A Constructivist-Ecological Model in Utilizing Collaborative Platforms to Improve Academic Writing Skills: A Conceptual Framework

Eric Sulindra[1*], Anastasia Nelladia Cendra[1], Indriana Lestari[1]

[1]*Universitas Katolik Widya Mandala Surabaya, Indonesia*

eric@ukwms.ac.id[*]

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Abstract

In language learning, digital platforms have offered unique opportunities to the learners to expand their skills and competencies beyond their standard level. In academic writing, collaborative platforms, or digital collaborative platforms, have been widely used by writers to achieve their writing goals. However, these platforms have been used in random manners and ways, according to different degrees of the writers' familiarity to the platforms. There is no structured pattern of how these platforms are effectively used and able to support the writers optimally. Therefore, the paper is conceptualizing a proposed model of how the digital collaborative platforms may function as affordances in supporting the academic writers achieving their goals. The affordances technically function as a bridge between the constructivism approach and the ecological perspective. affordances refer to opportunities for action that the environment provides, which learners perceive and utilize. The learners' ability to use the affordances determine how they construct the meanings and ideas, especially in their writing. The affordances are available within the environment, creating an ecology for the writers, under the ecological perspective lens. A five-stages model is presented in the paper to explore how a writer is supported by the collaborative platforms in each stage to reach their goals. The stages are initial writing task; interaction with affordances; knowledge construction; feedback and reflection; and finally, development of writing proficiency. The elaboration is done within an ecological perspective and the principles of constructivism. Future research would benefit optimally if focusing more on the empirical aspects of the model and how the effectiveness of digital tools in creating affordances in the five-stage-model intervention.

Keywords: constructivist; ecological perspective; academic writing; digital collaborative platforms; affordance

Introduction

The integration of collaborative platforms, or in a more descriptive mode: digital collaborative platforms, in education has become increasingly relevant as technology reshapes learning environments. Digital platforms offer unique opportunities to enhance language acquisition, including in improving students' writing skills (Biju & Rahman, 2023; Fakhruddin et

al., 2024). Several studies have pointed out how digital tools accommodate collaborations, critical thinking, and authentic problem solving in writing (Behrend, 2014; Howell, 2018; Kesler et al., 2022). For instance, Howel (2018) found out that digital tools can be used to produce digital, multimodal arguments needed in a good piece of writing. Another study by Behrend (2014) pointed out the actual experiences of students in learning could be enhanced using online academic writing resources embedded within a course.

Digital platform integration to the writing process aligns well with constructivism theory, as it allows students to actively engage with their writing environment and leverage diverse resources to construct meaning. Researchers in educational psychology and pedagogy have found out how the social world of the learner and the interaction between them have facilitated learning (Jasrial & Zaim.M, 2023; Mensah, 2015; Shah, 2019). The learning tools, including the current digital online tools, therefore, can provide significant in mediating learning, helping learners to give richer experience in learning and to construct meaning or knowledge (Ahmad et al., 2020; Feyzi Behnagh & Yasrebi, 2020; Limbong et al., 2024). The two key features highlighted in constructivism - the relations between a learner with the physical and social environment (interactions), as well as the relationship between tools, learning facilitation, and the learners-experiential learning (Suhendi et al., 2021; Vygotsky, 1978) - are embodied in the way digital platforms are utilized to enhance how students construct their knowledge. By enabling students to engage with content in ways that encourage collaboration, critical thinking, and real-world problem-solving, constructivist digital pedagogy in ELL shifts the focus from passive knowledge absorption to active knowledge construction.

This kind of interaction between the learners and environment can be explained in more focus using the ecological perspective, an approach which is significantly influenced by the principles of socio-constructivism, since it marks out the great importance of interactions with the environment. In academic writing context, Bronfenbrenner's nested ecosystem model puts the learner or the writer within a layered environment consisting of micro-system, meso-system, exo-system and the macro-system (Bronfenbrenner, 1977; Nazari et al., 2017). The micro-system covers the functional, physical, cognitive and affective aspect of the writer as well as the interaction with the immediate environment. The meso-system is a layer providing the connection between the structures of the learner's writer's micro-system with the teacher and his or her parents, between his or her school and neighborhood, etc. (Bronfenbrenner, 1977). From an ecological point of view, investigating how each component in a context is related to other components, both the writer and the surrounding environment, plays a part in the learner's writing process. Later, Bronfenbrenner added the chrono-system as an interacting linkage between the different layers of the nested ecosystem model (Bronfenbrenner, 1977; Nazari et al., 2017).

