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Revolutionizing Language Learning with Smart Technologies

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Abstract

The technologies also enable more personalized and engaging experiences for students with very little additional burden on the instructor. As students create language utterances and engage in activities with these technologies, valuable data is collected to reveal uncommon mistakes, matters that are genuinely hard for reasons other than non-comprehension, relevant skill trajectories to consider, reasons for disengagement, and measures of whether effort will be sufficient to reach the needed proficiency in time. It is also possible to demonstrate whether a failing student can perform well when the needed accommodation in pedagogical strategy is identified and implemented. In this chapter, we identify three major pillars to revolutionize language study through the use of smart technologies: 1) Individually adaptive learning systems that learn about the students, the content, and the semantics and pragmatics of student interaction; 2) Pedagogically smart virtual characters, also able to understand their students and possess appropriate personality and emotion; 3) Immersive virtual environments that increase the rate of experiences and simulate the situations where language is needed.

Keywords: **Language learning, geography, mobile learning, smart technologies, mobile-assisted language learning**.

Introduction

Throughout history, educators have occasionally taken stock of new technologies to enhance education, predominantly, nowadays, the establishment of literature and gadgets defines a person's

capabilities. Given an emerging landscape, countless people find the need to learn a second language. Of the many tutoring districts, businesses, language coaching, and OK activities, language tutoring signifies a substantial worldwide industry that convenes with the felicitous services of assimilating language. In such a favorable environment, numerous core lore tenets have been tested, shaping himari's teachings of cognitive theory, comprehension, and literature, stervations, insecurities, structure, conversation, solace, cultural awareness, nuances, grammar rules, habits, assimilation, fluency, vocabulary, transaction, conversationality, worldview, and rules for dissonance.

In today's globalized environment, the role of language learning cannot be underestimated. Instead, the vigor of a firm is manifested through its efficacious involvement in international communication activities. In such a setting, foreign language education rose to prominence through its pivotal role as a medium, an instrument for international communication, and for commencing global connections. Many come into contact with the multiple functions and aims of foreign language training through their education as students, conscripts, and professionals. Yet, despite becoming aware of these components, a predominant prejudiced belief rooted in language teaching is the conviction that learning languages and teaching languages is solely about celebratory opportunities fulfilling the institutional purposes of higher education, regulations, development, and striving for social inclusion. (Makhmudov, 2020)

Background and Significance

As language acquisition is not confined by formal educational settings or curricula, these technologies can foster organic, lifelong language learning by breaking down the conventional campus or program barriers. Furthermore, current smart devices, assisting mobile learning everywhere and constantly, cater to the socio-constructivistic and ubiquitous nature of communicative language learning, which requires situated experiences with people outside of the classroom. By affording language learning a significant fraction of the user experience of smart technologies, educational products involving language learning elements can also explicitly align themselves with today's booming mobile device market. (Lock et al.2021)

On the other hand, smart software can also make state-of-the-art natural language processing tasks, such as machine translation, complex grammar check, and spoken dialogue systems, more overt, functional, and user-friendly. This provides immediate and discrete assistance for every small predicament a language learner might encounter, immediately and discreetly, anywhere through any portable smart networking device.

In the early years of the twenty-first century, networking technologies such as computer-based multimedia and the World Wide Web have significantly enriched communicative and interactive language teaching. Smart software, such as intelligent tutors and automated agents powered by artificial intelligence, can now tailor user-specific learning strategies and materials in real time. They can deliver such materials via both synchronous and asynchronous communications in pedagogically subtle ways and provide detailed feedback to student performances to encourage language heterogenesis, rather than mere form manipulation.

Theoretical Frameworks in Language Learning

The six domains were identified as essential to raising language competence; the functional purposes of second language teaching and learning (i.e., What should learners learn? How do learners learn, and what are the purposeful plans of their behaviors?) were identified in the construction training of language learning sources for teachers.

SLA theories provide theories and applications for language learning activities in six broad areas: 1. Language classroom teaching and learning; 2. Design for first language development; 3. Second language acquisition; 4. Interactions in language research; 5. Language assessment; 6. Language development. (Friedrichsen, 2020)

Educational image training is essential for language teachers in conducting language acquisitions and due to air languages, especially from children, by using primary language development theories for conducting language teaching.

In particular, expertise in traditional language teaching and learning, lack of available resources for instruction, and limited state support for training language teachers further resulted in a lack of automatic self-feedback in providing additional knowledge of language learning pedagogy. Therefore, most research findings were aimed at providing teachers with knowledge and understandings within second language spills for the purpose of framing SLA theories and confirming knowledge grounded in curriculum design.

