teaching with technology, an understanding of the relationship between digital literacy and digital fluency, and an introduction to technology assessment, development, and readiness. It also provided a more thorough understanding of multimedia teaching and learning through an introduction to device basics, tips for efficient course design, and pedagogical implementation of apps such as explaineverything, clips, adobe spark, notability, and padcaster.

Studies that have compared L2 implicit and explicit interventions have generally favored explicit instruction (Norris & Ortega, 2000). “Implicit instruction refers to unintentional learning tasks¨ in which the content or learning goal of the task is not directly told to the learner¨ while explicit instructions refer to learning tasks in which the content is directly clear to the learner” (Damhuis et al., 2014). In most studies, both implicit and explicit interventions prove to be effective, but explicit instruction typically draws larger gains in L2 learning. Despite the general consensus that explicit instruction is more effective for L2 instruction, the debate for explicit/implicit effectiveness has recently shifted toward the relative efficiency of varied instructional types along an explicit/implicit continuum taking more specific contexts and issues into consideration (Sanz & Morgan-Short, 2004).

In order to better implement engaging technology that promotes a holistic classroom environment and supports instruction to meet content, language, and technology objectives, this article will explore explicit and implicit technology integration with an iPad pro toolkit (iPad pro, smart keyboard, and apple pencil) in an undergraduate, L2 writing classroom. This paper was guided by the following research questions: 1. How does (explicit and implicit) technology instruction impact task design in an undergraduate, L2 writing classroom? 2. To what extent do explicit and implicit technology instruction support both the process and products of learners in the “Academic Writing as a Second Language Class?”

Review of relevant literature

An ecological perspective to multimodal course design

This paper adopts an ecological perspective when further exploring implicit and explicit technology implementation in instruction, viewing the way of being and acting not only in relation to others and to the environment, but also to how we conceive of teaching and learning (van Lier, 2004). Though it shares overlap with sociocultural and sociocognitive theories, Van Lier argues that an ecological approach aims "to look at the learning process, the actions and activities of teachers and learners, the multilayered nature of interaction and language use, in all their complexity and as a network of interdependencies among all the elements in the setting" (van Lier, 2010, p. 3). Adopting an ecological perspective opens the door for conducting research beyond frameworks limited to either the cognitive or social domains. An ecological worldview embraces perspectives that are more capable of adequately researching 21st century classrooms.

With an increase in both cultural and linguistic diversity across U.S. undergraduate institutions, recent L2 pedagogical research has seen a shift into understanding how multilinguals can use their full linguistic repertoire to support learning. As a pedagogical practice, "translanguaging leverages the fluid languaging of learners in ways that deepen their engagement and comprehension of complex content and texts" (Vogel & García, 2017). In addition to understanding the relationship between linguistic repertoires and classroom pedagogical practices to support literacy development, a social semiotic perspective (Halliday, 1978) views all meaning making as multimodal, occurring through complex interaction and uniquely interconnecting to convey meaning that is impossible through a single mode. "Multimodal composition disrupts the linear, static, and bounded constraints of written text to involve dynamic, interactive, and hyperlinked formats." (Smith et al., 2017, p. 7). Multimodal curricular design creates opportunities for multilinguals to express their identities beyond the affordances of written prompts, building on both independent and school practices. Multimodal curricular design supports an ecological perspective to learning, claiming that all elements in a context are interrelated.

In an ecological perspective, theory and practice are undeniably connected, and research must look at the "full complexity of the entire process, over time and space, in order to capture dynamic forces at work." (van Lier, 2010, p.5). Content Based Instruction (CBI) is strongly connected to Ecological Linguistics, viewing language as a meaning making activity integral to identity development (van Lier, 2004). The goal is to teach academic content through the use of language as a catalyst rather than the object of the lesson. In CBI, language is viewed as a subject that is "intimately connected with the self, as an entity that is always under construction, always

emergent" (van Lier, 2004, p. 109). Integrating multimodality into curricular design not only creates a dynamic opportunity for students to use their full repertoire to support content, language, and technology objectives, but it also looks at the meaning making process holistically, viewing learning as multilayered and complex.

