Technology-Enhanced Language Learning (TELL) - strategies and outcomes in second language learning

Dr. Raja Sekhar Gangavarapu
English Language Center, King Faisal University, Al-Hofuf, Kingdom of Saudi Arabia

Dr. Raja Sekhar Gangavarapu/ Technology-Enhanced Language Learning (TELL) - strategies and outcomes in second language learning

Abstract

The advent of modern technology has brought about unprecedented changes in our lives and we experience tremendous technological development every day. Technology has unimaginably impacted business, communication, medicine, education, science, tourism, and whatnot. Technology contributes significantly to the access and acquisition of information. This is the reason for the existence of a huge scientific and cognitive revolution that facilitates human life by increasing inventions in various fields. In the 21st century, technology facilitates learning also by providing a genuine and invaluable range of skills, knowledge, and ways of thinking. Our brains are also developing in this technological environment. Managing our goal settings, allowing us to focus, and controlling our working memory is done through cognitive control and technology impacts our brains to process properly and achieve our goals with our cognitive abilities. In language learning also, technology helps us to think, focus and remember or memorize concepts. Even it can be applied to language learning also whether it is a second or foreign language.

This paper predominantly focuses on the pivotal role of technology in language learning, mostly in second language learning, and how it helps us improve our memory and thinking processes in language learning. This study also examines various strategies to learn a language and improve language skills in technology-enhanced language learning environment. Some recommendations are given in the end how various strategies can be implemented effectively in second language acquisition.

Keywords: cognitive skills, language learning, language skills, memory, outcomes, second or foreign language, strategies, technology, tools

DOI Number: 10.14704/nq.2022.20.13.NQ88352 Neuro Quantology 2022; 20(13):2830-2839

Introduction

Languages are windows to different cultures and they enable us to connect with others from around the world. Language learning helps improve people's thinking skills and memory. The language centers in the brain are so flexible and learning a second or foreign language can develop new areas of our mind and strengthen our brain's natural ability to focus. The research studies show that people who are proficient in two languages perform better than those who speak only one language. The rapid technological changes of the 21st century (e.g., computer-assisted language learning, data-driven technology, online and blended learning approaches, and emerging technologies such as online games, virtual and augmented reality, and immersive classrooms, etc.) are changing the landscape of second and foreign language teaching and learning. Consciously or at least partially consciously, almost all language learners use tools, take actions, or self-regulate their behaviors to make their language learning or language use more effective or more efficient **(Cohen, 2011; O'Malley & Chamot, 1990; Oxford, 1990).**

The strategies for L2 skills learning are reviewed and analyzed and then the strategies for language subsystems are reviewed. This paper concludes with the issues in the field of language learning strategies in digital environments, provides recommendations that guide language instruction in technology-enhanced contexts, and highlights questions that still need to be

answered regarding the role of technology in the application of language learning skills.

Research Methodology

This paper will investigate the strategies enhanced by technology in language learning and also put some recommendations in the end. A systematic review was used as the research methodology. Many articles and research papers were analyzed utilizing a content analysis method and also many books were referred. According to the aim of this study the research objectives are as follows:

1. To examine the technology enhanced strategies in language learning

2. To analyze the four language skills and strategies to learn and improve them

3. To review the strategies for language learning subsystems (vocabulary and grammar) in technology-enhanced language learning

4. To discuss how these strategies help the learners to learn a second or a foreign language

5. To put some recommendations, in the end, for language learning using technology

Strategies for learning language skills in technology-enhanced language learning (TELL)

The use of technology in the classroom and outside also makes the students or learners feel motivated and they can practice a language through the material available on the internet and interactive multimedia exercises. Today technology transforms students from passive recipients to active learners and allows more profound and enriching linguistic immersion. Technology promotes interactivity and collaborative learning in the classroom and outside as well. For instance, flipped classrooms are popular today. Moreover, it creates a unique experience for students as well as teachers. Even teachers can evaluate and monitor students' progress using various apps on mobile phones, tabs, and laptops or PCs, from time to time and guide them systematically by giving instructions. Technology impacts language education in the skill areas of listening, speaking, reading, and writing as well as all competencies (grammatical, sociolinguistic, discourse, and strategic).

Many research studies are available for strategies for learning language skills such as listening, speaking, reading, and writing in technology-enhanced language learning environments. Let us examine how students learn language skills by using technology.