Krashen has simplified the processes in first and second language acquisition and concluded that input was provided as the sole factor influencing the two developmental sequences. This theory initiated a paradigm shift in SLA research, and subsequent empirical studies were designed to confirm the effect of input on adult language learning.

Theoretical frameworks in language learning theories, drawing on or related to first language child developmental theories, always have a significant contribution to explaining second language developmental phenomena in the field of language acquisition. However, theories related to adult language learning reveal that there was a lack of acceptance of such theories as scaffolding for designing curriculum in the field of second language acquisition (SLA).

Behaviorism and Language Learning

In 1913, the American psychologist John Watson published a paper on behaviorist theory. Behaviorism is a psychological theory that sees language acquisition as a mechanical procedure, relying on a series of intertwined conditions (stimulus-response) proposed by Watson. He was particularly interested in articulating plausible accounts of the necessary connections between speech and observable stimuli and envisages a method of teaching foreign languages that is unable to make sense of a single word but requiring that each sentence response be immediately made to the appropriate stimulus. Watson postulates that the learning of a foreign language would be easy and that any child could profess at the end of two years that he grasps a foreign language as readily as he understands his own. Readiness is acquired by mere repetition of the spoken or written indicatory sentences. According to Watson, by using a great number of identical sentences, the teacher could teach the boy to react to "quis es tu" with many tricks. He could be taught to give twenty different replies to "quis es tu," in response to his teacher saying "autem ego sum pater tuus." The child would then acquire a host of linguistic spleens replying very naturally to word-combinations concerning himself, his family unit, and so on. (Santana, 2023)

Cognitivism and Language Learning

We can say that the sociointeractionism function, which is the subject of our research, takes cognitivism support, and the key idea is the importance of social communication at the heart of human knowing and the learning process. Cognitivist learning theory is that learners impose meanings actively, interpret information, and make sense of it. The theory is that humans are self-directed and grow towards self-realized determinations. The issue emphasized by the theory of learning involves understanding the learner's complex working of the cognitive structure and internal web structure and

details in awareness in the performance of the learning process. The individual's skill-building process is founded on internal readiness and certainty structures and information presentations. Cognitivism also removes the individual from the focus, making this process the main consideration factor, instead of creating specific learning objectives, and enabling student evaluations to be more effective.

Cognitivism is opposed to behaviorism, considering the human mind to be active and deciding, and what is essential is not the changes in the state of the person but what he does with them while doing research in the learning process of the human mind. In short, instead of criticizing the passive action of the human mind in learning, it emphasizes that active action in the learning process. In the process of language learning, considering the mind as active is compelling. Language occurs when the human mind makes active decisions. For example, in the case of a conversation, according to this learning theory, two people are talking because they make decisions and understand each other by interpreting what the other person says, deciding what they are going to say in response. (Muhajirah, 2020)

Constructivism and Language Learning

Second language acquisition theory is based on the practice of classroom teaching, doing, and experiencing together with materials in the language classroom. The students are necessarily both physical and social participants in the process of learning, doing, and acting. When we observe their behavior for a long time, we can study how, under what context, when, and in what ways they have studied with the language. They can also unfold and construct their own languages and patterns in a creative way. The internal structures for the common meanings are easily acquired through the interaction involved in referent information sharing.

There is growing agreement among scholars across a variety of fields that language is best understood as tightly interwoven with social and cultural practice. However, despite important advances in our understanding of language and culture, the pedagogical treatment of second language has not yet been suitably addressed.

Sociocultural theory looks at collaborative learning to study learning within its local context and as a social activity with cultural meanings. The essence of language learning is students' joining the language game, using and interacting with the target language in social interaction within the coactive and scaffolding relationships, and thus practicing communicative strategies little by little. (Khan & Mansoor2020)

A number of theories have been put forward to outline the process of language learning, and a theory relevant to the interactive design of CAL materials is constructivism. Constructivism is a theory based on the notions of active learning, learner autonomy, and collaboration in social contexts. Language acquisition and development that result from natural communication within social contexts have also been addressed by contemporary approaches, such as sociocultural, socio-cognitive, and socio-interactive theories of the cooperative/collaborative learning literature.

