Robotics in English Language Teaching: Student-Centred Approaches for Interactive Language Learning

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***Abstract*— The integration of robotics in English Language Teaching (ELT) has emerged as a transformative innovation, reshaping traditional pedagogical practices into interactive, student-centred experiences. Educational Robotics (ER) not only enhances learners' communicative competence but also creates environments that foster autonomy, collaboration, and creativity. Grounded in principles of task-based learning, Content and Language Integrated Learning (CLIL), and gamification, ER provides authentic contexts for language practice. This article explores the influence of robotics on ELT, emphasising how student-centred teaching can be achieved through interactive activities, language games, and scenario-based tasks. Drawing from research on robotics in education, as well as practical platforms such as VEXcode VR and open-source educational robots, the paper illustrates how robotic applications can reduce language anxiety, improve motivation, and enhance learning outcomes. The study highlights both pedagogical opportunities and challenges, advocating for robotics as a catalyst in reimagining language education for the 21st century.**

***Keywords*— robotics, English Language Teaching, student-centred learning, educational robotics, language games**

I. INTRODUCTION

In recent decades, advances in digital technologies have significantly reshaped educational practices, especially in the field of language learning. English, as the world's most widely taught foreign language, is central to this transformation. Traditional methods of English Language Teaching (ELT), while foundational, often struggle to engage contemporary learners who are immersed in digital environments from an early age. Consequently, innovative approaches such as robotics and artificial intelligence have been integrated into classrooms to create dynamic, learner-driven experiences.

Educational Robotics (ER) has become an increasingly influential tool in ELT, merging technological engagement with linguistic development. Ziouzios, Chatzisavvas, Chaschatzi, Baras, Bratitsis, and Dasygenis (2021) emphasise that ER fosters problem-solving, teamwork, and communication skills while simultaneously supporting second language acquisition. By interacting with programmable robots, learners engage in authentic communicative tasks such as giving instructions, role-playing, and solving contextualised challenges in English. These tasks align with student-centred pedagogical models that prioritise learner autonomy and collaboration over teacher-directed instruction.

Student-centred approaches in ELT recognise learners as active participants in their own educational journeys, with an emphasis on personalisation, creativity, and meaningful communication. Robotics supports this orientation by reducing language anxiety, encouraging experimentation, and providing a playful context for authentic practice. For instance, when learners guide a robot through an obstacle course using English commands, they simultaneously practise imperative structures, spatial vocabulary, and problem-solving strategies (Ziouzios et al., 2021). Unlike rote memorisation, such interactions are experiential, multimodal, and collaborative.

This article explores the influence of robotics on English Language Teaching with a specific focus on student-centred pedagogy. It examines the theoretical foundations of ER in ELT, practical applications through interactive activities and language games, and case studies that demonstrate its impact on learners. Additionally, the article considers challenges in accessibility, teacher training, and implementation, while proposing strategies for integrating robotics into student-centred classrooms.

II. LITERATURE REVIEW

A. Robotics in Education

Educational Robotics (ER) has gained recognition as a valuable pedagogical tool for enhancing learning outcomes across disciplines. Initially associated with science, technology, engineering, and mathematics (STEM) education, robotics has expanded into other domains, including literacy and language learning. ER involves the use of programmable robots to create interactive learning experiences, which promote problem-solving, collaboration, and creativity (Eguchi, 2014). According to Ziouzios, Chatzisavvas, Chaschatzi, Baras, Bratitsis, and Dasygenis (2021), robotics provides opportunities for learners to practice observation, analysis, and decision-making while simultaneously engaging with linguistic content.

Robotics encourages project-based and inquiry-based learning, which are inherently student-centred. Misirli and Komis (2014) argue that when students program or interact with robots, they develop not only computational thinking but also communication strategies, since tasks often involve teamwork and negotiation. Moreover, robotic activities create an environment where errors are viewed as opportunities for experimentation rather than failures, thereby fostering resilience and motivation.

