

# *Autonomous L2 Learners Navigating the Digital Wilds: A Complexity Theory Perspective*

Yiting Han, Nanyang Technological University, Singapore

WorldCALL 2023 – CALL in Critical Times  
Conference Proceedings

## **Abstract**

This study employs a Complexity Theory-oriented longitudinal qualitative case study to explore the experiences of five autonomous second language learners in digital environments. Two research questions guide the study: how digital tools and resources mediate learners' experiences, and how technology interacts with the development of identity, motivation, and autonomy. Findings reveal that learners utilize a wide array of digital resources in a highly personalized manner, influenced by their goals, interests, and life contexts. The study also uncovers complex interactions between technology and learners' identity, motivation, and autonomy. The research contributes to scholarly discussions in Second Language Acquisition and Computer-assisted Language Learning by offering a holistic, life-wide approach to language learning. It also provides methodological and pedagogical insights, advocating for the role of educators in fostering learners' agency and mindfulness in digital language learning contexts. The study concludes by suggesting future research directions, including the impact of emerging generative AI technologies on autonomous life-wide language learning.

Keywords: Digital Wilds, Complexity Theory, Learner Autonomy, Autonomous Language Learning, Learner Needs, Learner Agency



WorldCALL Conference 2023 in Chiang Mai, Thailand

## **Introduction**

In an era where digital technology permeates every aspect of our lives, the landscape of language learning is undergoing a significant transformation (Godwin-Jones, 2018). No longer confined to the four walls of a classroom, language learning has expanded into the "digital wilds"—a term that encapsulates the myriad of informal, online spaces where learning occurs (Sauro & Zourou, 2019). These digital environments offer a plethora of resources and platforms, enabling learners to customize their educational journey according to their unique preferences and needs (Reinders & Benson, 2017).

However, navigating the digital wilds is not a straightforward endeavor. It involves a complex interplay of factors such as motivation, identity, and autonomy, all of which are mediated by technology (Benson, 2011; Godwin-Jones, 2019). This complexity calls for a theoretical framework that can capture the nuanced, dynamic nature of language learning in digital contexts. Enter Complexity Theory, a lens that allows us to understand language acquisition as a non-linear, interconnected, and emergent process (Larsen-Freeman, 1997; Kramsch & Whiteside, 2008).

Additionally, although we agree that language learning is intrinsically linked to real-life experiences and reject the notion that classrooms are isolated containers of educational activity, it is worth noting that second language acquisition research has a heavy reliance on academic samples—mostly university students (Plonsky, 2016). This sampling bias has led to calls for more diverse research subjects, including a Call for Participation for SLA research in non-academic samples by the journal *Language Learning* (2019). Research on non-academic learners is crucial as it can offer new insights into sustaining language learning in life-wide settings and its associated challenges.

This paper aims to address this gap by exploring the unique experiences of autonomous L2 learners in the digital wilds, focusing on how they utilize digital tools and resources and how these tools interact with their learning journey. Guided by Complexity Theory, we investigate the following research questions:

1. What digital tools and resources mediate the learners' learning, and in what ways?
2. How does technology interact with the development of identity, motivation, and autonomy during the learning journey?

## **Complexity Theory and Language Learning**

Complexity Theory offers a comprehensive lens for understanding the intricate, dynamic nature of language learning. Originating from disciplines like physics and biology, Complexity Theory has found its way into the social sciences, including second language acquisition (SLA) (Davis & Sumara, 2006; Larsen-Freeman, 1997). This theoretical framework posits that language learning is not a linear process but rather a complex system influenced by a multitude of interconnected variables (Kramsch & Whiteside, 2008). It allows us to investigate how learners construct and sustain their learning by examining the interconnectivity and entanglement of various factors within the learning system. This perspective is particularly relevant for understanding the complexities of navigating digital learning environments, where the variables are not just numerous but also highly fluid (Douglas Fir Group, 2016).

## Complexity Theory-Oriented Studies on Language Learners

While Complexity Theory (CT) has gained theoretical traction in the field of second language acquisition (Herdina & Jessner, 2002; Larsen-Freeman & Cameron, 2008), there exists a noticeable gap between the theory's promise and its empirical applications in language learning research (Ecke & Hall, 2013). Much of the empirical work has focused on the four language skills—reading (Zhang, 2010), listening (Dong, 2016), speaking (Yu & Lowie, 2019), and writing (Kusyk, 2017; Spoelman & Verspoor, 2010). These studies have shown that language development is highly variable and influenced by a complex interplay of internal factors like cognition and emotion, as well as external factors such as school and social contexts.