Current Challenges in Language Learning

Foreign language learners face various difficulties, such as pronunciation, grammar, and word learning, reading comprehension, and speaking of the foreign language. It is hard to overcome these difficulties. For example, pronunciation is difficult to correct if one does not make a genuine effort. Language teachers offer linguistic corrections using a variety of methods, such as marking students' errors, correcting their errors, and asking to prove English use without correcting the students' errors. If language teachers correct all errors, students' performance may improve within an assignment, but their next assignment will still need to be re-corrected. If language teachers do not correct the errors,

students may not be aware of their errors and may continue to make those mistakes. Additionally, teachers may distinguish the importance of those errors, but students may not realize their severity. Many teachers aim to find an optimal balance between the benefits of correction and the amount of error correction.

Today's language learning settings tend to be limited in terms of providing dynamic interaction in real-life communicative situations rather than in traditional classroom discourse involving merely one-way transfer of knowledge by the teacher. This teacher-directed verbal behavior is essentially limited to dialogues, with only the most imaginative and innovative teacher able to bring varied situations and experiences to children who may need to learn to communicate in another language. The teaching and learning methods are basically transmissive, meaning that knowledge is given from higher levels in terms of information, skill, and reinforcement. Much of the function of such classroom interaction is to provide opportunities for educational activities. Teachers and students are familiar with the mechanism of that structure that is situated in a social and person-to-person, face-to-face, coupled (oral, non-oral, etc.) method of interaction. It is this unique type of person-to-person communication that classroom instruction in another language attempts to replicate.

Lack of Personalization

Technology can contribute to personalized learning by assisting with an instructor's ability to manage a classroom effectively. Texts physically guide many students on assignments by assisting with the ability to listen, ask questions, participate in discussions, and explore sounds that don't make any sense. These are daily assignments, projects, and examples of curriculum that will help learners broaden their knowledge. Medium controls the human development this assistance provides. It shapes the conversations that are expected and helps justify grading a wide range of assignments. Providing consistent and effective feedback should be a factor in any platform or app for language study. It can make progress visible and provide incentives for life-changing personal success.

There is a reason personalized instruction has long defined the approach of the best language teachers: the research speaks for itself. Innovation in e-learning is much needed. With the appropriate assistance of natural language technologies, learners would be able to earn credit beyond simple assignments for conversation exercise and story composition, whether they work alone or in teams. By fostering individual goals, the application could contribute to personal and social progress. Meanwhile, teachers can direct these interactions and further observe student growth, focusing on the aspects that make everyone productive, responsible, caring, and honest.

In this regard, technology still has a long way to go. As mentioned before, learners still generally rely on interactions with pre-recorded lessons and assessments that provide little help in recognizing advances in spoken language. More than that, few applications attempt to tailor their teaching to the needs of multiple learners. For example, they do not allow siblings attending the same school to work through a digital course together, even though they might both be learning English as a second language. (Harris et al.2021)

When a teacher instructs students in learning a language, the key to the success of that process is personalization. Since there is a high variety in learning styles and paces of progress from individual to individual, a good teacher is one who can help a high number of students by adapting instruction techniques based on multiple approaches. In doing so, the teacher tailors assignments, activities, and incentives that make the classroom a better place for everyone.

Limited Interaction Opportunities

To promote language learners' communicative patterns and language acquisition, a flexible instructional model needs to be established that promotes both learner and expert teacher roles. That is, CMC can be designed to adapt and interleave two discourse threads: topic-centered content and language-based content. No matter the kind of content thread, the teacher plays a significant role, either explicitly within the CMC technology or implicitly through the learning materials themselves. Therefore, each thread promotes one or the other aspect of the teacher-student shift within CMC environments. The said shift requires not only that a discourse become a technology, but also that both teachers and students understand what the technology can do to foster that shift and employ it in various roles according to what it can offer. The integration of all these elements into traditional classroom teaching practices should form the foundation of a building for adding information and modern technologies.

As Ritchie et al. (1997) pointed out, learner-learner interaction cannot be guaranteed in all types of learner-centered tasks. Thus, it is important for teachers to provide students with opportunities for peer collaboration. Four categories of those types of collaboration have been classified: cooperation, competition, information gap, and opinion gap tasks, each of which is employed for specific communication purposes. Additionally, as research has found, when they are given side-by-side technology, they can actually help each other and stay focused more than they do when teacher-centered style is employed. Similarly, with the technology, a small student group learns through cooperation, assisting one another in learning the material by using interactive, self-paced, and situated multimedia content. However, implementing task-based language learning, or more specifically, CMC activities is not that easy, since teachers are unlikely to change their entrenched practices.

