How Interface Impacts Learning for Native Speakers

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ABSTRACT

Language learning in childhood is both similar and different from an adult learning a second language. This review argues that learning technology has an important role to play in elementary school language learning classrooms. To learn a new language, students need to hear, speak, read, and write it. These learning processes can be supported in the classroom with interactive media, such as including video games, in particular those that are accessible to everyone. This literature review will review research child development and language learning. It will seek to cover information on different linguistic theories and approaches. This research is divided into three primary sections and two sub-sections. First the literature review will cover how students learn a new language, followed by the interfaces that are currently being used and created. Finally, it will cover information on video games specifically diving into how successful games can help one learn a language. Through interfaces, students will be able to grasp a better understanding of language.

KEYWORDS

Second Language, Native Speakers, First Language

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1 Introduction

This literature review will be focusing on young children in elementary. The overall objective of this research is to explore the relationship between research and practice in applied linguistics. It is important that children learn language from caregivers and parents. Children tend to mimic the behavior and language of adults. This process allows children to acquire phrases and new words due to repetition. The basic understanding of the cognitive, social and emotional development of different age groups will be helpful when teaching, planning, implementing and interpreting research. In this research, I will be explaining microlearning and how it is effective in learning a new language. Children learning linguistics will be introduced as well as social robots. I will introduce Krashen's theory of second language acquisition which will give us background information needed to understand how people learn a second language. In modern linguistics, there are many theories as to how people develop language ability. According to Krashen's theory, there are two independent ways in which one develops linguistic skills: acquisition and learning (ElBatanony et al., 2021).

The five hypotheses of Krashen's theory of second language acquisition: the acquisition-learning hypothesis, the monitor hypothesis, the input hypothesis, the affective filter hypothesis, and the natural order hypothesis (ElBatanony et al., 2021). The acquisition-learning hypothesis is known by linguists and language teachers. It is the process that children undergo when they acquire their first language. It requires meaningful interaction in the target language - natural communication - in which speakers are concentrated not in the form of their observations but in the communicative act. The Monitor hypothesis explains the relationship between acquisition and learning and defines the influence. The monitor acts in a planning, editing, and correcting function when three specific conditions are met: the second language learner has sufficient time at their disposal, focuses on the form or think about correctness, and they know the rule. The Input hypothesis is Krashen's attempt at explaining how second language acquisition takes place. According to this hypothesis, the learner improves and progresses along with the 'natural order' when they receive a second language 'input' that is one step beyond their current stage of linguistic competence. The Affective Filter hypothesis embodies Krashen's view that a number of affective variables play a useful, but non-casual, role in second language acquisition. These could include motivation, self-confidence, anxiety, and personality traits. When the filter is 'up' it stops language acquisition. The last hypothesis is known as Natural Order which predicts that there will be grammatical structures that tend to be acquired early while other people acquire later. Both children and adults can subconsciously acquire language. This process is similar to the process children undergo when learning their native language. (ElBatanony et al., 2021)

2 Students Learning a New Language

In this first section, phonology will be explored. Phonology is the study of sound structure in language. In both

speaking and understanding, it provides the medium by which meaning is conveyed. It is useful to provide a working framework for the study of the sound structure of the language. This is because when adults speak to children, children will mimic what is being said from adults.

2.1 Linguistic Skills

All components of phonological processing are cross-linguistic skills that relate to decoding across languages. In one study, skills were examined by following a theory of core phonological processing deficits that has three related constructs - phonological awareness, phonological coding, and phonological recording (Leafstedt & Gerber, 2005). In summary, phonological processing is a set of cognitive skills needed to process sounds. The purpose of this study is to frame basic questions about the reading difficulties of English Learners (ELs) in terms that relate to cognitive mechanisms. Krashen's monitor hypothesis asserts that a learner's learned system acts as a monitor to what they are producing (ElBatanony et al., 2021). I will review what kinds of cognitive resources related to the first language, also known as L1, competencies are available for via cross-linguistic transfer as they learn to read English (Leafstead & Gerber, 2005). Multiple cross-linguistic studies suggest that linguistic experience plays an important role in tone perception and the source of difficulty in learning tones has generally been attributed to the interference from English stress and intonation systems for American students (Fan et al., 2017). Because cognitive resources are available, it is easier to analyze what learners need. Learners depend on their second language when they forget their first language. The first theory of common underlying proficiencies (CUP) states that common underlying knowledge about language lies beneath the surface of bilingual or multilingual performance (Leafstead & Gerber, 2005). For example, knowledge in reading in L1 (First language) is an available resource for assisting in L2 (Second language) reading acquisition. This goes hand in hand with cross-linguistic transfer which is conceptualized as the access and use of linguistic resources in L1 (first language) by students while learning other languages (Leafstead & Gerber, 2005).