These interactions have been well-documented in a number of empirical studies. A study by Wuryaningrum (2023), for instance, showed that knowledge in a particular macrosystem where the writer is writing has a significant effect on the idea generation and reasoning abilities of the writer. Another earlier study by Slomp (2012) has marked out that in the development of writing skills, the processes include general pedagogical processes like writer's workshops, student and teacher conferences, peer conferences, or class discussions. These continuing forms of interaction between students and individuals in their immediate environment, associated with

Bronfenbrenner's ecological lens (Bronfenbrenner, 1977; Nazari et al., 2017; Onwuegbuzie et al., 2013) give impact in directing the development of student writing skills.

Within this integrated framework, affordances serve as the critical operational mechanism that connects constructivist principles with ecological contexts. In the ecological perspective, affordances refer to opportunities for action that the environment provides, which learners perceive and utilize (Gibson, 1982; Nguyen, 2025). This means affordances are not simply objective features of digital platforms; rather, they emerge from the dynamic interaction between the learner's capabilities and the environment's possibilities. From a constructivist standpoint, learners don't passively receive affordances—they actively interpret and engage with them to construct meaning. From an ecological standpoint, affordances only exist when perceived by a learner capable of acting upon them within a specific context. According to Gibson (1982), affordance itself a fact of the environment and a fact of behavior. It is both physical and mental. Gibson pointed out that affordances exist specifically at the intersection of organism capabilities and environmental features, depending fundamentally on the fit between an individual's physical capabilities and the physical properties of the environment.

However, the intersection pattern of constructivist and ecological approaches with technology in the context of the writing process has not been widely explored. So far, most research deals with the existence of constructivism in digital technology, which can be utilized for enhancing language skills such as writing. No research has been conceptualizing a particular pattern of the intersection. Therefore, this study would explore how the integration of technology in academic writing is implemented using the framework of constructivism and the ecological perspective. It examines how technological tools (such as Learning Management Systems, collaborative platforms like Google Docs, or feedback software) offer technological affordances, in the lens of ecological perspective (Chong et al., 2023; Thoms, 2014; Van Lier, 2010), that support constructivist learning principles (Chen & Zhang, 2022; Hammoodi & Alishah, 2020; Singh, 2019) in developing writing skills. The paper also analyses how the learning environment created by technology shapes learners' ability to construct knowledge through social interaction, dynamic engagement with linguistic resources, and feedback mechanisms. This paper points out a reality where knowledge construction in language learning is actively shaped by both social and environmental interactions with technology (Feyzi Behnagh & Yasrebi, 2020; Lathifah, 2024; Pribadi et al., 2022). By focusing on affordances - opportunities that technology provides for interaction and feedback (Jonathans & Metboki, 2022; Miftah & Cahyono, 2022; Shirani, 2020) - this paper describes digital tools as integral to shaping learners' abilities to construct knowledge in contextually rich, dynamic settings. Epistemologically, it is grounded in constructivist beliefs that knowledge is co-constructed through active engagement, collaborative processes, and scaffolding (Mhlongo et al., 2023; Schnaider, 2023; Suhendi et al., 2021). The ecological perspective complements this view by considering the role of the learning environment, emphasizing how students' interactions with technology and peers dynamically influence language development.

Method

Literature Review

Constructivism

Constructivism is the central foundational theory, emphasizing that learners construct knowledge through meaningful engagement and reflection (Hammoodi & Alishah, 2020; Mensah, 2015; Tungka, 2018; Vygotsky, 1978). Learning is socially mediated; peer collaboration and feedback help learners build knowledge. Learners can construct meaning more effectively when knowledge is presented in real-life contexts or situations that simulate them.

The theory of constructivism stems from the original concept of Vygotsky's social development theory, in which learning is regarded as a process of stimulus and response. In Vygotsky's original concept of learning, between the stimulus and response, there is a mediation (Vygotsky, 1978). The mediation state takes place between the learning stimuli and the learner's responses, mediating the learning process and making it specifically meaningful for the learner. The learner would actively modify the stimuli and produce the behaviour which is the result of the stimuli modification by mediation (Vygotsky, 1978). The modification stage occurs in an intermediary zone called Zone of Proximal Development (ZPD). The direct manipulation of learning conducted by the learner is the central concept of constructivism, where the learner constructs meaning, or manipulates the stimuli to construct a new and unique knowledge (Lantolf & Poehner, 2011; Vygotsky, 1978).