Role of Smart Technologies in Language Learning

The primary reason why smart technologies are deeply ingrained in the education sector is their provision of exhaustive resource banks. From a computer configured with Internet access, both preparatory and presentation materials can be easily captured by language teachers, including ppts, news, supplementary materials, multimedia, etc. With up-to-date technology, various authentic materials are available on different platforms. The introduction of advanced smart technologies facilitates the way of presenting different topics on a global scale. For instance, while materials stored in CDs or DVDs can only be shown by a CD or a projector, online videos can be browsed and presented by both individual students or the whole class.

The world is witnessing a rapid advance of smart technologies in every aspect of human life, from sports and culture to education and healthcare. In the field of language learning, smart technologies perform a great deal of diversified functions. First, in terms of content provision, the development on different platforms offers learners diversified, up-to-date and authentic materials, including news and video clips. Second, in regard to learning management, smart technologies enable language educators to incorporate a range of diverse activities within the learning process, such as speaking, listening, reading and writing. Third, in terms of collaboration building, language learners can contact individuals with the same interest and exploratory nature to discuss and interact on a large scale.

Adaptive Learning Systems

In another study, the results indicated that students who complete personalized assignments using the adaptive e-learning system significantly outperformed participants in the control group. The

adaptivity of the reading strategy instruction was also effective; that is, higher readers' comprehension was affected negatively when using the non-optimal strategy in the low strategy adaptivity condition. Adaptive strategy instruction significantly influenced reading comprehension and time on task, resulting in higher comprehension scores for students. The adaptivity in these learning environments is automatic because they base the system's decision.

Adaptive learning systems tailor learning activities, resources, and the learning environment to the individual student. In language learning, some research findings are based on empirical studies looking at a variety of applications using adaptive learning systems, just-in-time teaching, or a different approach. For example, game-based adaptive learning systems enable students to achieve higher motivation and have greater satisfaction in playing a game and subsequently achieve better knowledge acquisition and performance. The adaptive learning system that automatically adjusts the level of educational gameplay to the abilities of the student intends to provide a tailored learning experience. The results indicated that the adaptive serious game achieved better motivation and knowledge acquisition among the students across two different variations of the game.

Interactive Language Apps

At present, there are numerous good interactive apps designed to assist users in learning a new language. Many of these apps are free to download and use. Some well-known apps in their respective fields include Babbel, Duolingo, Rosetta Stone, Mango Languages, Memrise, Mindsnacks, Anki, Busuu, and HelloTalk. Note that while many of these apps are free to use, they still possess useful lessons that can effectively optimize users' knowledge. According to, Mindsnacks, Babbel, and Rosetta Stone possess flashy interfaces and clear icons which make the navigation smooth. They are geared towards those with enthusiast intent. With consistent use, self-learning apps like Anki and Memrise can provide users with specific content that they want to study.

There are numerous smartphone and tablet apps intended for learning the English language. Two well-designed ones, Babbel and Duolingo, merit attention. Given that the user experience of the two is quite different, it is interesting to find out which one is preferred by college students for English language learning. Two surveys conducted by us among a total of 308 college students suggest that while Babbel and Duolingo are chosen in almost equal numbers, Babbel is rated significantly higher than Duolingo. A possible reason is the greater focus of Babbel on conversational skills and speaking ability. In answering the questionnaire, the students have provided us with useful information about their preferences and the reasons behind such preferences. (Kalsoom et al.2024)

Artificial Intelligence and Language Learning

Unlike merely memorizing materials, language learning also requires practice and immersion. Historically, this cannot be learned but must be experienced, often traveling to a country where the language is spoken for an extended period. However, the development of world internet has made real-life practice in language learning feasible, by playing web-based games, using chatbots, and conversing with other learners and even native speakers throughout the world. In smart systems, artificially intelligent chatbots not only support domain-specific language learning by engaging students in real-time exercises on given topics, but also participate in problem-solving tasks and role-playing so that students can learn grammar knowledge while practicing spoken language. Learning game concepts are not only used as learning aids in education but also found in many professional training scenarios, especially in language learning.