iPad implementation in the L2 classroom

Since the introduction of the iPad in 2010, digital, mobile devices have become more popular for both personal use and for use in educational contexts. The iPad has been advertised as a tool to bridge the gap between a smartphone and a laptop (Eichenlaub et al., 2011). With tablet devices, students are conveniently exposed to materials that support the integration of language learning and everyday communication in authentic contexts. The mobile nature of the iPad provides teachers with the ability to provide immediate and personalized feedback, or even the opportunity to provide a flipped classroom by immediately projecting onto a screen and providing flexibility. In addition to mobility, "the iPad features and near limitless combination of apps allow for an increasingly customized and personalized user experience that naturally aligns with student centered, constructivist pedagogies" (Wakefield et al., 2018, p. 244). Through the adoption of iPad as a communication, presentation, and evaluation tool, Manuguerra and Retocz (2011) demonstrated that students were able to participate and engage in ways that were previously unavailable in live lectures. They were able to record notes and rewatch lectures, and to additionally annotate and share notes in real time. As a result, student attitudes and perceptions regarding iPad enhanced instruction were reported as higher.

Despite the increased presence of iPads in formal educational contexts, very few studies have explored iPad implementation in EFL settings (Demski, 2011; Wang et al., 2015). Within a higher educational setting, Albadry (2015) found that iPads preloaded with apps in a Saudi Arabian EFL university context improved student motivation and learning. Findings additionally revealed that student autonomy and collaboration among peers had improved. Xin and Affrunti (2019) found that using the iPad increased potential for vocabulary learning in the areas of word recognition, word meaning, and word application in students at risk of learning disabilities.

Recently, studies on iPad and writing classrooms have heavily focused on either analyzing specific writing output, or on understanding student perceptions regarding iPad for writing (Chang & Hsu, 2011). From basic input such as letter tracing for English Language Learners (ELLs) to extensive annotations and collaborative writing features (Pegrum, 2014). Using a narrative, qualitative case study design, Gabarre et al. (2014) explored the effects a lack of scaffolding with iPad for writing instruction have on both learner attitudes and performance, demonstrating how technology

mediated learning is most effective with clear instructions and guidance. Pellerin's (2014) action research study additionally showcased the trend toward iPads as catalysts to autonomous learning, affording learners with the opportunity to create their own learning environment and meaningful language tasks with the scaffolded guidance of an instructor. The findings show that iPad inclusion creates opportunities for authentic and engaging language learning tasks that encourage learners to develop their autonomy (2014).

It is common to see technology-language driven professional development workshops include instruction for teachers on general knowledge or practical implications of Computer Assisted Language Learning (CALL), yet these sessions often focus on 'What the teachers know and can implement,' without accounting for student background knowledge, feedback or interest in technology implementation. Teachers often attempt to implement technology through mediums such as presentation enhancers, online flashcards, and review games. However, it is essential for teachers to reflect on the following questions before integrating technology in the classroom: 1. How does implementing technology enhance the purpose, objectives, and underlying goals of my lesson? 2. How does integrating technology enable students to meet objectives in authentic ways that are both relevant and engaging?

L2 undergraduate writing classroom context

This research explores the implementation of explicit and implicit technology implementation into an L2 academic writing curriculum, implemented in four undergraduate courses over the course over one academic year, at a public Midwestern University. This research project followed the iPad technology implementation journey from Fall 2018 to Spring 2019 semesters. The course is designed toward first year, international students, and it focuses on developing fundamental elements of incorporating sources of knowledge into academic research papers. It involves reading and reflecting and expanding knowledge about a specific theme. An iPad pro toolkit, consisting of an iPad pro, smart keyboard, case, and apple pencil, is complementarily offered to every first-year student at the university, thus the ESL academic writing course was an ideal location in which to study explicit vs. implicit technology implementation.

This research project followed my technology implementation journey from Fall 2018 to Spring 2019 semesters. Eighty-one students were enrolled throughout that period, with the vast majority of students (75) coming from China. Students were additionally from India (2), Saudi Arabia (1), Malaysia (2), and Indonesia (1). 74 of the

81 students were freshmen, and the other seven were sophomores who had recently transferred. Three of the seven had transferred from international settings (China, Malaysia, and Saudi Arabia). The majority of the students enrolled in the class were science or mathematics majors.