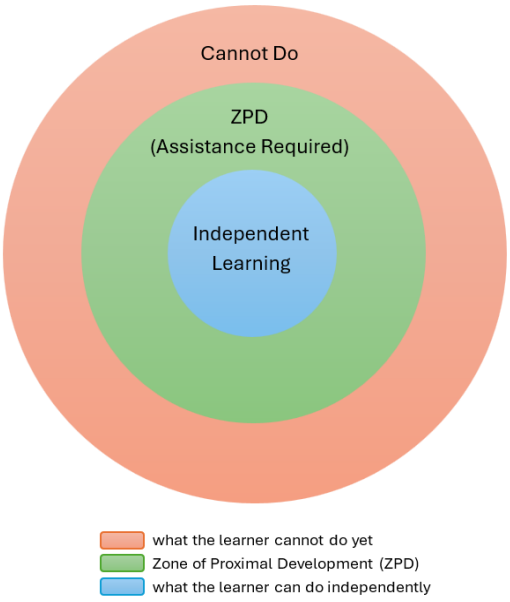

Diagram 1. Zone of Proximal Development in Constructivist Framework

There are two key features highlighted in constructivism, the relations between a learner with the physical and social environment, and the nature of relationship between tools and learning facilitation (Vygotsky, 1978). More research and researchers in educational psychology and pedagogy then found out how the social world of the learner and the interaction between them have facilitated learning (Jasrial & Zaim.M, 2023; Mensah, 2015; Shah, 2019). Moreover, the research by educators and psychologists also reveals that learning tools, including the current

digital online tools, are significant in mediating learning, helping learners to construct meaning or knowledge (Ahmad et al., 2020; Feyzi Behnagh & Yasrebi, 2020; Setiawan et al., 2020; Vijayavalsalan, 2016). Then, the original constructivism is further extended into socio-constructivism, or socio-cultural theory. The mediation process occurs in the interrelations between the learner and the socio-cultural environment.

Vygotsky's Sociocultural Theory emphasizes that learning occurs when a more knowledgeable other (teacher, peer, or even technology) provides scaffolding within the learner's Zone of Proximal Development, known as ZPD (Chong et al., 2023; Lantolf & Poehner, 2011; Vygotsky, 1978). The ZPD represents the gap between what learners can achieve independently and what they can achieve with guidance and support.

Ecological Perspective

The Ecological Perspective expands on constructivism by focusing on the interaction between learners and their environment (Bronfenbrenner, 1977; Van Lier, 2010; Vorobel, 2017). A key focus in ecological perspective of learning is on the proximal processes or 'the engines of development' between the students and their immediate learning and teaching environments, which affect the desired developmental changes in students (Bronfenbrenner, 1977; Kek & Huijser, 2016). The environment of ecological perspective consists of four major types of environment: the microsystem, the mesosystem, the exosystem, and the macrosystem (Bronfenbrenner, 1977; Chong et al., 2023). Firstly, the microsystem is the system of interactions between the learner and the closest surroundings like parents, school teacher, tutors and takes place in a setting such as school, home, or workplace. The major components of the system are time, place, physical features and the activities. Secondly, the mesosystem is the interrelations of the learner at a particular point in his or her life such as the interrelation with peer groups, local communities, church members, and other similar communities. To conclude, a mesosystem is a collection of microsystems (Bronfenbrenner, 1977). Then, the exo-system is an extension of a mesosystem to embrace other broader social structures. The example of an exo-system of a learner is his or her society, town, and probably the chain-store system of his or her work place or the university where he or she studies. Finally, the macrosystem, it is a system of greater formal and informal, social, legal, political structures surrounding the learners. They include the political system of a country, its ideology and the economic condition of the province, state, or country where the learner lives. In ecological perspective, these interrelations between the learner and the systems of environment are the ecology of the learner. This ecological system would impact the progress of learning (Bronfenbrenner, 1977; Liu & Chao, 2018; Thoms, 2014; Van Lier, 2010).

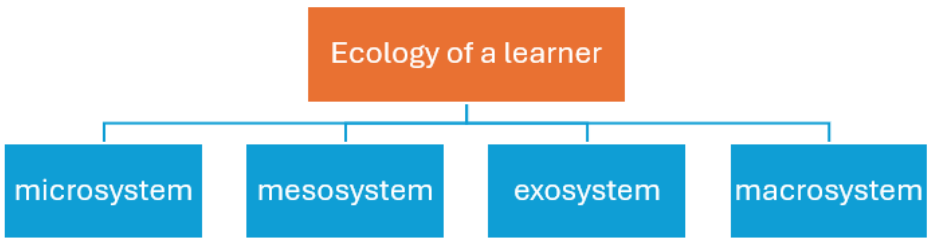

Diagram 2. The ecology of a learner

The Ecological Perspective in language learning broadens the constructivist framework by emphasizing that knowledge construction does not occur in isolation but is deeply embedded in the learner's environment. This perspective highlights the concept of affordances - opportunities or resources within the environment that learners actively utilize to develop linguistic skills. The ecological view suggests that the environment provides learners with various "affordances" that support both individual and collaborative learning, allowing them to build language knowledge through interaction with both social resources and social inputs. This dynamic use of affordances enhances the learner's engagement with language in authentic, task-based contexts, making learning more applicable to real-world scenarios.