Listening

Listening was first recognized as a major component of language learning and teaching in the late 1970s. At that time, researchers suggested that language instruction should focus on the learner's listening comprehension in the early stages of acquisition while delaying oral production until the learner was more familiar with the new language. Two approaches to the teaching of listening skills, the natural approach and the total physical response (TPR), are supported by Krashen's Monitor Model of SLA (Second Language Acquisition) and grouped within the broader comprehension approach umbrella.

The natural approach, developed by **Krashen and Terrell (1983**), focuses on comprehensible input and the optimum affective state of the learner. Computers are used to teach and learn listening skills. Computers allow teachers to add multisensory elements, text, sound, pictures, video, and animation, which provide meaningful contexts to facilitate comprehension. Computers allow learners to hear the available input as many times as needed until they feel they have understood it. Multimedia programs can be designed to present material at different difficulty levels with adjustments in speed of delivery according to individual learner needs.

Total physical response, developed by **Asher** (1977), is frequently used as a technique within a variety of teaching approaches and methods. It focuses on psychomotor associations and lowering the affective filter. Learning is enhanced through the association of language with motor activity. Motor activity is a function of the right brain, and the right-brain activities should precede the language-processing functions of the left brain. TPR lowers students' affective filter and stress levels. The use of computers to learn and improve listening skills with the TPR is as follows:

- **TPR Games** (program description from TPR World Website)

- **Live Action English Interactive** (program description and demo)
- **Review of Live Action Spanish Interactive** (from Language Learning and Technology, Vol. 8, No. 3, September 2004, pp. 40-43)

Two types of processes, **bottom-up** and **top-down**, have been identified as central to listening comprehension. Bottom-up processing focuses on individual linguistic components of discourse. Comprehension is viewed as a process of decoding messages proceeding from phonemes to words, to phrases and clauses and other grammatical elements, to sentences. Top-down processing focuses on macro-features of discourse such as the speaker's purpose and the discourse topic. Comprehension is viewed as a process of activating the listener's background information and schemata (i.e. prior knowledge about the context and the topic) for a global understanding of the message. There are many apps and websites available for listening skills on the internet. For example, Randall's ESL Cyber Listening Lab, and John's ESL Community - Listening Activities.

Utilizing the **Strategy of Inventory for Language Learning** (SILL) (Oxford, 1990) to evaluate students' self-dictation activities with YouTube videos, **Chang and Chang** (2014) examined forty-eight Taiwanese college students' English listening comprehension strategies on YouTube's caption manager platform. SILL's metacognitive items assess the use of strategies such as planning, setting goals, organizing, noticing, paying attention, looking for opportunities to make learning effective, monitoring, and evaluating. In an Advertising English college course, **Chang and Chang** first spent 8 weeks presenting and having students practice top-down strategies (listening for main ideas, prediction, and drawing inferences) and bottom-up strategies (vocabulary, sound patterns, and syntactic patterns), then spent another 8 weeks implementing metacognitive strategies. In the second stage, students were required to recall and reflect upon (e.g., what I know, what I want to know, and what I learned) their metacognitive strategy development by answering questions related to (1) strategies they used to understand the online video, and (2) reasons why they could not answer certain listening comprehension items and the problems they encountered. The results indicated that, after strategy instruction, students consciously incorporated metacognitive listening strategies (e.g., "I notice my English mistakes and use this information to help me do better"; "I pay attention by listening when someone is speaking English in the advertisement videos") to manage and adjust their English learning when listening YouTube videos. Students who reported using the metacognitive strategies in the SILL performed significantly better on listening comprehension tests. They reinforced their listening comprehension by creating dictation questions, recalling strategy uses and reflecting on their listening problems.

Speaking

Technology is the vehicle to get access to this modernized world. Technology is used extensively in all fields including education today. Teachers use technological tools to teach all four skills of a language whether it is a second or foreign language. Using technology in learning a second language has become a real necessity nowadays. Speaking is an important skill today to communicate with people.

