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Exploring the technological affordances of SimpleMind in supported academic writing: a mind-mapping software analysis

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Abstract

This research investigates EFL undergraduate students' utilization of cross-platform mind-mapping software and the factors shaping their choice of devices and timing when employing SimpleMind to enhance their academic writing skills. Grounded in Mayer's (2019) cognitive science principles of learning, this study posits that offering EFL learners dual channels for processing information, encompassing both visual and verbal modalities, enhances information retention and reduces cognitive load. SimpleMind, a digital graphic software, has the potential to support learners in this dual coding process of information, provided it is used thoughtfully. Through the framework of the affordance-actualization theory, this research advocates for empowering language learners to proactively discover and leverage SimpleMind's affordances to craft a customized strategy aligned with their specific academic writing learning environment. This paper presents preliminary findings from a larger study involving 71 Japanese first-year students. They explored SimpleMind's features to cater to their individualized academic writing learning preferences.

Keywords: academic writing, digital graphic software, affordances, EFL learners

Introduction

Enhancing academic writing with digital software

Extensive research has underscored the inherent challenges of writing in a second language compared to one's native language (L1) (Javadi-Safa, 2018; Ströbel

& Wiechmann, 2020). Notably, inadequate proficiency in English writing skills can have detrimental effects on academic writing performance (Khadawardi, 2022). Fortunately, there has been a substantial body of research investigating the impact of digital tools on writing, particularly from a Computer-Assisted Language Learning (CALL) perspective. Digital graphic tools, in particular, have garnered attention for their potential to enhance foreign language (FL) learners' writing abilities.

Over the past two decades, studies have consistently shown that integrating technology into the classroom, in addition to its role in language instruction, has positively contributed to students' academic writing skills through various digital software applications (Strobl et al., 2019; Javier, 2022). Noteworthy examples include the utilization of mind-mapping digital software in collaborative EFL learning environments, which has been shown to improve participants' retention of course content (Kılıçkaya, 2020). Additionally, employing digital graphic writing activities through tools like Inspiration has facilitated critical reflection on assigned texts and led to enhancements in complex cognitive structures to organize their conceptual system (Hassanzadeh, Saffari & Rezaei, 2021).

Digital literacy: Exploring affordances
Numerous studies have demonstrated the overall effectiveness of technology, particularly digital software, in language learning. However, the assumption that English as a Foreign Language (EFL) learners inherently possess the necessary digital literacy skills to effectively utilize digital tools in the classroom may not be entirely justified. EFL teachers often grapple with the challenge of nurturing their students' digital literacy (Hafner et al., 2013) while striving to provide engaging and relevant materials. Conversely, students frequently lack the linguistic and cognitive tools required for critical reflection on their digital practices. Although many learners navigate emergent learning applications intuitively, they seldom evaluate the suitability of digital resources in alignment with their individual learning objectives.

Furthermore, there is a notable gap in research regarding the underlying meaning-making practices concerning the affordances of digital tools and learning approaches (Takana-Ellis, 2022). Existing research often offers theoretical perspectives on multimodal and digital literacy, lacking empirical data and neglecting to identify how EFL learners may exploit the specific meaning-making capabilities of digital software for educational purposes. This raises the pivotal question of whether EFL learners' self-guided use of digital graphic software, such as SimpleMind, truly fosters the development of digital literacy in EFL academic writing contexts. Few studies have delved into students' realization of affordances and their attitudes when choosing between these two approaches (computer-based and mobile-based) to comprehend the factors shaping their selection of language learning devices.

To address this research gap, our study seeks to investigate the determinants influencing students' decisions when opting for these methods in academic

writing activities. The overarching research question guiding our investigation is as follows:

To what extent does the self-directed use of digital graphic software like SimpleMind contribute to the development of digital literacy among EFL academic writing learners?

Method

Participants and study design

This study involved 71 Japanese first-year students enrolled in a pre-intermediate level course of the Common European Reference Framework at a private school in Tokyo. They participated in an academic writing course aimed at enhancing their language skills. Over a duration of fourteen weeks, these students documented their learning experiences and insights in weekly reflective journals, which were shared among their peers. In these journals, students were instructed to articulate their strategic utilization of SimpleMind, a digital graphic software, and evaluate its perceived advantages for their academic writing development. Introduced in 2008, SimpleMind has evolved into a widely-used mind mapping tool across various platforms, such as PC, iOS devices and Android devices. It offers users a versatile mind-mapping application designed to assist in visually organizing thoughts, ideas, and information. Furthermore, students collaborated in pairs to compile a collection of SimpleMind practices tailored for language learning purposes. This comprehensive approach allowed for an in-depth exploration of students' experiences and practices with SimpleMind as a tool for academic writing enhancement.