There are three key concepts of learning in ecological perspectives, namely affordance, dynamic interaction, and context. The followings are the description of how each key-concept is related to learning, affordances - opportunities or resources - that learners can use to construct knowledge; dynamic interaction - a situation when learners and their environment engage in continuous, reciprocal interactions that shape learning; contextual learning, in which learning is inherently situated in a specific social and environmental context, such as a classroom or social collaborative platforms.

In the ecological perspective, affordances are a critical concept. Affordances refer to the opportunities for action provided by the environment, which the learner can perceive and utilize. The learners' ability to perceive and exploit these affordances influences how effectively they construct language knowledge (Jiang et al., 2024; Mhlongo et al., 2023). Additionally, the ecological perspective underscores the significance of dynamic interaction between learners and their environment. This interaction is not static; it continuously evolves based on the learner's responses to the environment and the environment's responses to the learner (Badwan & Simpson, 2022; Liu & Chao, 2018). By grounding language learning in real-life, contextually relevant interactions, the ecological perspective provides a robust framework for understanding how digital tools creating affordances, to foster active, meaningful engagement with the language, enhancing learners' ability to apply their skills in diverse and practical settings.

The Implementation of Digital Tools in Writing

Several studies have pointed out how digital tools accommodate collaborations, critical thinking and authentic problem solving in writing (e.g. Behrend, 2014; Howell, 2018; Kesler et al., 2022). In a study by Howell (2018), there were interventions in the teaching and learning argumentative writing and investigating these cases: construction of arguments composed of claims, evidence, and elaboration of that evidence; using digital tools suitable for producing digital, multimodal arguments. The finding emerging in the study was scaffolding embedded in the writing process to blend conventional and digital forms; then collaboration was needed and significant consideration of digital tools in mediation of students' argumentative writing. Another study by Behrend (2014) pointed out the actual experiences of students in learning could be enhanced using online academic writing resources embedded within a course. This study focused on providing Academic Language and Learning (ALL) support online, as media of collaboration to construct ideas and knowledge. The mediating artefact proved to be useful for the students. They found it useful in clarifying assignment expectations, which resulted in improved assignment outcomes. Meanwhile, a study by Kesler et al. (2022) showed evidences that integrating visual programming environments in schools may increase the use of constructivist

pedagogy principles (such as collaboration, critical thinking and student-centered learning), even among teachers with traditional teaching perspectives. The findings revealed that pedagogical perspectives were reflected and expressed in their visual programming artifacts and, consequently, affected the learning level of the users of these artifacts. All these studies have proven that constructivist perspective has been effectively accommodated by digital pedagogy (Behrend, 2014; Howell, 2018; Kesler et al., 2022; Szabo & Csepes, 2023; Zahn, 2017)

The success claimed by researchers regarding the use of digital collaborative writing tools in enhancing writing skills are closely related to the constructivism learning principles these digital tools accommodated. Constructivism principles explain why and how learners have more opportunities in social interactions through digital tools and later in turns contributing significantly to ideas generation and development.

Findings and Discussion

Proposed Framework

The proposed conceptual model of how constructivist principles work in the process of academic writing can be put in the following stages. There are five stages which are described in Table 1.

Table 1. The Five Stages of Ecological Constructivist Principles in Academic Writing using Digital Tools

Stages	Constructivist Work in Academic Writing
Stage 1: Initial Writing Task	Learners engage with the socio-environment, even the digital ones (e.g., collaborative platform, writing assistant, community of learning, more capable peers or tutors) to work on an assigned writing task.
Stage 2: Interaction with Affordances	Learners perceive and interact with affordances (e.g., peer feedback, grammar suggestions, resources like dictionaries or other language/ information resources).
Stage 3: Knowledge Construction	Learners construct their writing knowledge through active engagement, peer interaction, and scaffolding provided (by the technology or/and instructors). This process manifests the 'heart' of constructivist principles.
Stage 4: Feedback and Reflection	Learners receive feedback (peer, teacher, or automated) and revise their work accordingly. They engage in reflective learning, improving their writing skills through iterative interaction with the constructive environment (technological tools, communities, peers).
Stage 5: Development of Writing Proficiency	As learners continue to engage with these affordances in the environment, their writing skills improve, moving them toward greater autonomy and proficiency in academic writing.