Technology can stimulate the playfulness of learners and immerse them in a variety of scenarios. Technology gives learners a chance to engage in self-directed actions, opportunities for self-paced interactions, privacy, and a safe environment in which errors get corrected and specific feedback is given. Modern technologies available today for learning and improving speaking are:

- Communication lab
- Speech recognition software
- Internet
- TELL (Technology Enhanced Language Learning)
- Podcasting
- Quick Link Pen
- Quicktionary
- YouTube videos

As far as speaking skill is concerned, the learners focus on the following activities to learn and improve their speaking skills using technological tools:

- Produce English speech sounds and sound patterns

- Use word and sentence stress, intonation patterns, and the rhythm of the second language.
- Select appropriate words and sentences according to the proper social setting audience, situation, and subject matter.
- Organize their thoughts in a meaningful and logical sequence.
- Use language as a means of expressing values and judgments.
- Use the language quickly and confidently with few unnatural pauses is called fluency **(Nunan, 2003).**

Therefore, modern technological tools are much more interesting and provide fun and enjoyable learning, motivating the students, and helping them to enhance their language learning fruitfully. Moreover, these tools help students learn at their own pace and promote autonomy in them.

Reading

Reading comprehension is, indeed, a complex cognitive ability that involves not only linguistic (e.g., vocabulary, grammatical knowledge), but also cognitive (such as working memory, **De Beni and Palladino, 2000)**, and metacognitive skills (both for the aspects of knowledge and control, **Channa et al., 2015**), and, more specifically, higher order comprehension skills such as the generation of inferences (**Oakhill et al., 2003**). Recently, due to the diffusion of technology in many fields of daily life, text comprehension at school, at home during homework, and at work is based on an increasing number of digital reading devices (computers and laptops, e-books, and tablet devices) that can become fundamental support to improve traditional reading comprehension and learning skills (e.g., inference generation). Enhancing reading comprehension strategy instruction through a blended approach. The instructional approach was composed of an interactive, multimedia lesson on CD-ROM, an online assessment version of the comprehension test, and a booklet to guide the learners through the lesson steps. The interactive multimedia lesson included basic sound, a short video clip, and interactive exercises that addressed three reading strategies: activating prior knowledge, summarization, and looking back. One distinctive technological feature of reading online is the interactivity between learners and texts. In their interactive English Language Learning System (iELLS), **Nor, Hamat, Azman, Noor, and Bakar** (2011) employed interactive tools such as **Annotation and My notes** to teach English reading comprehension to 81 Malaysian college students. By design, the system embedded reading strategies that students would not be aware of, thus encouraging them to comprehend. The embedded tool, **My notes,** encouraged students to reflect on what they read and to share with peers or to comment on peers' notes, write down questions and notes, get Strategies in technology-enhanced language learning 475 notes organized, and list unknown words. **The Annotation tool** allowed students to process the reading materials by applying reading strategies such as highlighting important points or points that they do not understand and by writing comments into the texts. **The Annotation** tool provided the opportunity for students to process and internalize the text at their own pace, leading to the development of reflective learning. According to the researchers, technological advantages such as immediate feedback, self-paced learning, and exposure to a variety of media (audio and video), on the one hand, relieved the teacher's workload, and on the other hand, motivated students to read.

Reading strategies in the TELL context are mainly scaffolded by platform design or software programming. For example, **Dalton, Proctor, Uccelli, Mo, and Snow** (2011) developed a web-based reading prototype to improve reading achievement. The goal of scaffolding is reading digital texts with embedded prompts that ask students to apply reading strategies. The six strategies that pop up for students to consider are: predict, question, clarify, summarize, visualize, and feel.

Thus, technology helps learners improve their reading comprehension ability.

Writing

The best long-term strategy for improving writing skills is to read a lot. Today, we have audiobooks and e-books and they enable learners to read and write in any language. We have writing tools also available on the internet to check, correct, and improve our writing: Grammarly, Hemingway, Ommwriter, Google docs, and many more.

Modern technologies improve the writing skills of learners of a second or foreign language. We have several apps and games to improve our grammar such as Lingualeo, Duolingo, or Speak Up from Google Play. Moreover, learners can use online dictionaries, transcription software, thematic sites, etc. to improve their writing skills.

In a Chinese university, **Tang, Xie, and Wang** (2011) designed a Wiki-based collaborative writing environment for their e-Commerce Specialty English course. This environment was composed of four types of tools for students to use when completing writing assignments: (1) tag web resources, an online semantic annotator allowing learners to conceptually model semantic relations, (2) peer revision and feedback to assist group members in coordination of collaborative learning process, (3) semantic search that facilitated search and retrieval options, and (4) page histories that recorded every major review version. Three learning strategies were identified by the researchers, namely, collaboration and knowledge sharing, peer assessment, and monitoring the stages of the writing process.

Thus, writing can be practiced by learners using technological tools available for their constant evaluation of writing skills.