There is an overlap between natural acquisition and instructed learning (Pinter, 2011). In order to preserve languages, one must speak it to the child. Language has a critical period tied to learning. Therefore, infants and children can acquire a language faster, up until they are seven years old. This is because children have a working memory which gives them the ability to hold information short-term, while transforming or manipulating it in some way (Lipka & Siegal, 2012). The dual language exposure is expected to enrich vocabulary development (Malzkuhn & Herzig, 2013). It is generally accepted that for English learners, as a second or foreign language, there is a transfer of skills, abilities and patterns from the L1 (first language) into the L2 (second language), especially in writing (Simpson, 2004). Krashen's natural order hypothesis states that all learners acquire a language in roughly the same order (ElBatanony et al., 2021) There are three components in the transfer of literacy skills — the cognitive processes involving writing and reading, the structural components that underlies writing and reading, and then the mechanism that allows the processes and structures to transfer, either across languages or across modalities (Simpson, 2004). In other words, the transfer of skills needs to be effective, so the child has enough cognitive development to learn about writing and reading (Simpson, 2004). Support is given from teachers but must also come from parents and all those who surrounding the student. It is important for teachers to learn to explore the differences and similarities in language acquisition, so they can work effectively in the classroom. (Pinter, 2011)

2.2 Children Can Grasp a Language Faster

Research shows that children between the ages of 6 and 10 use both left and right hemispheres of the brain to contribute to language development (Sugiura, 2011). As the language system dramatically develops during childhood, the brain and functions should as well. The brain grows double the size during the first three months of life than any other time (NWTLiteracy, 2015). Everything that the child experiences and hears for the first six years will influence their social interactions and their ability to learn. This does not mean that it is set in stone, but it lays an important foundation. There is something known as "Windows of Opportunity" when the brain is ready to receive specific kinds of information from the senses (NWTLiteracy, 2015). This is a time where one can learn a particular skill and grasp knowledge more easily than at any other time in our lives. It doesn't mean it shuts down, but the brain is ready for the information. This starts at birth and ends at age 7 or 8. The executive function is the skills for people to learn later in life. Babies begin learning language as soon as they are born. Acquisition of language is a natural, intuitive, and subconscious process of which individuals need not be aware. The baby is unaware of the process as it is happening, and when the new knowledge is acquired, the baby does not realize that he or she possessed any new knowledge (ElBatanony et al., 2021).

Language systems dramatically develops during childhood, the brain and functions and structure should as well (Sugiura, 2011). All children begin to babble at the same age despite the language in their household. When looking at young children's vocabulary, their vocabulary is distributed across their languages, they typically know fewer words in each of their languages, when compared to their monolingual counterparts. When all words are added together (from different languages) bilingual children know approximately the same number of words as monolingual children.

One study looked at students living in a bilingual household and attended bilingual preschools. Results showed that there was no loss in Spanish proficiency over the one-year period at the bilingual preschool (Winsler, 1997). The learning environment needs to interact and be engaged with people who speak both languages on a regular basis (CU Boulder School of Ed, 2019). During this time young bilinguals are still building their linguistic resources. Kids use their emerging language repertoire resourcefully. For example, if a bilingual child cannot quickly retrieve in one language, they borrow it from the second language.

Code mixing helps bilingual children think strategically. Kids as young as two-years-old show some ability to adapt their language according to the language used most at home. Research shows that bilingual children have code-mixing as apart of language development (Winsler, 1997).

One important recommendation is to allow native speakers to play the role of an expert assisting the learner in improving both linguistic and cognitive skills related to the language (Fan et al., 2017). Native speakers can offer authentic language discourse to help language learners acquire new lexical items and correct grammatical structures (Fan et al., 2017). Moreover, the experience could help learners gain confidence and motivate them to engage in conversations in the future (Fan et al., 2017).