The stages explain the implication of constructivist principles in the writing process. Each stage shows the mechanism of each constructivist principle in affecting and even later shaping the final writing product. In each stage, it is obvious that a writer cannot be separated from his or her environment (Behrend, 2014; Fitria et al., 2023; Ghufron & Nurdianingsih, 2020; Nazari et al., 2017); they interact each other, determining how would the writing be going and in what ways.

In Stage 1, ***Initial Writing Task***, the learners interact and engage with the surrounding social environment, especially the digital ones (e.g., collaborative platform, writing assistant, community of learning, more capable peers or tutors) to have activities on an assigned writing task. Basically, in this stage, the learners, as a writer, utilizes the digital tools as the media for the affordances (corresponding to later Stage 2). These digital media provide pathways and rooms for the writers to get the necessary affordances.

Stage 2 marks the interaction between the learner-writer with the necessary affordances. The learner-writer gets connected and interacts with affordances such as the peer feedback, grammar suggestions, various language resources like dictionaries or other language and information resources. These learner-writer undergoes the constructivist principle of active engagement and at same time meeting the features of ecological principles: environmental opportunities. The learner doesn't simply use features passively; they construct meaning from how these affordances facilitate their writing goals.

In Stage 3, knowledge Construction takes place. The learner-writers construct their writing knowledge after getting insights from active engagement, peer interaction, and scaffolding provided by the digital platforms. This process manifests the core principle of constructivism. This demonstrates that affordances become vehicles for constructivist knowledge-building when embedded within supportive social and technological contexts.

The **Stage 4**, the feedback leads to the learner-writer's reflection. These learners receive feedback (peer, teacher, or automated ones from the digital platforms) and revise their work accordingly. They engage in reflective learning, improving their writing skills through effective interaction with the constructive environment (technological tools, communities, peers). This reflects the constructivist emphasis on reflective learning and the ecological principle of dynamic, evolving interaction between learner and environment.

At **Stage 5** the development of writing proficiency is expected as the outcome of the stages. As learners continue to engage with these affordances in the environment, they develop their writing skills, improve their writing competency, and making them more autonomous and proficient in academic writing. This stage's outcome demonstrates that the ecological interaction produces developmental outcomes through sustained participation in the learners' digital and socio-ecological learning space.

These stages reflect that in academic writing, a writer exists in a place where he or she is interconnected with several other components surrounding. An academic writing would perform the writing in an academic context, as the macrosystem (Bronfenbrenner, 1977). The topics selected are probably highly influenced by the microsystem and the mesosystem (Bronfenbrenner, 1977; Nazari et al., 2017). Then, the development of the ideas and the factors supporting or inhibiting might come from the macrosystem (Nazari et al., 2017; Van Lier, 2004;

Wuryaningrum, 2023). The ecological system can be the physical ones or the digital ones, meaning that the ecological interactions also cover interactions with the digital tools, including the collaborative writing platforms (Jin, 2018; Mhlongo et al., 2023), to create affordances.

Based on an ecological perspective that situates students' growth as academic writers across multiple engagements with writing, including those outside of school, the ecological model of academic writing assessment can provide students, teachers, departments, and institutions with richer accounts of students' literate experiences and how those experiences impact their writing skills to accomplish academic tasks (Wardle & Roozen, 2012). Therefore, an ecological model of writing assessment might enable and strengthen the affordances for student learning and writing in the sites which would support their writing skills enhancement (Wardle & Roozen, 2012). The model assigned the students to generate writing topics outside their institutions and across their boundaries, using any digital tools (Jin, 2018; Mhlongo et al., 2023; Zuo & Ives, 2023).

Writing, even in an academic setting, is never personal. Academic writing is something related to the social environment. The writing process and result is always influenced by the environment, either physical environment or digital environment (Azizah et al., 2024; Fernandes et al., 2021). Academic writing is an act of thinking, and knowing that one's thinking will eventually be placed in the public arena (Barnett, 2024; Subandowo & Sárdi, 2023). Consequently, what an academic writer writes and how the writing would shape itself are both interacting with each other in a system, and ecosystem of academic writing. Since academic writing is greatly influenced by the environment, the approach for enhancing the skills should also be generated and shaped within the ecosystem.

Academic writing which is across disciplines and utilizing all sorts of resources of the writers, including the institutional settings, experiences and social positions, are potentially able to enhance the academic writing skills (Barnett, 2024; Wardle & Roozen, 2012). In their study, Wardle & Roozen (2012) pointed out academic writing can summon writers to stretch themselves into new places, communicate with known and unknown readers, move across different surfaces, and position themselves within a literature. Finally, there is an obvious potential of writing as a process of self- transformation (Wardle & Roozen, 2012). If the impact of academic writing is that significant to the writer, then on the other way around, to be a proper academic writer, one should enrich and develop one's personal experiences and interactions with the surrounding ecosystem. Then, the purposive intervention in the ecological aspects of an academic writer might impact the writing skills significantly.