However, process-oriented studies that document language learning through a CT lens are relatively scarce but are gaining momentum (Castro, 2018; Pellerin, 2017). These longitudinal studies offer detailed insights into the dynamics and nonlinearity of language learning by focusing on individual learners. For example, Castro (2018) explored the motivational trajectory of a Brazilian university-level EFL student in a language advising context. The study documented the dynamics of motivational fluctuations and identity fractalization as the learner interacted with the language advisor over time. More research is needed to understand language learning in today's technology-mediated environments through a CT lens, especially focusing on the strategies and challenges of life-long learning in these dynamic contexts.

### Methods

This study employs a qualitative multiple-case study design informed by Complexity Theory to explore the experiences of autonomous L2 learners in digital environments.

#### *Participants*

Participants for this study were recruited from two distinct online platforms: an alumni forum of a university specialized in foreign language studies located in the multilingual city of Shanghai (where the researcher had been an undergraduate student), and an online Spanish-learning interest group called 'Spanish Corner' (where the researcher had been a member). The focus of this study is on non-academic samples (workplace adults) to explore life-wide learning. Recruitment messages were sent out to both the alumni forum and the interest group in June 2019. The criteria for inclusion in the study are detailed in Table 1. Five focal participants were ultimately selected, each demonstrating active engagement in language learning within digital wilds.

---

<b>Inclusion criteria</b>
<ul style="list-style-type: none"><li>• Self-identify as motivated and autonomous language learners</li><li>• Actively conduct/plan/organize language learning, or have experience learning with the help of digital tools (e.g., using videos, using learning apps, playing games in a foreign language, etc.)</li><li>• Have graduated from school and entered into workplace</li></ul>

---

Table 1: Inclusion criteria for the study

### ***Data Collection***

Data were collected through a variety of methods to capture the complexity of the learning experiences:

- Semi-structured interviews across a year
- Retrospective narratives
- Participant-generated photography and follow-up interviews (Prosser & Loxley, 2010)
- Artifacts (e.g., screenshots of digital platforms used)
- Reflective learning journals (optional)
- Observations and field notes

### ***Data Analysis***

Initially, a thematic analysis (Braun & Clarke, 2006) was conducted, guided by a Complexity Theory-oriented approach. The analysis aimed to understand the interplay between various factors such as digital tools, identity, motivation, and autonomy in shaping the learners' experiences. After the thematic analysis, a comparative case analysis (Yin, 2018) that involved comparing individual themes and patterns among the participants, examining whether there were replicative relationships across cases, and identifying important differences among the cases to answer the research questions of this study was conducted.

### **Findings**

#### ***Research Question 1: What Digital Tools and Resources Mediate the Learners' Learning, and in What Ways?***

The findings reveal that each learner engaged with a diverse array of digital tools and resources, ranging from natural media text and structured materials to digital dictionaries and time-management apps. This diversity was facilitated by the expansive digital landscape, offering each individual a wealth of choices tailored to their unique learning goals, interests, and personal lives. Participants demonstrated a high level of awareness and purposefulness in selecting and utilizing these digital resources, making their choices highly personalized and aligned with their broader life roles and vernacular technology use.

#### ***Metaphorical Understandings of Technology***

The study found that participants' interactions with technology could be understood through various metaphors (Reinhardt, 2020), each highlighting different facets of technology's role in language learning:

- **Tools:** All participants used digital tools like dictionaries to facilitate learning. However, this metaphor falls short in capturing the socially networked nature of some tools.
- **Ecology:** This metaphor emphasizes the environmental aspect of the digital landscape but doesn't fully capture the agency learners have in selecting and orchestrating resources.
- **Windows:** Technology serves as a window through which learners can observe authentic language uses and cultural practices.
- **Doorways:** This metaphor signifies the participatory nature of Web 2.0 platforms in collective knowledge building.
- **Mirrors:** Digital platforms such as social media are used for identity work, allowing learners to reflect on their learning journey.
- **Playgrounds:** This metaphor captures the playful disposition learners have towards exploring and experimenting in digital spaces.

- **Extension of Self:** Technology can extend the learner's capabilities, but this relationship requires mindful management to prevent overreliance that could hinder meaningful learning.