Students are placed in this class after completing the university-required ESL Composition Placement test, which demonstrates a student's writing proficiency in English. The ESL composition test is designed to assess familiarity with university-level writing that involves critical reading and becoming familiar with using sources. Students are evaluated on how well they address and develop a topic from an accompanying reading, and on how effectively they can communicate main ideas. Grammatical accuracy, syntactic variety, appropriate use of vocabulary, logical organization, and awareness of academic rules for use of text sources are often implicated in effective communication, so these are examined and scored accordingly. Students will receive one of 3 possible scores, and a score in the mid-range will result in enrollment in the Academic Writing in English as a Second Language Course.

Explicit and implicit curricular design

iPad task design

Three lessons were purposefully designed and chosen for use to better understand the effects of implicit vs. explicit technology instruction. Each lesson emphasized a different iPad application learned in the iPad professional training from the university. An introduction video using the Adobe Clips application was assigned to students during the first week of classes, a Daily Rehash using the explaineverything application was assigned for students to complete throughout the semester, and a final research presentation using the adobe spark pages application was assigned for completion at the end of the semester.

This first assignment asked students to find a partner and create an introduction video using the Clips application. The purpose was for students to get to know a classmate, become familiar with conducting a short, oral presentation in English, and become familiar with designing a video using the iPad and adobe Clips application. In this assignment, students were required to introduce their partner, including interests, majors, commonalities, differences, and basic background information. Through this assignment, students were required to be creative in their use of clipart, text, and videography to effectively introduce their partner in English.

The second assignment asked students to provide a "Rehash Presentation" of key concepts and ideas from the previous week's class content. This assignment required students to emphasize key concepts that were covered in the previous class

session in a substantive, interactive, and entertaining way. The purpose was for students to practice synthesizing large amounts of input into a clear, concise, and engaging format in L2 that was easily accessible to their classmates. Using the explaineverything application, students were asked to either incorporate a video or audio running commentary, to include written background components using a live iPencil feature, and to integrate an open browser to visually supplement the presentation.

The final assignment asked students to orally present findings of a final written research paper using the adobe spark pages application. The purpose of this assignment was for students to formally, orally present their research findings in L2 in an informative, visually appealing and engaging multimedia format. Through this assignment, students had the chance to learn the basics of the adobe spark application, and how to convey information in an organized format, including how to publish and share content. Adobe spark was chosen for its ability to visually engage audiences and for the opportunity to create a story as a responsive web page that can be viewed and shared in any web browser.

Implicit and explicit lesson design

Explicit iPad instruction was implemented in one of the two classes each semester, while implicit instruction guided the remaining class through completing assignments with their iPad applications. Explicit instruction consisted of 15 minutes of teacher planned, direct instruction on how to use the clips, explain everything, and adobe spark applications throughout the semester. Preparation for explicit instruction was more time consuming, often requiring more work on the front end of instruction. On average, the researcher spent 2.5 times as long preparing lessons for explicit instruction as compared to the implicit. This included creating in-class demonstrations of the key features of each application in addition to the exemplar used throughout both modes of instruction. During explicit instruction, the instructor was intentional in their role as a facilitator, actively ensuring student involvement through walking around the classroom, and live projecting their iPad onto the screen for easy access for students to follow along. In the clips application explicit instruction, the teacher went step by step, including how to record short vs. long clips, how to edit, how to add clipart and subtitles, and either video record themselves or add pictures from personal devices or the internet to enhance their presentation. During the explaineverything explicit instruction, students were taught how to record live video, use the iPencil interactively, use background frames, apply shapes, add audio tracks, and engage with an interactive browser. In creating the final adobe spark assignment, the basics of the application, including how to choose a themed template, embed

video clips, upload photos, link to an external website, and how to share with others were explicitly taught.

During implicit instruction, each of the three applications were introduced as the main mediums for the three projects. In implicit instruction, the same examples used in explicit instruction were re-used. However, the subsequent 15 minutes were not used to explicitly teach certain features of the applications but allotted for students to self-explore features. During this time, the teacher gave freedom for students to explore the same features explicitly demonstrated in the other class. She also walked around the classroom observing student use of the application and encouraging students to explore and ask questions as they arose. The teacher was clear in verbally offering to assist with the same features of all applications in each mode of instruction.