Task design and theoretical framework

The design of the digitally-mediated educational environment adhered to the principles of self-determination theory (Agawa & Takeuchi, 2016; Ryan & Deci, 2012), which prioritize fulfilling learners' fundamental needs for competence, autonomy, and relatedness. The incorporation of the SimpleMind application into academic writing activities, encompassing tasks like brainstorming, planning, mind mapping, outlining, and revising, aimed to bolster learners' self-assurance. This increased confidence, coupled with the development of digital literacy, was anticipated to enhance the learners' sense of competence.

Furthermore, the learning environment was intentionally crafted to be supportive of autonomy. Learners were granted the flexibility to interact with visual learning materials, including options to customize text sizes, incorporate images, and select colors, all facilitated through SimpleMind. This design allowed learners to exercise autonomy in their learning journey. To promote a sense of community and togetherness, learners were encouraged to share their writing activities with their peers. This communal aspect was intended to foster a feeling of relatedness among participants.

Data collection and analysis

Learner data, comprising pre- and post-surveys along with learning journals, were collected and subsequently organized using Microsoft Excel for initial analysis. The data were systematically categorized based on thematic elements, specifically focusing on skills and the realization of affordances.

For the scope of this report, attention was directed solely toward data related to the mind-mapping phase within the realm of academic writing. This subset of data was utilized to construct a five-step model elucidating the actualization of affordances. This model sheds light on the intricate process of individualized and purpose-driven affordance creation in the context of academic writing facilitated by mind-mapping techniques.

Results

In Table 1, an analysis of the affordances offered by SimpleMind to support academic writing is presented. The table is generated from a theme-based coding approach, where similar comments from students are grouped into categories for a more comprehensive analysis. The first column enumerates the devices available for downloading the free version of SimpleMind. The second column outlines the features of this digital graphic software that can be employed to structure second language (L2) text. It's important to note that this list is not exhaustive; it encompasses only those features identified by the participants.

Participants exhibited an adept use of the SimpleMind during the trial on Mac/Windows. They harnessed the color extension to make choices for counterarguments in persuasive essays and to annotate contradictory information. By simply clicking on branches, a pop-up menu emerged, offering a range of colors and editing functions. Both the trial free software and the mobile app provided a free-form layout function. However, it's worth mentioning that the ability to share work and add external resources to mind maps was exclusively available in the trial version on PC. The third column encapsulates learners' synchronized actions, illustrating how they employed the SimpleMind in drafting their academic essays, essentially manifesting the realized affordances.

Before the intervention, some participants shared their prior experience with the SimpleMind app in the pre-survey. They frequently utilized the free-form layout and color functions to create study schedules. Additionally, they employed the sharing function to produce high-quality PDFs for printing, as highlighted in the following quotations:

> Last semester, I used the SimpleMind app on my MacBook. I employed the free-form layout and color function to create weekly learning schedules. I would click on the share button, which allowed me to convert my mind maps into high-quality PDFs for easy printing.

> During a library visit, the librarian informed me of the return dates for borrowed books. I created a mind map on my phone using the Timeline

Table 1

Affordance's constituent elemental factors for SimpleMind-supported academic writing

Type of device	Features of SimpleMind	Leaners' synchronized actions	Actions for affordance realization	Relevant goals for organizational setting
PC (SimpleMind trial – Mac/ Windows)	Free-form layout and colors	Choose a random layout and suitable colors	Choose two different colors for counter-arguments in persuasive essays	Goals:
	Share mind maps as pdf file	Use the sharing button to extract the file	Sync (i.e. Dropbox, iCloudDrive, Google Drive…)	– enhance digital literacy for EFL academic writing on different kinds of learning devices
	Add images, icons, labels, and checkboxes	Use adding functionalities	Download relevant sources from the Internet to add	– enable meaningful engagement with mind mapping strategy in the target language
	Add links to documents or web pages	Use adding functionalities	Copy and paste relevant links from the Internet	
Smartphone/ tablet (SimpleMind free)	Free-form layout and auto-color	Choose suitable layout	Closely examine the best layout for particular types of essays	– support vocabulary and well-organized structure development
	No sharing function	Take a screenshot to share	Save the screenshot to internal storage	
	No function to add images, icons, labels, and checkboxes	Create more branches and sub-branches to explain ideas	Write ideas in more detail	
	No function to add links to documents or web pages	Take a screenshot of a mind map and put it to the 3rd app (i.e., GoodNote to add more information)	Save the screenshot to internal storage, then paste it into the 3rd application	

template on my PC to visualize these deadlines. The sharing button helped me extract the picture, which I set as my desktop background to prevent missing any deadlines.