How do smart technologies empower language learning? In the context of language education, smart technologies that incorporate AI are effective in making education targeted, personalized, and

rich in feedback and opportunities for application in real life. With the help of AI, systems that provide language learning can adapt to individual needs and provide beneficial support both to learners and to language instructors. AI in these smart systems collects and analyzes data from learners, combined with an understanding of how learning happens. It can categorize, note progress or misconceptions, and determine how learning needs to be adjusted and diversified just like a good language instructor might. Even better, a smart system can adjust nearly instantaneously and has access to a wealth of data and resources. (Huang et al.2023)

Natural Language Processing

Today, every second person on earth speaks two or even more languages. This fact is forcing educators to think about new efficient methods of foreign language learning. New advantages in modern IT technologies allow new modern eLearning solutions to be created. However, the efficiency of foreign language eLearning courses is a non-trivial problem. Each student has his/her own learning approach and learning path, and effective learning should be considered in terms of student achievement in the context of learning and teaching. In other words, learners must have the learning objectives from the beginning to align the learning process, content, and performance assessment.

The natural language processing (NLP) significantly improves the traditional language eLearning process by providing automatic processing and analysis of language, discourse, and dialogues, which greatly enhances language learning. NLP is particularly able to enhance training quality and scalability in a new way. In practice, though, the current approach to enabling NLP is similar to that used mostly for keyword content processing: Standards are used to provide a set of concepts and a domain of discourse to apply the content, and interesting analysis can be performed.

Chatbots and Language Practice

Meanwhile, a Japanese language student Abby, who used the chatbot LARI as her speaking partner, reported substantial improvement as well as satisfaction in learning Japanese. Moreover, research conducted has demonstrated that the effectiveness of speaking practice tools developed with mobile environments can be just as effective without the use of a complete tutoring system.

An investigation focused on the viability of SLA when using dictation activities together with an ASR-based conversational agent. The results showed potential of the conversational agent as a second language instructional tool. During a 25-minute dictation session, children spending 5 minutes conversing with the agent had improved significantly in their subsequent dictation activity as compared to those who do not. These results suggest that conversational agents utilize dictation activities to facilitate language learning.

An exploratory study found that virtual conversation partners with speech recognition capability using ASR technology are effective and more preferable by students who participated in language learning. However, the virtual conversation partners that were evaluated in the study were not capable of providing the students with any feedback. While some learners reported conversing with the virtual conversation partners to be unnatural, others also appreciated conversing with them especially when they were capable of recognizing and transcribing large portions of the conversations. Learners have reported feeling less pressure and more comfortable conversing with virtual conversational agents and secretaries as compared to having real conversational practice.

Chatbots are used in language learning settings to deliver language tutoring using text-based chat interactions. Various studies have evaluated language learning chatbots' effectiveness across various languages and learner populations. Generally, learners have more positive attitudes about using conversational agents as compared to other types of technology.

Gamification in Language Learning

The concept of functional literacy expresses the development of reading and writing skills in essential cultural activities. So teachers propose games and other game modes that aim to address diversity. Several authors justify the need to explore, discuss, and understand the cultural aspects and the life experiences of young learners as an important aspect of teaching and learning by exposing students to a rich array of experiences. The use of games, activities, puzzles, and jokes as tools for effective language teaching contributes to the construction of a pedagogy that has sense for young learners whenever necessary, efficient, and feasible, whether to prepare and conduct meetings, communication boards, or for other systematically use the board to help the students visualize the language elements that problems have to solve.

Complex material can be simplified through games, puzzles, and riddles that stimulate learners. Games provide emotional involvement and psychological security by immersing learners in play. The possibility of repeating the game as many times as needed in a relaxed environment greatly reduces stress related to learning an active second language. Difficulty can be adjusted to the goal set for the students, providing necessary motivation. Games are part of many methods cited in the literature about the teaching of foreign languages to young learners, but no studies on the integration of TEL games have been found. In this line of research, the use of serious games fascinated by the concept of play will be considered for teaching and learning of foreign languages as an enabling tool for the effective application of learning aligned with pedagogy and technology for elementary classes. (Ahmed et al.2022)

Benefits of Gamified Learning

Kagima and Taylor (2019) advocate the importance of game-based learning over gamification of learning, as the former is likely to provide greater learning benefits if designed appropriately, whereas the latter focuses on providing rewards and incentives for understanding content and skills. Furthermore, gamified approaches to learning have positive feedback loops that involve student progress and path control, according to Young et al. Such approaches also use deep learning to informally test, from data, what works and does not work for the students to maintain a high level of engagement and provide accountabilities to educational objects.

Another benefit of gamified learning is the culture of continuous learning-based behavior, where the student is always thinking about their next successful activity. This increased motivation to learn can improve future work tasks. Those who succeed in this journey often experience personal growth. Finally, technology-empowered gamification of learning gives the teacher better insight to inspire and guide students age-appropriately while optimizing curriculum development and ultimately contributing to a better society.