Conclusion

Academic writing skills are the skills which are not exclusively coming from the writers themselves. These skills are nurtured, shaped, and growing within a supportive ecosystem which is greatly affected by the interactions and dynamics of the respective environment. The skills are then in a close interaction with the ecology of the writers: the writers themselves, the environment, and the supporting (or in some contexts, inhibiting) system. Constructivism and ecological perspective are the two main frameworks which best explain the dynamic and interaction occurring within the ecosystem. Then, technology, or specifically, collaborative digital platforms, may come into action and intervene the ecosystem. These digital platforms supportively provide

'the writing affordances' which can support the academic writers to achieve their writing goals effectively.

A model of how the digital platforms create affordances in supporting the academic writers are presented here, in five important stages: initial stage, the interaction stage, knowledge construction stage, feedback and reflection stage, and finally the development of writing proficiency stage. Each stage reflects the dynamic of the writers within a constructivist realm, from an ecological perspective lens. This model is a conceptual model of how academic writing may thrive utilizing the constructivist principles and under the ecological perspective enlightenment.

Future research can focus and explore more on the empirical aspects of the model and how the effectiveness of digital platforms/ tools to create affordances in the five-stage-model intervention. Another possible research may explore the relationship between the digital platforms or tools and the impact of implementing the model.

References

Ahmad, R., Ahmad, R., Sagir, M. I., & Jaafar, T. J. (2020). Paradigm of shift in assessment: Constructivist and instructional technology model. *Journal of Critical Reviews*, *7*(8), 1394–1397.

Azizah, R., Shinta, A., Endang Fauziati, & Koesoemo Ratih. (2024). Connectivism Practice in English Language Teaching (ELT): Teachers' Perception on Benefits and Challenges. *Journal of International Multidisciplinary Research*, *2*(8), 12–22. https://doi.org/10.62504/jimr810

Badwan, K., & Simpson, J. (2022). Ecological Orientations to Sociolinguistic Scale: Insights from Study Abroad Experiences. *Applied Linguistics Review*, *9*, 356–363.

Barnett, R. (2024). Seven Pains of Writing: The Discomforts of Academic Becoming in a Judgmental Age. *Arts and Humanities in Higher Education*, *0*(0), 1–18. https://doi.org/10.1177/14740222241305781

Behrend, M. B. (2014). Engeström ' s activity theory as a tool to analyse online resources embedding academic literacies. *Journal of Academic Language and Learning*, *8*(1), 109–120.

Biju, L. G., & Rahman, A. (2023). Review on the impact of technology-supported writing environment for developing writing skills. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, *23*(3), 290–313. https://callej.org/index.php/journal/article/view/60/36

Bronfenbrenner, U. (1977). Toward an Experimental Ecology of Human Development. *American Psychologist*. https://doi.org/10.14195/0870-4147-48-1

Chen, X., & Zhang, F. (2022). Construction of College English Ecological Classroom from the Perspective of Student-centered Theory. *International Journal of Education and Humanities*, *3*(1), 51–54. https://doi.org/10.54097/ijeh.v3i1.512

Chong, S. W., Isaacs, T., & McKinley, J. (2023). Ecological systems theory and second language

research. *Language Teaching*, *56*(3), 333–348. https://doi.org/10.1017/S0261444822000283

Fakhruddin, A., Astuti, P., Rustipa, K., & Wahyuni, S. (2024). The Influence of Digital Writing Platforms on Collaborative Writing Processes in Undergraduate Students. *Proceedings of Fine Arts, Literature, Language, and Education*, 110–120.

Fernandes, R., Ananda, A., Montessori, M., Firman, F., Putra, E. V., Naldi, H., & Fitriani, E. (2021). Adaptasi Dosen Digital Immigrant Terhadap Pelaksanaan Pembelajaran pada Masa Pandemi Covid-19. *Journal of Sociology Research and Education*.

Feyzi Behnagh, R., & Yasrebi, S. (2020). An examination of constructivist educational technologies: Key affordances and conditions. *British Journal of Educational Technology*, *51*(6), 1907–1919. https://doi.org/10.1111/bjet.13036

Fitria, R., Trisnawati, I. K., & Mulyani, M. (2023). What Indonesian EFL Learners Perceive of Collaborative Writing: Experience in Writing Essays Online. *English Education Journal*, *14*(1), 493–516. https://doi.org/10.24815/eej.v14i1.29227

Ghufron, M. A., & Nurdianingsih, F. (2020). Flipped teaching with call media in EFL writing course: Indonesian EFL writing teachers' reflection. *Pertanika Journal of Social Sciences and Humanities*, *28*(SUPPL.2), 1–18.