The fourth column details the actions taken by participants after reflecting on their learning objectives and strategies:

Following technical training on SimpleMind, I gained insight into selecting appropriate colors for main ideas and counterarguments. When I couldn't bring my laptop, I found using my smartphone feasible, provided I could choose an appropriate layout.

I consistently carry my iPad to lessons as it offers a larger screen for comprehensive mind map viewing. Whenever my teacher requests mind map submissions, I swiftly capture a screenshot and send it via email.

These objectives were unique to each learner and served specific purposes. Although not all of them were initially envisioned as educational goals (column five), they collectively contributed to the overarching aim of enhancing digital literacy for academic writing.

Discussion

The model presented illustrates a noteworthy shift in digital graphic practices within the field of EFL academic writing. Prior to engaging in reflective activities, SimpleMind on PC primarily served as a digital scheduling tool. Furthermore, the sharing feature was primarily utilized for printing PDF files, with little perceived relevance within the academic context. However, post-reflection, the use of the sharing function underwent a substantial transformation. It expanded to encompass synchronization of mind maps across various cloud-based platforms such as Dropbox, iCloudDrive, and Google Drive, essentially creating comprehensive documentation of mind map products. Additionally, users began to integrate external links and web pages, effectively amalgamating the mind maps generated through the SimpleMind trial version into a rich source of information for subsequent revisions.

Moreover, the sharing and adding features of SimpleMind, available on both smartphones and tablets (without extension), were harnessed in an innovative and flexible manner that allowed individual learners to generate new ideas and complete tasks on their mobile devices with remarkable efficiency. Some learners exploited the SimpleMind trial version to effortlessly incorporate images, icons, labels, and checkboxes, while others seamlessly switched between the trial and free versions, alongside a third application, to bridge any gaps. These individualized approaches underscore the dynamic potential of the software's features, which evolved into distinct affordances for each learner.

Collectively, these affordances significantly heightened engagement with academic writing, a task that would have proved challenging for most without the support of this digital graphic software. This brief analysis effectively illustrates the diverse pathways to digital literacy, all of which align with the overarching objective of promoting digital literacy in the context of EFL academic writing. The provided application became an accessible tool that facilitated meaningful engagement with students' ideas.

In relation to the self-determination theory, the pre-writing activities involving

SimpleMind empowered learners with a sense of autonomy, granting them the ability to choose and comprehend the usage of platforms that aligned with their interests. Moreover, the digital graphic software nurtured a sense of competence, offering valuable support in the task of planning and structuring their essays. Lastly, the ensuing discussions among students regarding their final essays bestowed a social purpose upon the writing process, bringing them closer as a group and facilitating the provision of peer corrective feedback.

Conclusion

This brief excerpt from the preliminary analysis of technology affordances within the context of SimpleMind-supported academic writing offers valuable insights into the advantages of utilizing digital graphic software in language learning. Specifically, students not only found support in their specific learning tasks but also, fundamentally, in fulfilling their basic human needs, encompassing autonomy, competence, and relatedness.

The analysis underscores that language learners possess a fundamental understanding of how digital graphic software can be leveraged for language acquisition. By aligning the use of SimpleMind with particular learning objectives, such as the ability to compose English academic essays, learners are incentivized to explore software features that facilitate their goals. In this broader perspective of digital literacy, extending Hafner et al.'s (2013) definition, it becomes apparent that learners require technical proficiency in navigating SimpleMind features, recognizing that these features manifest differently across various platforms, including PC and smartphone or tablet. Additionally, cultivating a sense of curiosity becomes imperative to effectively harness these features to cater to their specific needs.

Particularly, individual learners have successfully realized diverse affordances, thus creating a repository of best practices for fostering digital literacy within the context of EFL academic writing. Recognizing that this is an iterative process, educational goals are expected to adapt in response to evolving learning requirements and technological advancements in digital graphic tools. Further study would thoroughly investigate the role of digital graphic software in enhancing EFL learners' writing skills. Anticipated outcomes of this analysis include revealing the intricate interplay between different affordances across various mediums, encompassing both paper and various devices. This exploration is likely to further underscore the interconnected nature of individual tasks within the broader language-learning process.

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Author bio

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