Support is given many ways, such as a child's environment but it comes from parents as well as those who interact with the student. Bilingualism converges on a simple take-home point; earlier is better for some aspects of language learning. There may not be a sharp turn for the worse at any point of development, but there does seem to be a slow decline in some language learning abilities (CU Boulder School of Ed, 2019). Our brains may be more receptive earlier in life, however, other factors such as motivation, social context, or environment may have an impact on learning a second language (CU Boulder School of Ed, 2019).

3 Learning Interfaces

This section explores the use of social robots for one-on-one tutoring as well as introducing integrated physical learning materials from mobile device applications that benefit early childhood learning (Cheung et al., 1993). It seems that the demand and development for assistive technologies has increased as recent software and hardware computing is getting more reliable, easier to implement and more affordable (Garcia-Ruiz & Santana-Mancilla, 2019). Over the past decade, educators have been incorporating mobile devices such as tablets and touch laptops as part of their teaching tools. Elementary classrooms now include tablets for subjects such as language learning, arithmetic, music, design, and art. This is because educators take advantage of their interactivity and portability. This approach rests on the theoretical foundation that sensory-motor activity are critical to cognitive development (Cheung et al., 1993). Mobile phones are always a great platform to implement anywhere, anytime micro-learning opportunities, since it accompanies its owner wherever they may go. There is a great deal of mobile language learning systems with which learners can leverage the brief fragments of free time that are spaced throughout the day for language learning tasks (Fan et al., 2017).

Another interface educators are using are voice user interfaces. Voice user interfaces, also known as VUI's, support children's language development by serving as a learning interface (Pantoja, 2019). It is a successful, engaging tool because it allows children to act as a mediator of the voice agent by repeating what the agent said to their classmates. Voice agents promote peer interactions because it stimulates children to communicate and engage in social activities with their peers during the day. VUIs could be an alternative way for adults to communicate with children using speech synthesis. Because it was used as an app on a tablet it kept the student always engaged.

Another interface educators are using are social robots. Social robots are an artificial intelligence system that is designed to interact with humans. Social robots are used for educational purposes to help students stay engaged and get responsive feedback (Rintjema & Schodde, 2018). Vogt's case study investigated the effectiveness of robot tutoring, as well as analyzing the effectiveness of learning from a robot tutor (Vogt, 2018). Changes across sessions are measured on two dimensions: engagement and performance. In this case study, participants were required to take seven lessons to guide them to learn English vocabulary as a foreign language using a social robot (Vogt et al., 2019). There were 15 Dutch children: 5 girls and 10 boys. The robot is from SoftBank Robotics NAO who autonomously worked with the participants for four sessions. During these microlearning sessions, students were tested on what they acquired after. The results show that children improved their learning achievements after spending time with the robot as a tutor and enjoyed having immediate feedback.

In addition to robot tutors, language learners take advantage of social media as an interface. Li's study (2017) investigates performance on how Spanish speakers use social media to learn English. Participants were told to use social media to see their preference of tools to learn English. The students enjoyed the platforms because they induced more student-to-student interactions making them feel more comfortable. Although Li's study participants are in high school, it applies to children now and their current interfaces used for learning. This study shows that students used social media to watch video lectures at home and to communicate with their classmates on out-of-class assignments. Teachers are continuously adopting new elements for teaching and learning, e.g. setting up a YouTube channel for delivering video lessons, utilizing DropBox, Google or OneDrive for students to share their presentation files (Li, 2017). It helps students stay engaged and helps with language learning. YouTube is students' most frequently used tool for the English language. It is the most effective tool because departments all over the world create a number of videos for teaching purposes. Students use social media to keep each other motivated to complete their work. The more the students' shared materials, including information, files, links, via social media for classmates to complete assignments the more they obtained materials from classmates to complete their own assignments and vice versa (Li, 2017).

Overall, this section described an exploration of the VUIs design in the context of high-quality social play. Voice agents will be increasingly used to facilitate creative, social activities. Elementary and preschool facilities will be incorporating technology in their classroom. Having an instant feedback system will come in handy when teaching and learning language. It will allow children to repeatedly speak to the voice agents. Students also used social media to encourage them to do work. Compared with the other learning activities, sharing and obtaining materials (i.e. materials exchange) are perhaps the most consistent students'

activities in their learning practice through the means of social media (Li, 2017). Let's welcome the new era of learning.