B. Robotics and Second Language Acquisition

The role of technology in second language acquisition (SLA) has been widely explored, with findings consistently showing its potential to enhance motivation, reduce language anxiety, and provide authentic communication contexts (Stepp-Greany, 2002). ER introduces a unique modality into SLA by allowing learners to practice language through embodied interactions. Ziouzios et al. (2021) describe how robotic scenarios, such as giving directions to a robot, support the acquisition of functional language and improve learners' confidence. Because the robot acts as a non-judgmental partner, learners are less anxious about making mistakes compared to peer-to-peer or teacher-centred interactions.

The communicative approach to language learning emphasizes authentic use of language for real purposes. Robotics aligns with this principle by embedding language into problem-solving tasks, role plays, and simulations. For example, a robot designed to simulate a waiter or shop assistant can engage learners in transactional dialogues, thereby promoting fluency and vocabulary retention. This form of task-based learning enhances both linguistic competence and pragmatic awareness (Littlewood, 1981).

C. Student-Centred Learning Frameworks

Student-centred learning shifts the focus from teacher authority to learner autonomy, encouraging students to take responsibility for their educational journey. This approach is deeply rooted in constructivist theories, particularly Vygotsky's sociocultural theory, which highlights the role of social interaction in learning (Oxford, 2003). In ELT, student-centred pedagogy manifests through task-based learning, communicative language teaching, and Content and Language Integrated Learning (CLIL).

The CLIL framework, as Dalton-Puffer and Smit (2007) note, prioritises meaning over form, allowing learners to acquire language naturally while engaging with subject-specific content. Robotics enhances this framework by providing contexts where language is used to achieve goals—such as navigating a robot through a maze or role-playing historical and cultural scenarios. Dourda, Bratitsis, Griva, and Papadopoulou (2012) further suggest that combining game-based learning with CLIL promotes both motivation and deeper cognitive engagement.

Additionally, the use of robotics supports differentiation and personalisation in language teaching. Learners can design their own robotic tasks; select the language they want to practice, and progress at their own pace. This aligns with Oxford's (1990) categorisation of learning strategies, which emphasises cognitive, metacognitive, and social strategies for language development. When students program or instruct robots, they not only engage cognitively but also collaborate socially, reflecting a holistic student-centred approach.

D. The Role of Gamification in Robotics and ELT

Gamification, the application of game elements in non-game contexts, has proven effective in sustaining engagement and motivation in ELT. Holden and Sykes (2011) highlight how mobile and digital games encourage authentic communication and enhance retention. Robotics naturally lends itself to gamification, as learners can engage in challenges, competitions, and quests that require the use of English. For example, a "robot treasure hunt" may require learners to issue English commands, solve riddles, and interact in teams to achieve objectives. Such activities integrate fun with pedagogy, fulfilling the dual goals of language acquisition and learner engagement.

III. THE INFLUENCE OF ROBOTICS ON ENGLISH LANGUAGE TEACHING

A. Enhancing Communicative Competence

One of the most significant contributions of educational robotics (ER) to English Language Teaching (ELT) lies in its ability to create authentic contexts for communication. Traditional classroom practices often rely on rehearsed dialogues and controlled exercises, which may limit learners' exposure to spontaneous language use. By contrast, robotics encourages learners to engage in functional language activities, where communication is necessary to achieve goals. For instance, a simple task of directing a robot through an obstacle course requires learners to use imperative forms, spatial vocabulary, and sequencing language (e.g., "turn left," "go forward," "stop at the chair") (Ziouzios et al., 2021). Such interactions not only reinforce vocabulary but also strengthen communicative competence by situating language use within meaningful, problem-solving contexts.

Robotics also supports dialogic learning by simulating real-world roles. Robots can be programmed to act as waiters, shopkeepers, or tour guides, requiring learners to engage in transactional or interpersonal dialogues. These simulations reflect authentic situations, such as ordering food at a restaurant or asking for directions, allowing learners to practice language that is both practical and culturally relevant. In this way, robotics aligns with the communicative language teaching approach, which emphasises fluency, pragmatic competence, and real-world application of English (Littlewood, 1981).