Gibson, E. J. (1982). The concept of affordances in development: The renascence of functionalism. In W. A. Collins (Ed.), The concept of development: The Minnesota Symposia on Child Psychology (Vol. 15, pp. 55-81). NJ: Lawrence Erlbaum Associates.

Hammoodi, S., & Alishah, A. R. (2020). The Evolvement of Autonomous Learning through Social Constructivist Movement. *Egitim Fakultesi Dergisi*, *6*(1), 91–105.

Howell, E. (2018). Scaffolding multimodality: writing process, collaboration and digital tools. *English Teaching*, *17*(2), 132–147. https://doi.org/10.1108/ETPC-05-2017-0053

Jasrial, D. Z., & Zaim.M. (2023). Constructivism For English Language Teaching In The 21. *Journal of English Education and Linguistics*, *7*(7).

Jiang, L., Li, Z., & Leung, J. S. C. (2024). Digital multimodal composing as translanguaging assessment in CLIL classrooms. *Learning and Instruction*, *92*(September 2023), 101900. https://doi.org/10.1016/j.learninstruc.2024.101900

Jin, L. (2018). Digital affordances on WeChat: learning Chinese as a second language. *Computer Assisted Language Learning*, *31*(1–2), 27–52. https://doi.org/10.1080/09588221.2017.1376687

Jonathans, P. M., & Metboki, Y. (2022). Reflecting on EFL Digital Learning in Indonesia: Seeking for E-Learning Pedagogy. *Proceedings of the International Seminar on Language, Education, and Culture (ISoLEC 2021)*, *612*(ISoLEC), 259–263. https://doi.org/10.2991/assehr.k.211212.048

Kek, M. Y. C. A., & Huijser, H. (2016). Problem-based learning into the future: Imagining an agile PBL ecology for learning. In *Problem-Based Learning into the Future: Imagining an Agile PBL Ecology for Learning*. https://doi.org/10.1007/978-981-10-2454-2

Kesler, A., Shamir-Inbal, T., & Blau, I. (2022). Active Learning by Visual Programming: Pedagogical Perspectives of Instructivist and Constructivist Code Teachers and Their Implications on Actual Teaching Strategies and Students' Programming Artifacts. *Journal of Educational Computing Research*, *60*(1), 28–55. https://doi.org/10.1177/07356331211017793

Lantolf, J. P., & Poehner, M. E. (2011). Dynamic assessment in the classroom: Vygotskian praxis for second language development. *Language Teaching Research*, *15*(1), 11–33. https://doi.org/10.1177/1362168810383328

Lathifah, A. S. (2024). Pemanfaatan Teknologi Digital dalam Pembelajaran Konstruktivisme: Meningkatkan Kualitas Pendidikan di Era Digital. *Jurnal Pendidikan Dan Kebudayaan (JURDIKBUD)*, *4*(1), 69–76. https://doi.org/10.55606/jurdikbud.v4i1.2838

Limbong, E., Setiawan, I., & Hamilton, A. (2024). Bridging the Gap: The Reality of Digital Technology Integration by Indonesian Pre-service EFL Teachers. *Script Journal: Journal of Linguistics and English Teaching*, *9*(1), 58–78. https://doi.org/10.24903/sj.v9i1.1524

Liu, Q., & Chao, C. C. (2018). CALL from an ecological perspective: How a teacher perceives affordance and fosters learner agency in a technology-mediated language classroom. *ReCALL*, *30*(1), 68–87. https://doi.org/10.1017/S0958344017000222

Mensah, E. (2015). Exploring Constructivist Perspectives in the College Classroom. *SAGE Open*, *5*(3). https://doi.org/10.1177/2158244015596208

Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon*, *9*(6), e16348. https://doi.org/10.1016/j.heliyon.2023.e16348

Miftah, M. Z., & Cahyono, B. Y. (2022). Collaborative Writing Assisted with Edmodo Learning Management System in Indonesian EFL Classes: Learners' Attitudes and Learning Engagement. *Call-Ej*, *23*(2 Special Issue), 108–131.