Methodology

This study adopts an action research approach, with the researcher actively participating in instruction. The teacher-researcher was responsible for curriculum design, lesson instruction, and product evaluation in all four classes over the course of one academic year. Data from multiple sources were collected to better understand and explore the effects of implicit and explicit instruction using iPad applications. Multiple methods of data collection were used, including classroom observations, field notes/reflective teacher journals, student product samples, and informal student interviews. Classroom observations informally took place throughout each semester, with specific field notes taken on days of iPad application lessons. After reflection, field notes were later expanded into jottings and conceptual memos, which later became an integral component of the teacher's longitudinal reflective journals. Reflections in journals included but were not limited to jottings on curriculum design, pedagogical implementation, challenges, adaptations to challenges, student questions and reactions, and assignment process and product. Throughout the academic year, the researcher informally gathered student feedback on explicit and implicit instruction. Additionally, components of student submissions were also used as sources of data.

Findings

Exploring explicit and implicit creation process

Observations of the effects of both explicit and implicit instruction on the student

creation process of the three assignments over the course of the academic year varied greatly. A summary of both affordances and limitations of explicit instruction are provided below:

Table 1. Summary of affordances and limitations of explicit instruction

Affordances	Limitations
• Increase of students on task within the application • Increased time in creation of the product • Increased “in depth” application exploration • Increased autonomy in self-exploration • Guiding framework to scaffold students at various levels • Increased questions directed toward the instructor	• Decreased time for peer to peer interaction, sharing, and teaching • Decreased use of L1 • Decreased autonomy and self-directed discovery • Decreased interest for students who were already familiar with the features of the application • Decreased opportunities to explore any features that were not explicitly demonstrated by the teacher

Through explicit instruction, the researcher noticed an increase in students on task, at least on task and exploring within the application. It is interesting to note that though explicit instruction, students were not always following exactly along with the teacher, however students who were “off task” were often still exploring within the application. For example, if the teacher was explicitly teaching how to add a live browser within a video application, students were often exploring “next steps" of browser implementation, such as embedding videos, searching for specific websites, or understanding how to add live video commentary to the videos. When students explored within the application and found something interesting, they were less likely to share with a peer, since the instructor was often leading discussion at this time. In explicit instruction students felt more freedom to explore specific functions of the applications in depth than when given the freedom to explore the application on their own. While observing when teaching from the back of the room during the eplaineverything explicit instruction lesson, the instructor noticed three students out of the application itself; during the same allotted time for implicit learning of the explaineverthing lesson, eight students were seen out of the application. It was also clear that students in the explicit instruction class generally spent more time overall on the process of creating the finished product. This was observed both from time spent in-class creation process and confirmed through student feedback. Additionally,

through explicit instruction, students felt comfortable to ask specific questions to the teacher during instruction, though peer to peer talk was less frequent compared to implicit instructional time. The average number of questions asked pertaining to the iPad applications in both explicit instruction classes was 11, as compared to 5 in implicit instruction classes.

Explicit instruction also provided students who were less proficient with either language or technology with a framework for which it was easier to follow instruction. This was evidenced though examples of higher grades on products of explicitly taught lessons as compared to other assignments. Specific guidance toward certain features of the application provided an opportunity for students to explore features on their own and allowed them to develop ownership and autonomy in their exploration and discovery. Through informal conversations with students, several confirmed these assignments as the first time they had ever successfully created a video in another language. When pressed further, one student explained that though technology is commonly used on a daily basis and as a study tool in his home country, it was rarely used in a creative setting. Explicit instruction also provided a framework for accountability with other students. With explicit instruction, there was an unspoken understanding that each student would be familiar with each feature explicitly taught, so particularly for collaborative projects, students were more likely to pay attention in order to adequately contribute to the finished product. This was clearly observed in the adobe spark videos, when students would often suggest using features that were explicitly taught to their partners.