B. Reducing Language Anxiety and Building Confidence

Foreign language anxiety has long been recognised as a barrier to effective language acquisition. Learners often fear making mistakes in front of peers or teachers, leading to reluctance in speaking and experimenting with new vocabulary. Robots can serve as non-judgmental interlocutors, creating a safe space where learners feel less pressure. Ziouzios et al. (2021) note that students may be more willing to interact with robots because they perceive them as playful partners rather than authoritative figures. This playful dimension reduces the affective filter, enabling learners to take risks and engage more freely in spoken English.

Furthermore, robotics-based activities often incorporate trial-and-error learning, where mistakes are reframed as opportunities for problem-solving. When learners issue incorrect commands to a robot, the resulting "failure" is not penalised but instead becomes a point of reflection and correction. This approach reduces the stigma associated with errors, fostering resilience and self-confidence.

C. Supporting Multimodal and Experiential Learning

Robotics facilitates multimodal learning, engaging visual, auditory, and kinesthetic modalities simultaneously. Learners not only hear and speak English but also physically observe the robot's movements, manipulate its programming, and interact with its sensors and responses. This integration of modalities strengthens cognitive connections and enhances retention (Stepp-Greany, 2002). For example, when a student instructs a robot to "pick up the red ball" and sees the action executed, the association between language and meaning becomes immediate and tangible.

In addition, ER creates experiential learning opportunities where learners construct knowledge through active participation rather than passive reception. Constructivist theories emphasise that students learn best when they are actively engaged in making meaning (Oxford, 2003). Robotics embodies this principle by situating English within purposeful tasks and real-world simulations. Learners are not merely practicing grammar structures; they are applying English to accomplish objectives, solve problems, and collaborate with peers.

D. Promoting Collaborative Learning

Collaboration is a cornerstone of student-centred pedagogy, and robotics naturally fosters teamwork. Many robotic activities are designed for groups, where students must negotiate, assign roles, and share responsibilities in English. For instance, in a group tasked with programming a robot to navigate a maze, one learner may serve as the "programmer," another as the "navigator," and another as the "reporter." Such role distribution requires constant communication in English, reinforcing not only linguistic competence but also social and collaborative skills (Misirli & Komis, 2014).

Moreover, collaborative robotics activities align with the sociocultural theory of language learning, which posits that knowledge is co-constructed through interaction (Vygotsky, as cited in Oxford, 2003). By engaging in dialogue with peers to complete robotic tasks, learners participate in a shared process of meaning-making that strengthens both linguistic and cognitive development.

E. Integration with Content and Language Integrated Learning (CLIL)

Robotics also supports Content and Language Integrated Learning (CLIL), an approach that combines language learning with subject matter acquisition. Dalton-Puffer and Smit (2007) argue that CLIL contexts enhance motivation by prioritising meaning over form. When learners engage in robotics-based activities, they are simultaneously learning English and developing skills in science, mathematics, and problem-solving. For example, a lesson that requires students to program a robot to measure distances or follow geometric patterns allows them to practice mathematical concepts while using English as the medium of communication. This dual learning outcome exemplifies how robotics enriches ELT through interdisciplinary integration.

F. Motivation and Engagement

Finally, robotics significantly boosts learner motivation and engagement. Unlike traditional classroom drills, robotics introduces an element of novelty and play. Holden and Sykes (2011) highlight that game-like contexts sustain learners' attention and enhance retention. When robotics is integrated with gamification elements such as challenges, competitions, or storytelling quests, learners perceive language learning as enjoyable rather than burdensome. Ziouzios et al. (2021) observed that students expressed high levels of enthusiasm during robotic scenarios, perceiving the activities as games rather than lessons. This shift in perception transforms language learning into an intrinsically motivating process.

IV. STUDENT-CENTRED LANGUAGE TEACHING THROUGH ROBOTICS

A. Shifting from Teacher-Centred to Learner-Centred Approaches

Traditional English Language Teaching (ELT) has often been teacher-centred, with instructors directing the learning process, providing knowledge, and controlling classroom interactions. While this approach can ensure structure, it frequently limits opportunities for learners to take ownership of their language development. In contrast, robotics naturally aligns with student-centered pedagogy, where learners are active participants, decision-makers, and co-creators of their educational experiences. According to Ziouzios et al. (2021), robotics-based scenarios allow learners to engage in authentic dialogue, experiment with commands, and reflect on outcomes—processes that shift authority from teacher to student.