There are several well-established benefits for using gamified approaches to learning, including improved engagement, motivation, and hence, the completion rate due to a more engaging and fun learning experience. Exemplified success by the selection of relevant, accurately sequenced content to support the learning curve, and real-time, personal feedback to encourage improvement, practice, and better performance. There is also the potential to break down complexities via the use of chunked, mini-games.

Gamification in learning, according to Deterding et al. (2011), is the application of typical elements of game playing (point scoring, competition with other players, rules of play) to other areas of activity, typically as an online marketing technique, to encourage engagement with a product or service. Adapting this into classroom learning can potentially increase a student's motivation,

attention, and duration of study time. This significantly amounts to improving long-term learning outcomes.

Virtual Reality and Language Learning

Virtual reality (VR) has achieved prominence recently as a tool for training and education across a myriad of fields. The use of VR is particularly effective for training that involves immersive situations and may pose a risk to trainees or even involve training animals. With the vast majority of learners leaving their home countries to learn English, VR promises language learners the opportunity to experience English-learning environments without needing to leave their countries. One of the early uses of VR for language learning was centered on the development of virtual environments, such as restaurants and shops, in which learners practice language in lieu of it being used in real-world environments. Students in VR-based language learning intervention were shown to outperform those in a traditional course in the application of communicative strategies in their target language in hospitality context interview scenarios with VR students showing increases in the use of question strategies, phrase elaboration, and encouragement of another person in which truthfulness was evaluated as well in the before and after the intervention phase of the study. (Lin et al.2023)

Immersive Language Practice

With the proliferation of the Internet, various online chat tools are currently available, benefiting the popularity of distance learning. Many researchers have attempted to use these various online chat tools for English language learning, but most instruct students to chat with a partner and discuss various topics. The main problem is that students tend to chat with their classmates in their main spoken language, not in the target language. The instructor does not really use spoken English for teaching materials and questions in aural/reading exercises. Students also tend to chat in the non-target language if prompted with the questions asked in the non-target language. Even with corrected commercial e-contents, where the instructor uses spoken English in the teaching materials, the students cannot use the corrected English questions in the spoken practice portions because the correctness is lost in the spoken English questions. The corrected e-contents with the spoken practice functions are still not applicable as the self-access and distance learning materials. To ensure speaking exercise is as important as listening, reading, or writing, we suggest that the learning resources must be able to provide language learning activities such as self-access and distance learning materials, currently taught by the instructor.

Speaking practice is extremely important in language learning. Teachers or other educators can offer great opportunities to students to practice speaking by asking them to present their ideas and arguments, complete various personal tasks, and so on. These activities serve well in cultivating the students' mind, forming their values, enhancing their command of critical thinking, and improving their capacity for social intercourse. However, involving teachers/educators for spoken practice is very expensive, yet the resources are far from sufficient to meet the students' demand in most non-English speaking countries. Consequently, almost all students learning English are inadequate in spoken English in real life. What an irony that though speaking is the most urgent task in language learning, yet it is the most difficult to have real chances to do it! With spoken practice, students can acquire moral, intellectual, emotional, and social growth, and can also improve their communication skills. Therefore, for many students, speaking is more important than listening and writing. Yet spoken practice is the weakest part in most students' English proficiency.

Augmented Reality in Language Learning

In this study, a descriptive experimental method was used to design an educational application that can support language learners in the English classrooms. The application employs the AR technology and enhances the learning and primary education levels with mobile devices. The experimental implementation and assessment of the use of this mobile application aimed to contribute to the literature by presenting the game-like way of learning to the foreign language. Findings of the study suggest that game-based learning achieved by educational mobile applications is a unique way of learning for children while it helps to contribute to the classroom dynamics during class. In addition to these contributions, it is thought that the findings, which reveal the effects of integrating augmented reality into an educational application, contribute towards problematic aspects of the literature on using mobile learning in the teaching of foreign language courses.

The combined abilities of the smart necklaces can create an application that uses augmented reality (AR) techniques to create a personalized AI counselor who can travel with the learners wherever they go, detecting the words and phrases that they are trying to learn and showing them content that is relevant to their lives. The AI counselor can be designed to gradually support increasing competence in language learning until full fluency is achieved. Its language instruction can be designed to be tried out in parallel with the language classroom or by persons who are learning a language by themselves independently.