Strategies for language learning subsystems in technology-enhanced language learning (TELL)

We have two subsystems in a language: **vocabulary and grammar**. We can improve our subsystems also by using technological tools in the process of language learning. Let us examine and analyze them.

Vocabulary

Vocabulary learning strategies are the most productive research area in TELL, though grammar learning strategies sometimes accompany vocabulary learning strategies. Strategies used with the **e-Lective** method are useful for the learners. Students in the e-lective condition used higher levels of cognitive and social strategies (e.g., summarizing and discussing), whereas the in the paper condition they employed fewer social strategies (e.g., consulting with the researcher and peers regarding meanings of words). The following **Table 1** shows how learners can improve their vocabulary today:

Table 1 Strategies used with ***e-Lective*** and associated reading activities (Li, 2009, pp. 131-133)

Strategies used with ***e-Lective***	Associated reading strategies
Note taking	Taking more, well-organized notes with ***e-Lective*** to facilitate memorization and review
Guessing and inferring	Using contextual cue-oriented guessing strategies with higher accuracy than in the paper condition
Summarizing and making connections	Engaging in the use of higher levels of cognitive strategies that promoted deeper semantic processing and better vocabulary retention, such as summarizing, applying, and manipulating phrases and words
Reading aloud	Being able to use the built-in text-to-speech module to read aloud and practice the pronunciation in words, sentences, and whole texts; attention paid to syllables and stress patterns
Discussing	Using a wide range of cognitive strategies to process the reading and retain vocabulary (e.g., repeating, quoting, referencing the texts); switching languages to make communication as comprehensive as possible; translating to verify understanding; and reasoning – a higher level of semantic processing of information

Furthermore, gamification of learning so frequent in TELL makes it natural to learn vocabulary via computer games. **Smith, Li, Drobisz, Park, & Kim (2013)** designed a vocabulary learning game for intermediate level Chinese students enrolled in a College English course. The interactive game-like interface forced learners to create sentences through constrained choices. Some researchers and instructional technologists design and investigate vocabulary learning strategy software or applications. For instance, **Lan** (2013) developed a co-sharing-based strategy learning system, Mywordtools, for 61 sixth-grade students in Taipei to learn English vocabulary. This application enables students to learn vocabulary by using the available language learning strategies embedded in the design. Ou Yang and Wu (2015) incorporated LLS instruction into their e-learning platform called MyEVA. MyEVA is a mixed-modality English vocabulary learning strategies system. In this system, they used **Schmitt's (1997**) division of strategies for learning L2 vocabulary into discovery (i.e., determination strategy and social strategy) and consolidation (i.e., social strategy, memory strategy, cognitive/metacognitive strategy, pictures/imagery, related/unrelated words, grouping, and the word's orthographical and phonological forms).

The findings indicate that the vocabulary learning mode that allows learners to pre-determine a preferred learning strategy (e.g., word card, flashcards, synonym, antonym, imagery, grouping, and clipping) before actual learning resulted in the greatest vocabulary acquisition and best retention.

Grammar

After vocabulary, grammar is the most important area in a language, and learners can understand and practice how words and sentences are used in a structural way to write or speak a language

correctly and fluently. Let us examine some strategies to improve grammar.

Using technology to teach grammar will be most effective when the technology is integrated into the curriculum, course, and lesson. Many teachers look to task-based instruction (TBI), which involves teachers and learners in student-centered "real-world task analysis, problem generation, and assessment grounded in real-world activities" as opposed to bottom-up grammar point approaches (Blake, 2013, p. 43).CALL implementations include structuring technology-based simulations, tutorials, computer-mediated communication (CMC) discussions, problem-based learning tasks, and autonomous learning tasks. Teachers must make include goals and context of instruction (EFL, ESL, and English for specific purposes, test taking, communication, and so forth) as well as choices between focusing on grammatical accuracy versus fluency in spoken and written genres and formal or informal registers. Teachers will also need to choose between (a) explicit versus implicit grammar instruction and (b) feedback that is general or individualized as they balance grammatical form, meaning, and use. Online games such as Minecraft can also be utilized, providing shared spaces for interaction as well as formal and informal grammar in context. Rote memorization of grammar forms is becoming more interactive, for example with online flashcard tools (for example, Quizlet) that allow learners or teachers to create and share their flashcards and then customize activities or assessments. Teachers can choose individual or collaborative tasks; instruction that is in-class or distance-based; instruction that encourages language self-analysis; or instruction that does or does not involve human-human interaction. Effective human-computer interaction is possible through newer technologies that involve natural language processing and intelligent CALL including grammar checkers or automated writing evaluation. Fee-based automated writing evaluation tools (for example, Grammarly, Criterion) allow learners to check their grammar and often organization before submitting it for an assignment or public view. Alternatively, learners can use human-created content for meaningful self-directed learning such as by searching a collection of written texts, or corpora (for example, through COBUILD or COCA).