B. Promoting Learner Autonomy

Autonomy is central to student-centred pedagogy. Oxford (1990) defines it as the ability of learners to take responsibility for their own learning by employing strategies that match their individual preferences and goals. Robotics provides a platform for autonomy by enabling students to design, test, and refine their own tasks. For instance, in programming environments like VEXcode VR, learners can choose the commands they wish to use, experiment with trial-and-error, and set personalised challenges that match their proficiency level.

Robotics also allows learners to regulate their own pace of learning. Instead of passively absorbing teacher-directed lessons, students control when and how they interact with robots. This self-regulated learning empowers them to make decisions, evaluate their performance, and adjust strategies. Such agency fosters intrinsic motivation and aligns with constructivist principles that emphasise learner-driven knowledge construction (Oxford, 2003).

C. Differentiation and Personalisation of Language Learning

Student-centred teaching recognises the diverse needs, interests, and abilities of learners. Robotics supports differentiation by allowing teachers to design tasks with varying levels of complexity. For example, beginner learners might instruct a robot using simple commands such as "stop" or "turn left," while advanced learners may create multi-step tasks that require conditional statements, sequencing, and descriptive vocabulary.

Personalisation is further enhanced when learners design scenarios relevant to their lives. A student interested in travel might program a robot to simulate an airport check-in desk, while another might design a café simulation. These personalised contexts create meaningful connections between learners' experiences and language use, thereby increasing engagement and relevance (Dourda et al., 2012).

D. Gamification and Motivation
Gamification is one of the most powerful ways robotics makes ELT student-centred. Holden and Sykes (2011) argue that game-based learning enhances motivation by transforming learning into an engaging, enjoyable experience. Robotics naturally lends itself to gamification through quests, competitions, and storytelling. For instance, students might engage in a "robot treasure hunt" where they must issue English instructions to guide the robot toward hidden objects. Such activities incorporate game elements such as points, levels, and challenges, making learners active participants in their learning journey.

Moreover, gamification aligns with self-determination theory, which emphasises the role of autonomy, competence, and relatedness in motivation. When learners succeed in guiding a robot through a maze or solving a robotic puzzle in English, they experience a sense of competence. Collaborating with peers fosters relatedness, and the freedom to design or modify tasks enhances autonomy—all of which sustain motivation in a student-centred environment.

E. Collaboration and Social Learning
Robotics promotes student-centred learning by fostering collaboration. Tasks often require groups of learners to assign roles, share ideas, and negotiate decisions in English. This cooperative dimension reflects Vygotsky's sociocultural theory, which highlights the importance of social interaction in cognitive and linguistic development (Oxford, 2003).

For example, in a group tasked with programming a robot to simulate a restaurant scenario, one learner may act as the "programmer," another as the "customer," and another as the "waiter." Through these distributed roles, learners negotiate meaning, practice dialogue, and collectively build linguistic competence. Such collaborative activities transform the classroom into a learning community, reducing reliance on the teacher as the sole source of knowledge.

F. Role-Play and Simulation
Role-play is a central feature of student-centred pedagogy, and robotics provides a unique platform for it. Robots can be programmed to play specific roles, such as shopkeepers, tour guides, or police officers, while learners interact with them using English. Ziouzios et al. (2021) describe scenarios in which robots simulated everyday roles, allowing children to practice dialogues related to ordering food, asking for directions, or checking into a hotel. These simulations situate language within authentic, real-world contexts, thereby deepening engagement and communicative competence.

Role-based tasks also promote creativity and imagination. Learners can design scenarios where robots represent cultural icons, historical figures, or fictional characters, blending language learning with cultural and interdisciplinary knowledge. Such flexibility demonstrates how robotics empowers students to shape the learning process according to their interests, creativity, and goals.