### ***Co-adaptation Between Learners and Technology***

A noteworthy finding is the co-adaptation relationship (Larsen-Freeman & Cameron, 2008) between the learner and technology. Data analysis revealed a two-way dynamic: learners both used and were influenced by technology. As one participant, Y, pointed out, navigating the digital wilds is not a straightforward task. Without mindful management and a high level of awareness, learners risk overextending their sensory engagement, leading to issues like overdependence on social media or addiction to certain facets of technology. Such overreliance can hinder deep and meaningful learning. Conversely, when technology is used with intent and awareness, it can offer enriching learning experiences and extend learners' capabilities in beneficial ways. The findings suggest that successful autonomous learners need a critical disposition towards technology and constant evaluation of their relationship with the technologies they interact with.

### ***Research Question 2: How Does Technology Interact With the Development of Identity, Motivation, and Autonomy During the Learning Journey?***

#### ***Identity***

All participants intentionally used technology for L2 learning in alignment with their multiple roles and identity needs. A recurring pattern was the cultivation of new and preferred "transportable identities" originating from their interactions within the digital wilds. Some participants also developed a "learner identity" characterized by innate curiosity, openness to different perspectives, and an appreciation for diversity. Technology acted as a "a place for curiosity and inquiry," enabling learners to indulge in interests, practice thinking, and engage with like-minded individuals. This learnful disposition towards self-realization fueled motivation and empowered autonomy.

#### ***Motivation***

Motivation was a cornerstone of the participants' L2 learning journey. While each individual presented a unique motivational trajectory, a commonality was the enjoyment derived from the language learning process, both offline and online. This enjoyment led to the autonomous initiation and sustenance of learning, becoming a habit integrated into their lives. The findings suggest that technology-mediated language learning becomes enjoyable when aligned with learners' purposes, values, beliefs, identities, interests, and preferences.

#### ***Autonomy***

The study highlighted the role of collaborative autonomy development, as facilitated by technology's connectivity features. Participants developed essential skills for independent learning, aided by digital tools. Their autonomy extended beyond language learning to navigating the contemporary connected world for productive engagement in personal, social, and civic dimensions. The findings indicate that navigating the digital wilds can promote autonomy by developing a critical awareness of technological mediation and language choices, empowering learners to make meaningful decisions.

## **Discussion and Conclusion**

### ***Theoretical Contributions***

This research contributes to multiple academic domains, including Second Language Acquisition (SLA), Computer-assisted Language Learning (CALL), and Education. By employing Complexity Theory (Larsen-Freeman & Cameron, 2008), it advances our understanding of how technology interacts with learners in life-wide settings, thereby enriching discourses on identity (Lam, 2000), motivation (Dörnyei, 2009; Ushioda, 2011), and autonomy (Benson, 2011). The focus on workplace adult learners addresses the sample bias concern raised in previous research (Plonsky, 2016).

The study adopts a holistic, life-wide approach inspired by Complexity Theory (CT), contributing to emerging literature on CT-inspired language learning. It offers applied linguists and educationists a non-reductionist framework for studying "individuals acting in context" as holistic units (Larsen-Freeman, 2017, p.29).

### ***Methodological Contributions***

Methodologically, this study pioneers the use of a Complexity Theory-oriented longitudinal qualitative case study, a methodology recently applied in similar studies (Castro, 2018). It also incorporates innovative data collection methods like participant-generated photography (Prosser & Loxley, 2010) and retrodictive narratives (Dörnyei, 2014), setting a precedent for future research.

### ***Pedagogical Contributions***

Pedagogically, this study has several implications. It highlights the critical role of language educators in fostering autonomous, personally significant, and socially transformative language learning in the 21st century. The findings suggest that educators can guide students in the effective use of technology, helping them develop agency and mindfulness. Educators can also engage learners' voices in classrooms, discussing the value of language learning and giving them agency in assignments and projects. By understanding students' multiliteracy needs, educators can help them realize the affordances offered by life-wide literacy practices. The study also advocates for the creation of supportive and open learning communities, both online and offline, where learners can share strategies, resources, and experiences, fostering collaborative autonomy.

### ***Future Research Directions***

It is worth noting that this study was conducted before the rise of generative AI. The advent of generative AI technologies offers exciting prospects for future research. These technologies could further influence the dynamics of learner autonomy, motivation, and identity in digital learning environments.