Technology can also assist in grammar instruction in large classrooms or low-resource environments; individualized instruction can be provided through group projects such as collaborative writing in synchronous or asynchronous Web-based environments (for example, Google Docs, PBWorks, or instant chat tools) or with customized feedback. Synchronous CMC projects pairing native and non-native speakers can aid learners in giving and applying feedback. Using technology in low-resource environments continues to be a struggle, though educators can access resources such as digital flashcards or grammar-based games for flip phones and other low-cost devices. A framework for structuring materials and tasks to use for language learning with technology is offered by **Chapelle (2001**) and includes considering the following six characteristics: language learning potential, meaning focus, learner fit, authenticity, positive impact, and practicality.

Strategic, self-regulated language learning with technology

Despite different purposes of using strategies to learn the language skills and subsystems of the target language, self-regulation is crucial to the success of language learning. Self-regulation is a process in which people organize and manage their learning, including control of their time, thoughts, emotions, behaviors, and environment **(cf. Zimmerman, 1998).** The richness of the technology design and applications available causes teachers to consider integrating technology in and out of language classrooms and makes self-regulated learning strategies a necessary skill set for L2 learners. It should be noted that all learning strategies are aimed at self-regulation, although self-regulation as a specific construct was not linked to language learning strategies until the late twentieth century (**see Oxford, 1999**).1 If learners are motivated, they autonomously select a particular activity, decide how long they are willing to persist in it, and what effort they are going to invest **(Dörnyei, 2001).** In understanding the importance of self-regulated learning strategies for L2 proficiency, Oxford (2011) distinguishes three dimensions of strategic self-regulation. The three dimensions are as follows:

1) Cognitive strategies are for remembering and processing language and metacognitive

strategies are for planning, organizing, monitoring, and evaluating in the cognitive area.

2) Affective strategies are linked with emotions, beliefs, attitudes, and motivation, and meta-affective strategies for planning, organizing, monitoring, and evaluating in the affective area.

3) Sociocultural-interactive strategies are for contexts, communication, and culture, and meta-social strategies are for planning, organizing, monitoring, and evaluating in the sociocultural-interactive area.

Outcomes in technology-enhanced language learning

No doubt, learners achieve positive results in their language learning using TELL. The outcomes are many. Let us examine some of them.

1. It is essential in language learning to expose learners to authentic, comprehensible input to engage them in the teaching and learning process. To do this, demanding materials in the target language for successful language learning is necessary, but to some extent is limited. So, language educators believe that by using information and communication technologies (ICT), we can solve this problem. TELL provides them with all kinds of materials and resources.
2. The uses of technology provide qualified access and exposure to linguistic and cultural materials. For example, using digital multimedia technologies enhances access more efficiently than a single medium alone using audio-visual technologies in teaching English and found that it helped students learn English more than any other group using a single technology.
3. The technology uses enhance authenticity using video and the internet. This kind of material provides a natural and context-rich linguistic and cultural situation that enables the learners to access authentic target language that can reflect cultural changes more effectively than printed sources.
4. Flipped classrooms also help learners learn and improve their language skills.
5. TELL enables learners to develop strategic and self-regulated learning.

Therefore, TELL (Technology-enhanced language learning) impacts learners in many ways and guides them to acquire a second language or a foreign language.

Conclusion and recommendations

In this paper, we reviewed and analyzed existing research on language learning strategies in TELL environments, first about specific language skills (i.e., listening, speaking, reading, and writing), then as associated with target language subsystems, such as vocabulary and grammar, and finally, as linked to strategic, self-regulated language learning. The technology-enhanced language learning strategies were reviewed to demonstrate the specifics of what learners and teachers do with technologies in the Digital Age, how they embed language learning strategies into games, online platforms, and/or apps, and how they cultivate self-strategically self-regulated learning.

The following recommendations are in terms of language learning strategy theory and practice for more effective language learning with technology.