V. PRACTICAL APPLICATIONS AND PRACTICE-BASED INSIGHTS

A. Robotics in Classroom Scenarios
One of the most promising aspects of integrating robotics into English Language Teaching (ELT) is its ability to create real-time, interactive learning scenarios. Ziouzios et al. (2021) illustrate this through the development of EI-Edurobot, a robot designed to facilitate English as a Foreign Language (EFL) learning among young children. In one scenario, learners were asked to give the robot directions to navigate an obstacle course, using English commands such as "turn left," "move forward," and "stop at the ball." This activity promoted vocabulary acquisition related to movement and spatial orientation while situating language practice in a playful, engaging context.

Another EI-Edurobot scenario involved role-play, where the robot assumed different identities such as a police officer, a waiter, or a tour guide. Learners interacted with the robot in English, practicing transactional dialogues and vocabulary relevant to real-world contexts. According to Ziouzios et al.

(2021), such scenarios made learners less anxious and more willing to experiment with language, as the robot was perceived as a "toy" rather than a strict evaluator. This case study demonstrates the pedagogical power of robotics in creating safe, student-centered environments for language practice.

B. VEXcode VR: Virtual Robotics for Language Learning
In addition to physical robots, virtual robotics platforms such as VEXcode VR (https://vr.vex.com) provide accessible opportunities for integrating robotics into ELT. VEXcode VR is a browser-based coding environment where students control virtual robots in simulated environments. Though primarily designed for STEM, it can be adapted for language learning by embedding English instructions within tasks.

For example, teachers can design an activity where learners must use English to describe the code or commands they input (e.g., "The robot will move forward three steps and then turn right"). This method not only develops computational thinking but also reinforces English vocabulary related to sequencing, numbers, and directions. Group-based challenges, such as programming the robot to complete a maze, require learners to collaborate, negotiate, and explain their reasoning in English, reinforcing communication skills in a student-centred context.

C. D. Role-Play and Cultural Simulations
Robotics can also facilitate cultural and interdisciplinary learning, aligning with the Content and Language Integrated Learning (CLIL) framework. Ziouzios et al. (2021) describe scenarios where robots were disguised as cultural landmarks, such as the Statue of Liberty or Big Ben. Learners were then asked to engage in conversations with the robot, discussing history, symbolism, and cultural relevance in English. This interdisciplinary integration of language, history, and culture provides a holistic learning experience, enriching both linguistic and cognitive development.

Similarly, robotics can simulate everyday situations such as hotel check-ins, restaurant orders, or museum tours. In these contexts, learners use English for practical purposes, engaging in authentic, functional communication. This approach mirrors real-world language use and prepares learners for intercultural communication beyond the classroom.

D. Gamified Robotics Activities
Gamification further amplifies the effectiveness of robotics in ELT. In one classroom activity, learners participated in a "robot treasure hunt" where they issued English commands to guide a robot toward hidden objects. Each successful task earned them points, while mistakes required them to revise their instructions. This game-like format encouraged learners to experiment with language, cooperate with peers, and maintain motivation through competition and play.

Another gamified approach is the "robot restaurant simulation." Learners program a robot to play the role of a waiter, while peers act as customers. The interaction requires learners to use polite requests, food-related vocabulary, and conversational structures in English. The scenario not only teaches language but also reinforces cultural norms such as politeness and turn-taking.

E. Accessibility through Open-Source Robotics
While high-cost robots may not be accessible in all educational settings, open-source hardware and software offer affordable alternatives. EI-Edurobot, for example, was designed as an open-source project, with resources freely available to educators (Ziouzios et al., 2021). Teachers can replicate or adapt the robot using cost-effective parts, ensuring that robotics-based language learning is not limited to well-funded schools. Similarly, virtual platforms like VEXcode VR reduce the need for physical hardware, making robotics activities accessible to classrooms with limited resources.

VI. CHALLENGES AND FUTURE DIRECTIONS

A. Cost and Accessibility
One of the most significant challenges in integrating robotics into English Language Teaching (ELT) is the cost associated with purchasing and maintaining robotic systems. Advanced educational robots may be prohibitively expensive for schools, particularly in developing regions. Ziouzios et al. (2021) note that commercial robots often require high investment, which limits their widespread adoption. Although open-source alternatives and low-cost platforms such as EI-Edurobot or virtual robotics environments like VEXcode VR mitigate this issue, accessibility

remains uneven across contexts. Ensuring equitable access to robotics-based learning will require investment in affordable technologies and policies that prioritize inclusion.