Through implicit technology integration instruction, the researcher also noted several affordances and limitations on the process of completing the three assignments. A summary is listed below:

Table 2. Summary of affordances and limitations of explicit iPad instruction

Affordances	Limitations
• Students increased use of L1 • Students were more likely to share and teach with peers • Students engaged in more autonomous and collaborative exploration	• Decreased in-depth exploration of specific features • Focus on meeting minimum requirements • Hesitation to ask instructor specific questions

In time given for implicit instruction, students were more likely to use their first language (L1) when asking questions to peers or discussing new findings with classmates. In around 80% of instances noted in teacher observational journals,

students used L1 for peer to peer interactions during time allotted for implicit instruction. Since the teacher was not using English to facilitate instruction, the students felt more comfortable to communicate in L1 when exploring and creating amongst themselves. Additionally, students were more likely to teach each other when they found an interesting feature, than to just keep to themselves. Peer to peer interactions and collaboration were much higher in implicit instructional time, though (as previously mentioned), it most often took place in student L1. This shows how providing students with freedom in technology exploration allows the opportunity not only for autonomous learning, but also for increased collaboration and shared learning amongst peers.

In implicit instruction, students also spent less time exploring different features in-depth, and quickly moved from one feature to another. On average, student assignments were submitted sooner in the implicitly taught classes as evidence in submission times on Canvas. Additional observations saw students complete and submit assignments in the span of a class period in implicitly taught lessons, which never occurred in explicitly taught lessons. This seemed to indicate a surface level exploring mindset, quickly transitioning to the next feature if they didn't find an attribute appealing. In implicit instruction, students seemed more likely to find the features that would help complete the project while fulfilling the minimum requirements, rather than to take the time to explore for possible future use. Despite the teacher's encouragement to take time to explore the application, students seemed most focused on understanding features that would help them finish quickly. The teacher occasionally asked students if they had tried a certain feature if she had seen them quickly open and close it and was often met with a shrug or an "It's hard" when asked why they didn't include it in their assignments. In implicit instruction, students seemed hesitant to ask the instructor questions, and seemed determined to either find answers on their own, or to use their L1 to ask a close peer for help. In many ways, this facilitated autonomous and collaborative learning.

As previously mentioned, the researcher found that more students tended to be entirely off task (out of the application) during implicit instruction as compared to explicit instruction. Even though the instructor continued to walk around the classroom in the same way as explicit instruction, it was obvious that the freedom given to students to self-explore the application provided increased opportunity for students to be off task outside of the application itself.

Exploring explicit and implicit products

The researcher also noticed several differences when exploring the overall products submitted in both the implicit and explicit instruction classes. Specific affordances of

submitted products of the explicitly and implicitly taught classes are summarized below:

Table 3. Comparisons of affordances of explicit and implicit iPad instruction on final products

Affordances	Limitations
• Less time consuming • Final products closely aligned with submission guidelines or examples	• Products overall longer in terms of both time (videos) and content (web pages) • Explicitly taught features were more prevalent in final products, demonstrating increased variety • More risks were taken in attempting to add features creatively beyond meeting minimum requirements

In classes that were taught using explicit technological instruction, the multimodal projects were generally longer in both length of time and words used. In their final presentations, over 70% of the students in the explicit instruction class exceeded the maximum time requirement; only 33% of students exceeded the same time requirement in implicit instruction classes. Additionally, in the explicit instruction classes, the features that were taught were used much more frequently throughout the final submissions, and there was a greater variety in features creatively used in the finished products. For example, in their explaineverything videos, over 50% of submissions from the explicitly taught lessons embedded a self-video, whereas this feature was never used in the implicitly taught class, with students preferring the audio voice function. Students taught through explicit instruction generally took more creative risks and were not afraid to try features that went beyond project requirements. In classes that were taught through implicit means of instruction, finished projects more closely resembled the example. Around 3/4 of the adobe sparks submissions in the implicitly taught classes shared every feature of the example. In the explicitly taught class, the percentage was significantly lower. Less creative liberties were taken, and products often fulfilled basic project requirements.

Adaptations to challenges and pedagogical implications

Throughout the technological implementation journey, the teacher faced several learning moments that resulted in adaptations to instruction from the first to second semester of implementation. Firstly, it should be noted that simply providing an example of the finished product during instruction and assuming students would clearly navigate key features of the applications themselves was not sufficient. Teachers assume that students are superior to them in digital knowledge, but this is often not the case, particularly when technology is used for educational purposes. Throughout the second semester, in addition to providing an example of a finished product, the teacher added explicit instruction of key application features to their lesson instruction.