1. With the embeddedness of technology in and out of language classrooms, in addition to traditional research protocols, we call for more research instruments to investigate technology-enhanced LLS **(see e.g., Chai, Wong, & King, 2016** on learning strategies and strategy instruction in TELL contexts). Strategies that were not included in traditional frameworks of LLS need to be added, such as, for instance, socio-environmental strategies, proposed by **Hauck and Hampel (2008),** and human-computer interaction strategies with emerging technologies. In addition, social language learning strategies, which were seemingly less important in traditional schemes, are now known as collaborative language learning strategies and are identified as one of the most important strategy sets in email tandem exchange tasks **(Stickler & Lewis, 2008).**
2. Due to specific technological infrastructures, most TELL-based strategy research has investigated the effectiveness of a technology

and platform in a laboratory setting, often including only short-term treatments. Instruction in language learning strategies and self-regulated learning with TELL over longer periods (e.g., a semester), taking place in intact classes seems to be more suitable in digital realms. More research is needed to explore how 21st-century L2 teachers and learners handle strategies and self-regulated learning in technology-normalized day-to-day classroom operations.

3. Language learners are challenged by new forms of learning and seek new strategies for learning **(Oxford & Lin, 2011).** In addition, the availability of new technologies and language learning tools has grown much faster than the preparation of language teachers. In addition to knowing about teaching methodologies and assessments of language learning in traditional ways, language teachers in digital realms also need to be equipped with knowledge and skills to identify technical attributes specific to the new technologies that can be feasibly integrated into and engaged with classroom instruction, and, design technology-enhanced pedagogy with LLS orientation for their students.
4. Investigations into language learning strategies and the effectiveness of strategies-based instruction need to be expanded and diversified taking into account new types of human-computer interactions and modes of learning.
5. Students should be prepared by teachers how to use technology in their language learning.

References

Chai, C. S., Wong, L.-H., & King, B. R. (2016). Surveying and modeling students' motivation and learning strategies for mobile-assisted seamless Chinese language learning. Educational Technology & Society, 19(3), 170-180.

Chang, M. M. (2007). Enhancing web-based language learning through self-monitoring. Journal of Computer Assisted Learning, 23, 187-196. https://doi.org/ 10.1111/j.1365-2729.2006.00203.x

Chang, C., & Chang, C.-K. (2014). Developing students' listening metacognitive strategies using online videotext self-dictation-generation learning activity. The EUROCALL Review, 22(1), 3-19.

Channa M. A., Nordin Z. S., Siming I. A., Chandio A. A., Koondher M. A. (2015). Developing reading comprehension through metacognitive strategies: a review of previous studies. Eng. Lang. Teach. 8 181–186. 10.5539/elt.v8n8p181.

Chapelle, C. (2009). The relationship between second language acquisition theory and computer-assisted language learning. Modern Language Journal, 93, 741-753.

Cohen, A. D. (2011). Strategies in learning and using a second language (2nd ed.). New York, NY: Routledge.

Cohen, A. D. (2018). Moving from theory to practice: A closer look at language learner strategies. In R. L. Oxford & C. M. Amerstorfer (Eds.), Language learning strategies and individual learner characteristics: Situating strategy use in diverse contexts (pp. 31-54). London: Bloomsbury.

De Beni R., Palladino P. (2000). Intrusion errors in working memory tasks: are they related to reading comprehension ability? Learn. Individ. Differ. 12 131–143. 10.1016/s1041-6080(01)00033-4.

Dalton, B., Proctor, C. P., Uccelli, P., Mo, E., & Snow, C. E. (2011). Designing for diversity: The role of reading strategies and interactive vocabulary in a digital reading environment for fifth-grade monolingual English and bilingual students. Journal of Literacy Research, 43(1), 68-100.

Dörnyei, Z. (2001). Teaching and researching motivation. Harlow, England: Longman.

Griffiths, C., & Oxford, R. L. (2014). The twenty-first century landscape of language learning strategies: Introduction to this special issue. System, 43, 1-10.

Hauck, M. (2005). Metacognitive knowledge, metacognitive strategies, and CALL. In J. Egbert & G. Petrie (Eds.), CALL research perspectives (pp. 65- 86). New Jersey, NJ: Lawrence Erlbaum.

Hauck, M., & Hampel, R. (2008). Strategies for online learning environments. In S. Hurd & T. Lewis (Eds.), Language learning strategies in independent settings (pp. 283-302). Bristol: Multilingual Matters.