Real-world Language Contexts

Networks allow real-world language and knowledge to be accessed in almost unlimited quantities and kinds of interaction, producing 'massive digital immersion' through multiple devil's advocates for any knowledge point or form of expression in the target language. Social and collaborative connections with peers and exchange of knowledge within a shared interest have become well-established accepted ways of using technology to increase language learning: learning to read more complex English than might be delivered through home experiences; enhancing motivation through fluent and purposeful text production for, and stimulated by, peer effect; and guiding easy in-search for meaning and vocabulary plus in-knowledge-application.

A major challenge for learners of a second language is to gain access to natural and meaningful instances of the target language. This has traditionally been achieved through educational visits, overseas trips, and exchange programs. Fortunately, the internet has revolutionized the reach of language learners by bringing instant access to large quantities of second language material. This has enhanced exposure to written and spoken language for some, but not all learners. While the overwhelming use of the English language in the digital context makes this resource more available than, for example, Finnish or Japanese, the abundance of languages has certainly not been matched. Native speakers of less widely spoken languages have less online content to access, even though it is their knowledge that learners need most to benefit from communication and paradigms in the language.

Big Data and Language Learning

Educational technology for second language acquisition has made great strides in recent years. It is now possible to tag many key dimensions of a video, such as the acoustic characteristics of the spoken language or the video's content. These language-relevant tags could be queried and used to match material to language goals within the educational setting. Such 'all-purpose' resources are already available on the web for other learning materials. Similarly, second language educational software has been heavily data-driven in the past. Quantitative data crowd-sourced from user

interactions or test scores entered into statistical models is a workhorse of our field. While these model-based and data-driven methods are valuable in language-specific applications, we believe the field's full potential is far from being realized. The opportunities raised by contemporary uses of technology touch on many other issues under investigation in this volume: intelligent virtual learning environments, tooled to diagnose and coach by objective performance, subjective impression, and measures addressing specific content, form, and context goals. Here, we survey some of the innovative language learning technologies made possible by 'big data'.

Personalized Learning Experiences

Different approaches to the question of language learning personalization are briefly analyzed here: cognitive science-based learning through coloring historical recording and adaptive sequence learning. These all have their own unique frames, and their different approaches may use similar words to name similar activities. Some of these can be seen as powerful teaching gadgets, within what remains a classic teaching framework. Others are truly facilitating change in the practice of teaching and learning, a change that leverages sophistication in computer systems to advance institutional teaching practices.

Technological tools have become essential to transforming the informational into knowledge, both expansive and significant. This transition is relevant to learners' experiences with language and language learning. It is less crucially a matter of letting technology be integrated into curricular experiences, and more essentially leveraging technology as a vehicle for students tailoring learning to personal profiles. Although early iterations of feedback based on analyzing corpus information gave some notion of differentiation in responses to learners, real personalization for the learner is brought about by the means to draw upon a great amount of information that can be linked to a variety of conditions that make the learning situation unique. Massive data handling, cognitive science insights into how to interpret information about individual learners as well as substantial computing capacity, make it possible to move from the mass instruction model of the industrial age into the personal learning reality of the digital era. Yet progress of this sort can take quite different looks, depending on the philosophical systems underpinning the technological approach.

Ethical Considerations in Smart Language Learning

In addressing these ethical considerations, this chapter would also like to remind the developers who create context-aware smart language learning software that they have a big responsibility in implementing support and coaching facilities with caution. It is important not to overly influence or take away the effort from the user, so as to allow students to remain autonomous agents capable of making decisions and learning independently from a support or coaching application. Moreover, we also need to remember that language learning should not be about information transfer only and must also include skills practice, reinforcing the need for the human teacher. The potential excessive influence of a smart technology agent on the educational goal should also be kept in balance, and the design guidelines that are drawn up on the basis of the findings presented in this study may aid in doing just that.

Creating technology for smart language learning comes with its own ethical considerations. These are discussed in this chapter, drawing on examples around language proficiency tests and concordance data in the LinguDocs project, the augmented reality Eyewear for Language Learning, and Contextual Word Sense Disambiguation algorithms designed for language learners. When developing smart technologies for language learning and surrounding users with coaching and support, further ethical considerations arise around ensuring learners remain autonomous agents,

protecting vulnerable groups from excessive influence by the application, and promoting learning and not just acquisition. The study also explores several techniques that can be used to monitor educational communication data in order to better address these considerations and provide some practical examples from the context of augmented reality language learning.