Despite best intentions, the teacher's general words to students during implicit instruction, for example, "Open the application! Explore! Ask for help!" were rarely reciprocated with appropriate student involvement. Students are often nervous to take risks or to be creative when given too much freedom, fearing that "differing too much from the norm" could affect their grades or others' perceptions of them. Instead throughout the second semester, the teacher offered specific guidelines to direct students toward key features with which she wanted them to interact.

General instructions in relation to specific product requirements such as "Be creative!" or "Add pictures" were often vague and did not adequately articulate the teacher's expectations. They were not helpful to students and did not provide a specific frame on which students could build their project. In the second semester, separate and clear rubrics for content, language, and technology expectations were created. This helped in assessing students fairly and holistically, and also provided students with a framework on which to create their final products. It is essential to create valid rubrics in assessment, and to ensure that what the rubrics say clearly matches the teacher's intention. During the first semester, the teacher felt frustrated if students technically met minimum rubric requirements, yet their quality of work did not match with the teacher's expectations. Recreating rubrics that clearly defined and aligned with teacher expectations ensured open communication and clearly defined expectations.

Before implementing any technology, it is essential for teachers to take time to become familiar with and learn the technology they plan to use in the classroom. Teachers should not rely on technology professional development that does not take both the individual and the context into consideration, nor should they assume the students are more familiar and knowledgeable regarding technology. If the teacher does not invest time into learning both technology and how it best fits into their teaching context, they cannot be effective in implementing holistic instruction. The

most effective technology implementation takes place when teachers believe in the power of the technology they are teaching and understand how to maximize learning within their specific contexts. This creates a space for students to not only meet technology objectives, but also to explore meaning making holistically. This will occur if teachers take sufficient time to learn, explore, and to view technology implementation as more than a required box to check.

The comparison of explicit and implicit technology implementation in an undergraduate, L2 context has several pedagogical implications. After implementing both implicit and explicit technology instruction into the classroom, it is clear that both teachers and students will benefit from a "guided freedom" approach to technology implementation. This methodology recognizes the affordances of both explicit and implicit instruction and suggests guided freedom as a frame for which to outline clear guidelines for expectations, yet also to provide opportunities for students to explore and develop autonomous learning. Through the implementation of detailed assignment requirements and rubrics that emphasize content, language, and technology objectives, students can understand teacher expectations from the start. While the use of exemplars can create a nice framework for learning, teachers should consider providing varied exemplars that support creativity. A guided freedom approach to technology integration may be practically exemplified through providing mini video tutorials of specific application features allowing student choice in watching and following videos of their choosing. This provides an added benefit of asynchronous learning, providing students with the opportunity to rewatch and relearn both content and language at their own pace. Sample assignments using a guided framework approach may ask students to explore and reteach specific features in partners or small groups, providing freedom with accountability.

Conclusion and future directions

This study outlines the benefits and limitations of both implicit and explicit iPad pro instruction in an undergraduate, L2 writing classroom context. The findings contribute to a better understanding of curriculum and task design that support instruction to meet content, language, and technology objectives. Three tasks were specifically designed and chosen to better understand the effects of implicit and explicit technology instruction on both student working processes and submitted products.

Main affordances of explicit technology instruction on learning processes included an increase of students on task within the application, an increase in time for the creation of a product, increased “in depth” application exploration, increased autonomy in student-exploration, the creation of a natural scaffold for students at various levels, and an increase in student questions directed toward the instructor. Main affordances of implicit instruction on the learning process included increased use of L1, increased peer to peer sharing and collaboration, and increased student engagement with more autonomous and collaborative exploration. Key affordances of explicit technology implementation on submitted products included more comprehensive projects in regard to both length of time (videos) and content (web pages), more variety in use of explicitly taught features, and more willingness of students to take risks when attempting to add features creatively beyond meeting minimum requirements. Key affordances of implicit instruction on submitted products included less time constraints for students and submitted products that closely aligned with submission guidelines.

Whether implementing technology through explicit or implicit instruction, it is essential to remember that if lesson goals and objectives can be met without technology, implementation is ineffective. Before implementing technology, teachers should take time to reflect and consider what the technology addition brings to the overall content, goals, and objectives of a lesson. While technology objectives are often viewed as separate from the “main goals” of learning, teachers should consider how technology implementations can promote holistic learning, focusing on promoting and developing the multilayered complexity of the entire learning process.

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