Lai, C., & Gu, M. (2011). Self-regulated out-of-class language learning with technology. Computer Assisted Language Learning, 24(4), 317-335.

Lan, Y.J. (2013). The effect of technology-supported co-sharing on L2 vocabulary strategy development. Educational Technology & Society, 16(4), 1-16. Li, J. (2009). The evolution of vocabulary learning strategies in a computer-mediated reading environment. CALICO Journal, 27(1), 118-146.

Nor, N. F. M., Hamat, A., Noorizah, M. N., & Bakar, N. A. (2011). An investigation on employment of interactive technological tools to comprehend online reading texts. International Journal of Learning, 18(2), 247-260.

Nunan, D. (2000). Technology support for second language learning. In P. Peterson, E. Baker, & B. McGraw (Eds.), International Encyclopedia of Education (3rd ed., pp. 204-210). Amsterdam, the Netherlands: Elsevier.

Nunan, D. (2003). Practical English Language Teaching Teacher's Text Book. McGraw-Hill.

Oakhill J. V., Cain K., Bryant P. E. (2003). The dissociation of word reading and text comprehension: evidence from component skills. Lang. Cogn. Process. 18 443–468. 10.1080/01690960344000008.

O'Malley, J. M., & Chamot, A. U. (1990). Learning strategies in second language acquisition. Cambridge, UK: Cambridge University Press. Ou Yang, F., & Wu, W. (2015). Using mixed-modality learning strategies via e-learning for second language vocabulary acquisition. Educational Technology & Society, 18(3), 309-322.

Oxford, R. L. (1990). Language learning strategies: What every teacher should know. Boston, MA: Heinle.

Oxford, R. L. (1999). Anxiety and the language learner: New insights. In J. Arnold (Ed.), Affect in language learning (pp. 58-67). Cambridge, UK: Cambridge University Press.

Oxford, R. L. (2011). Teaching and researching language learning strategies (1st ed). Harlow, Essex, UK: Pearson Longman.

R. L., & Lee, K. R. (2007). L2 Grammar strategies: The second Cinderella and beyond. In A. D. Cohen & E. Macaro (Eds.), Language learner strategies: Thirty years of research and practice (pp. 117-139). Oxford, UK: Oxford University Press.

Park, J., Yang, J.-S., & Hsieh, Y. C. (2014). University level second language readers' online reading and comprehension strategies. Language Learning & Technology, 18(3), 148-172.

Rahimi, M., & Katal, M. (2012). The role of metacognitive listening strategies awareness and podcast-use readiness in using podcasting for learning English as a foreign language. Computers in Human Behavior, 28, 1153-1161.

Saks, K., & Leijen, A. (2015). Supporting contrive and metacognitive learning strategies in technologically enhanced language learning. Estonia Educational Sciences Magazine, 3(2), 133-155.

Schmitt, N. (1997). Vocabulary learning strategies. In N. Schmitt & M. McCarthy (Eds.), Vocabulary: Description, acquisition, and pedagogy (pp. 199-227). Cambridge, UK: Cambridge University Press.

Smith, G. G., Li, M., Drobisz, J., Park, H.-R., & Kim, D. (2013). Play games or study? Computer games in eBooks to learn English vocabulary. Computers & Education, 69, 274-286.

Stickler, U., & Lewis, T. (2008). Collaborative language learning strategies in an email tandem exchange. In S. Hurd & T. Lewis (Eds.), Language learning strategies in independent settings (pp. 237-261). Bristol, UK: Multilingual Matters.

Stickler, U., & Shi, L. (2016). TELL us about CALL: An introduction to the virtual special issue (VSI) on the development of technology enhanced and computer-assisted language learning published in the System Journal. System, 56, 119-126.

Tang, G., Xie, D., & Wang, X. (2011). Wiki-based collaborative learning for college specialty English writing education. Paper presented at the 6th International Conference on

Computer Science & Education, SuperStarVigro, Singapore.

White, C. (1995). Autonomy and strategy use in distance foreign language learning: Research findings. System, 23(2), 207-221.

Zhang, H., & Song, W. (2009). A study of Chinese learners' behaviors in self-regulated CALL environment. Paper presented at the 2nd IEEE International Conference Beijing, China.

Zhou, Y. (2016). Digital vocabulary competition as motivator for learning in CFL classrooms. Journal of Technology and Chinese Language Teaching, 7(2), 1-22.

Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. Educational Psychologist, 33(2/3), 73-86.