## References

- Benson, P. (2011). Language learning and teaching beyond the classroom: An introduction to the field. In P. Benson & H. Reinders (Eds.), *Beyond the language classroom* (pp. 7–17). London, UK: Palgrave Macmillan.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Castro, E. (2018). Complex adaptive systems, language advising, and motivation: A longitudinal case study with a Brazilian student of English. *System*, 74, 138–148.
- Davis, B., & Sumara, D. (2006). *Complexity and education: Inquiries into learning, teaching, and research*. New York, NY: Routledge.
- Dong, J. (2016). A dynamic systems theory approach to development of listening strategy use and listening performance. *System*, 63, 149–65.
- Dörnyei, Z. (2009). The L2 motivational self system. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, language identity and the L2 self* (pp. 9–42). Bristol: Multilingual Matters.
- Dörnyei, Z. (2014). Researching complex dynamic systems: ‘Retrodictive qualitative modelling’ in the language classroom. *Language Teaching*, 47(1), 80–91.
- Douglas Fir Group. (2016). A transdisciplinary framework for SLA in a multilingual world. *Modern Language Journal*, 100 (Supplement 2016), 19–47.
- Ecke, P., & Hall, C. J. (2013). Tracking tip-of-the-tongue states in a multilingual speaker: Evidence of attrition or instability in lexical systems? *International Journal of Bilingualism*, 17(6), 734–751.
- Godwin-Jones, R. (2018). Chasing the butterfly effect: Informal language learning online as a complex system. *Language Learning & Technology*, 22(2), 8–27. <https://doi.org/10.125/44643>
- Godwin-Jones, R. (2019). Riding the digital wilds: Learner autonomy and informal language learning. *Language Learning & Technology*, 23(1), 8–25. <https://doi.org/10.125/44667>
- Herdina, P., & Jessner, U. (2002). *A dynamic model of multilingualism: Perspectives of change in psycholinguistics*. Clevedon: Multilingual Matters.
- Kramsch, C. & Whiteside, A. (2008). Language ecology in multilingual settings: Towards a theory of symbolic competence. *Applied Linguistics*, 29(4), 645–671.
- Kusyk, M. (2017). The development of complexity, accuracy, and fluency in L2 written production through informal participation in online activities. *CALICO Journal*, 34(1), 75–96.

- Lam, W. S. E. (2000). Literacy and the design of the self: A case study of a teenager writing on the Internet. *TESOL Quarterly*, 34, 457–482.
- Larsen-Freeman, D. (1997). Chaos/complexity science and second language acquisition. *Applied Linguistics*, 26, 141–165.
- Larsen-Freeman, D., & Cameron, L. (2008). *Complex systems and applied linguistics*. Oxford: Oxford University Press.
- Pellerin, M. (2017). Rethinking the concept of learner autonomy within the MALL environment. In M, Cappellini et al. (Eds), *Learner Autonomy and Web 2.0. Advances in CALL Research and Practice* (pp.91–114). Sheffield: Equinox.
- Plonsky, L. (2016, February). *The N crowd: Sampling practices, internal validity, and generalizability in L2 research*. Presentation given at University College London, London, United Kingdom.
- Prosser, J., & Loxley, A. (2010). The application of visual methodology in the exploration of the visual culture of schools. In D. Hartas (Ed.), *Educational research and inquiry: Qualitative and quantitative approaches* (pp. 199–222). London, UK: Continuum.
- Reinders, H., & Benson, P. (2017). Research agenda: Language learning beyond the classroom. *Language Teaching*, 50(4), 561–578.
- Reinhardt, J. (2020). Metaphors for social media-enhanced foreign language teaching and learning. *Foreign Language Annals*, 53(2), 234-242.  
<https://doi.org/10.1111/flan.12462>
- Sauro, S., & Zourou, K. (2019). What are the digital wilds? *Language Learning & Technology*, 23(1), 1–7. <https://doi.org/10125/44666>
- Spoelman, M., & Verspoor, M. (2010). Dynamic patterns in development of accuracy and complexity: A longitudinal case study in the acquisition of Finnish. *Applied Linguistics*, 31(4), 532–553.
- Ushioda, E. (2011). Language learning motivation, self and identity: Current theoretical perspectives. *Computer Assisted Language Learning*, 24(3), 199–210.
- Yin, R.K. (2018). *Case study research and applications: design and methods (6th)*. Los Angeles, CA: Sage.
- Yu, H., & Lowie, W. (2019). Dynamic Paths of Complexity and Accuracy in Second Language Speech: A Longitudinal Case Study of Chinese Learners. *Applied Linguistics*, 1–24.
- Zhang, L. J. (2010). A dynamic metacognitive systems account of Chinese university students' knowledge about EFL reading. *TESOL Quarterly*, 44(2), 320–353.

**Contact email:** yiting.han@sccl.sg