4 Video Game Design

In this third section, video games will be explored. The use of educational games is increasing, and it is important to verify these tools to provide users with the most adequate learning environments (Nunes et al., 2014). The main objective is to support children's speech and language development by implementing microlearning. Important usability testing and design guidelines regarding mobile interfaces are addressed (Garcia-Ruiz, 2019). Learning a new language takes time, but for others, it takes a lifetime to become fluent. For new learners, memorizing a dozen new words can take several hours of practice while mastering a language may require several years of dedicated work (Haustasaari, 2019). The more the language differs from a learner's native language, the more time investment one will need to reach proficiency. In order to overcome these challenges, researchers who have studied a second language educational technology have taken an approach to support microlearning. Microlearning deals with relatively small learning units and short-term learning activities. Microlearning helps because it follows the concept of spaced learning, which is then more effective and easier to retain if it is spaced out over time. For example, if a traditional eLearning course of 2 hours took two hours, microlearning would take a different amount of time to complete. It would essentially be 2 hours spaced out into 24 modules of 5 minutes each. According to scientists, information would likely end up in long-term memory and will be recalled and retained more easily.

In studies, a mobile application will allow second language learners to use their walking time to learn new words (Fukushima, 2019). Often second language learners lack the motivation to dedicate their time to vocabulary learning over other daily activities. Fukushima's application will allow learners to leverage their "downtime" when walking to school or work, to study vocabulary items. This study combines audio learning and location-based contextually relevant to accurately teach learners new words while walking. This is perfect for those who live in major cities. Sometimes, life gets too busy and in order to prioritize learning a new language, one must make sacrifices to maintain motivation. To overcome these challenges, second language learning technologies have taken an approach to support microlearning. As stated previously, microlearning connotes short and sporadic opportunities during the day when a learner shifts their focus from other tasks to vocabulary learning, while waiting for a train (Fukushima, 2019).

Polyglot Cubed is a matching game designed to match words and the picture representation of the word (Grace, 2012). The primary goal of this game is to provide a general audience with a way to learn basic vocabulary for planned foreign language immersion (Grace, 2012). This game would be perfect for those who are interested in visiting another foreign country. Usually, educational games result in an awkward coupling of game-goal with educational goal (Grace, 2012). Not only that, but it detracts from the game's values. Grace's research follows the multiple-trace theory because it allowed participants to play for 20 minutes but play time was recorded in 5-minute intervals. The multiple-trace theory is a memory consolidation model advanced as an alternative model to strength theory. With that being said, participants were able to retain information and learn new words because of the short intervals. Reducing the number of words presented to new users would reduce player stress. Following the multiple-trace theory, participants also experience the microlearning approach. Microlearning only takes five to thirty minutes. Because only one topic is covered, participants will not feel overwhelmed with too much information. Microlearning components often strip down extraneous content and focus only on what you need to know.

Another game design that incorporates learning a new language is VocaBura, which combines audio learning with location relevant L1-L2 word pairs (Hautasaari, 2019). The goal of this interface is to support second language vocabulary learning during daily routines while users focus on other tasks unrelated to vocabulary learning. This approach helps the learner recall words related to real-life locations they pass during their walking commute. In other words, vocabulary learning occurs when participants are walking by. Participants are more likely to remember words when it is said more frequently. According to the multiple-trace theory, repetition improves learning because finding at least one trace of an event becomes easier when there are more traces of that event in memory. With that being said, if the walking commute is the same route every day, participants will be able to retain information making it very helpful to learn a second language. As humans, comfort is sought in a familiar environment.

Conclusion

Through these evaluations of educational games, it was possible to make video games a medium to help learners learn a language. This work has implications for how open-ended designs can foster bilingual literacy learning by encouraging language differentiation through exploration and providing natural opportunities for family co-engagement (Nazare et al., 2017). Educational technology - such as learning apps for mobile devices - has become more prevalent in homes throughout the world. Overall, this review argues that learning technology has an important role to play in elementary school language learning classrooms. Interface has introduced so much different opportunities for people to learn language. Through interfaces, students will be able to grasp a better understanding of language.

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