Nazari, M., Farnia, M., Ghonsooly, B., & Jafarigohar. (2017). Ecological Understanding of Concept Blockage in Writing Anxiety Based on Bronfenbrenner' Chronosystem. *International Journal of English Language and Translation Studies, Vol 05, Iss 03, Pp 174-187 (2017) VO - 05*, *03*, 174. http://ez.urosario.edu.co/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsdoj&AN=edsdoj.bb82346ad8824c8c81003fbd2ae2959b&lang=es&site=eds-live&scope=site

Nguyen, Q. N. (2025). Affordance theory in language education: A multidimensional framework. Teaching English as a Second Language Electronic Journal (TESL-EJ), 29(3). https://doi.org/10.55593/ej.29115a1

Onwuegbuzie, A. J., Collins, K. M. T., & Frels, R. K. (2013). Foreword: Using Bronfenbrenner's ecological systems theory to frame quantitative, qualitative, and mixed research. *International Journal of Multiple Research Approaches*, *7*(1), 2–8. https://doi.org/10.5172/mra.2013.7.1.2

Pribadi, B. A., Ichwan, & Purnama, D. A. (2022). Online Learning Based on Constructivism To

Support Universitas Terbuka Distant Learners. *Jurnal Teknodik*, *26*, 1–10. https://doi.org/10.32550/teknodik.vi.978

Schnaider, K. (2023). "The influence of technological designs on teachers' and students' meaning-making: Semiotic chains configuring teaching and learning activities". *Computers and Education Open*, *4*(March), 100136. https://doi.org/10.1016/j.caeo.2023.100136

Shah, R. K. (2019). Effective Constructivist Teaching Learning in the Classroom. *International Journal of Education*, *7*(4), 1–13.

Shirani, R. (2020). *Explicit versus implicit corrective feedback during videoconferencing: Effects on the accuracy and fluency of L2 speech*. University of Victoria.

Singh, R. (2019). Students' perspectives on technology integration in ELT. *Journal of NELTA*, *24*(1–2), 95–106. https://doi.org/10.3126/nelta.v24i1-2.27682

Slomp, D. H. (2012). Challenges in assessing the development of writing ability: Theories, constructs and methods. *Assessing Writing*, *17*(2), 81–91. https://doi.org/10.1016/j.asw.2012.02.001

Subandowo, D., & Sárdi, C. (2023). Academic essay writing in an English medium instruction environment: Indonesian graduate students' experiences at Hungarian universities. *Ampersand*, *11*(May 2022). https://doi.org/10.1016/j.amper.2023.100158

Suhendi, A., Purwarno, P., & Chairani, S. (2021). Constructivism-Based Teaching and Learning in Indonesian Education. *KnE Social Sciences*, *2021*, 76–89. https://doi.org/10.18502/kss.v5i4.8668

Szabo, F., & Csepes, I. (2023). Constructivism in Language Pedagogy. *Hungarian Educational Research Journal*, *3*(13), 405–417.

Thoms, J. J. (2014). An Ecological View of Whole-Class Discussions in a Second Language Literature Classroom: Teacher Reformulations as Affordances for Learning. *The Modern Language Journal*, *98*(3), 724–741. https://doi.org/10.1111/j.1540-4781.2014.12119.x

Tungka, N. F. (2018). Guided literacy instruction: Helping students read multimodal English-medium texts. *Indonesian Journal of Applied Linguistics*, *8*(2), 345–357. https://doi.org/10.17509/ijal.v8i2.13281

Van Lier, L. (2010). The ecology of language learning: Practice to theory, theory to practice. *Procedia - Social and Behavioral Sciences*, *3*(1), 2–6. https://doi.org/10.1016/j.sbspro.2010.07.005

Vorobel, O. (2017). *Ecological perspective and foreign language teaching and learning*. 14–21.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes* (M. Cole, V. J. Steiner, S. Scribner, & E. Souberman (eds.)). Harvard University Press.

Wardle, E., & Roozen, K. (2012). Addressing the complexity of writing development: Toward an ecological model of assessment. *Assessing Writing*, *17*(2), 106–119. https://doi.org/10.1016/j.asw.2012.01.001

Wuryaningrum, R. (2023). The Role Macrosystems as Main Proponent of the Ecology Approach in Scientific Writing Learning. *European Journal of Education and Pedagogy*, *4*(3), 10–19. https://doi.org/10.24018/ejedu.2023.4.3.663

Zahn, C. (2017). Digital Design and Learning: Cognitive-Constructivist Perspectives. In S. Schwan & U. Cress (Eds.), *The psychology of digital learning: Constructing, exchanging, and acquiring knowledge with digital media* (pp. 1–205). https://doi.org/10.1007/978-3-319-49077-9

Zuo, X., & Ives, D. (2023). Technology-Assisted Reading Instruction for English Language Learners: A Methodological Review. *ECNU Review of Education*, 1–25. https://doi.org/10.1177/20965311231179490