Data Privacy and Security

The application code can be instrumented to record log information. While modern developments like the API client frameworks in Kubernetes and even the Java OpenJDK are designed for log record extraction, we have developed lightweight tooling that allows us to easily instrument any relevant Java Application for log data collection. Classic log event data consists of messages written to the serving runtime, where a serving runtime is an image of an application instantiated in a data center, and from the standard output and error streams generated as a result of executing the scripts for the application. The log messages are filed and written to log files.

Language learning utilities collect different kinds of data about the user. Scripting languages often have hooks into these data, from which log events can be extracted and sent to open source data collection tools like Apache Flume or Apache NiFi. The log data falls into several categories: Most client-server protocols and web services are designed to log events about client activity. For instance, web servers are constantly analyzing their logs to understand usage patterns. In the client-side web scripting language JavaScript, event handlers in the HTML elements allowing interactivity produce log data. This can be analyzed for use in second language tutoring.

Future Trends in Smart Language Learning

Meanwhile, the instructors are well-informed of the introduction of smart learning in their language courses, with guidelines, training, and technological support. The inter-collaborative teaching and students' project work through going beyond labs and smart learning spaces will contribute to the development of smart campuses. For innovative smart language learning with MALL: mobile applications and personal technologies, many faculties join hands to think up ideas, implement, and lead research into addressing real-world issues. All instructors will implement STEAM and access a variety of smart technologies in teaching languages to enhance both the teaching pedagogy and educational outcomes of the learners. Chosen smart technologies vary according to the perceived best fit for the nature and content of each domain. Instructors' capability to use smart technologies is further enhanced and assisted with expert technical and teaching support.

Research on smart learning is relatively new, but it continues to attract researchers from different areas of study. Although smart language learning with technologies is concurrently in progress with several studies into the field, the knowledge is still limited. Here are various potential cutting-edge aspects for enhancing smart learning, including making learning devices detect learners' emotions, gather data and combine this with learning content, and integrate the intelligent tutoring system (ITS) into smart learning platforms. The permeation of smart technologies has transformed our lives to a great extent. Indeed, we have realized the need to advance language learning through a combination of new smart learning ideas and with the support of technologies. The feedback from the focus group suggested that the learners are generally very positive and willing to embrace smart language learning in a variety of different innovative ways.

Voice Recognition Technology

The Nuance ASR school already integrates some features of personalized language learning, as does the Concordia University ESL Language Learning System, in which ASR capabilities have reached a fair degree of sophistication through years of constant use. Although, without competition,

these systems are not likely to develop additional instructions, grammar correction, and content focused on a single language or to recognize English speakers of many accents at the same level. Ideally, a personalization engine can recognize that a second language is more interested in a particular subset of vocabulary and that you are having more trouble with intonation in questions. With the advancements in computerization and telephoto technology, a future intelligent learning platform installed on laptops and speech recognition glasses can also understand the students' emotional responses. (Johnson, 2021)

Voice recognition technology has come a long way since its early days. The technology allows users to speak to their computers, tablets, or smartphones to execute commands, and with ongoing efforts in artificial intelligence, users can talk with voice recognition technology that intuits complex phrases and parses natural context. Open source options (ASR) are available for developers to experiment and build their working models. Companies are now working to add aspects of personalization in speech technology to optimize it. This one-size-fits-all technology is a major drawback, especially for newer users of language learning software. The current market best allows for voice recognition pre-configured by the parent application. For example, you can only use a bilingual syntax to teach translation unless it's programmed with your transcription of any kind of questions asking for comprehension of spoken content.

Conclusion

This article has examined two primary driving factors of educational technology designing/development - pedagogy and language - the essential component in both the language learning and technology fields, the interaction of learners with computers and each other in a technology-mediated language learning environment, and second language acquisition/ability that can be enhanced through technology. Existing language learning technologies and their applications, department-wide language technology projects and language learning technology-mediated projects that have succeeded or experienced various degrees of difficulties or failures have been reviewed as well.

Given the benefits of such technologies, language learning instructors, program administrators, educational technology developers, and university administrators should continue to collaborate to design and develop a larger number of high-quality technology-mediated language learning courses, to adapt existing language learning technologies, and to make advanced technologies ready for application in foreign language centers. The feasibility of such collaboration has been increasing as many free open source or substantially inexpensive existing and specially designed language learning tools are now becoming available or are capable of enhancement in a number of areas requiring little programming activity but mainly some efforts to create and implement new tools or localization. Issues and challenges of using advanced technologies for the improvement of foreign/second language acquisition and instruction are numerous and very complex, necessitating random thoughts for the future research and development in these areas.

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