B. Teacher Training and Pedagogical Preparedness

Robotics-based language learning requires teachers to possess both technological competence and pedagogical adaptability. Many language educators lack formal training in robotics or coding, which can lead to underutilisation of available tools. Misirli and Komis (2014) emphasise the importance of teacher preparation, arguing that robotics is most effective when integrated into meaningful, student-centred pedagogical frameworks rather than treated as an isolated novelty. Professional development programs are, therefore, essential to equip teachers with the knowledge and confidence to design effective robotics-based language activities.

C. Cognitive Load and Instructional Design

While robotics offers engaging and multimodal learning experiences, there is a risk of overwhelming learners with excessive complexity. Sweller's (1988) cognitive load theory highlights that instructional tasks must be designed to balance challenge and accessibility. If students focus too heavily on the technical aspects of robotics (e.g., coding or hardware manipulation), they may neglect linguistic goals. To prevent this, teachers must scaffold activities carefully, ensuring that language objectives remain central. For example, tasks can be structured in progressive levels, starting with simple English commands before advancing to more complex dialogues and simulations.

D. Integration with Curriculum and Assessment

Another challenge is integrating robotics into existing curricula and assessment frameworks. Traditional curricula often prioritise grammar and vocabulary acquisition through standardised testing, which may not align with the communicative and experiential nature of robotics-based activities. Ziouzios et al. (2021) argue that robotics is best suited to student-centred, communicative approaches, which require flexibility in curricula and assessment methods. Formative assessment techniques, such as portfolios, reflective journals, or project-based evaluations, may be more appropriate for capturing the holistic learning outcomes of robotics-based ELT.

E. Future Directions

Despite these challenges, the future of robotics in ELT is promising. Several directions offer opportunities for innovation:

1. Open-Source Development: Expanding open-source robotics platforms can democratise access and encourage global collaboration among educators. The EI-Edurobot project is an example of how affordable, open designs can empower schools to adopt robotics-based learning (Ziouzios et al., 2021).
2. Integration with Virtual Reality (VR): Combining robotics with VR environments may create hybrid learning experiences where learners interact with both physical and virtual agents. Such integration could enhance immersion and expand the range of communicative scenarios.
3. Adaptive and Personalised Learning: Future robotics platforms may incorporate artificial intelligence (AI) to adapt tasks based on learners' proficiency levels and interests. Personalised robotic tutors could provide tailored feedback, supporting autonomy and differentiated instruction.
4. Collaborative Communities of Practice: Online communities where educators share lesson plans, scenarios, and coding scripts can strengthen the global adoption of robotics in ELT. Ziouzios et al. (2021) propose developing a web-based platform for teachers to exchange ideas and resources, fostering a culture of shared innovation.
5. Research and Evidence-Based Practice: More empirical studies are needed to evaluate the long-term effectiveness of robotics in ELT. While preliminary research shows positive effects on motivation and communicative competence, longitudinal studies will provide stronger evidence for its impact on proficiency outcomes.

VII. CONCLUSION

The integration of robotics into English Language Teaching (ELT) marks a significant step toward reimagining how languages are taught and learned in the 21st century. Moving beyond traditional, teacher-centred models, robotics introduces interactive, multimodal, and student-centred experiences that actively engage learners in meaningful communication. By situating English within

authentic, task-based scenarios, robotics fosters communicative competence, reduces language anxiety, and empowers learners to take ownership of their educational journey.
Robotics also aligns seamlessly with student-centred pedagogical frameworks such as constructivism, task-based learning, and Content and Language Integrated Learning (CLIL). Through role-play, gamification, and collaborative problem-solving, learners use English as a tool for achieving objectives rather than as an abstract subject to be memorised. Platforms like EI-Edurobot and VEXcode VR illustrate how robotics can create safe, playful environments where mistakes are reframed as learning opportunities, thus building confidence and resilience.

Despite its promise, robotics in ELT faces challenges related to cost, accessibility, teacher training, and curricular integration. Addressing these barriers will require systemic investment, professional development, and innovative instructional design that balances technological complexity with linguistic goals. Open-source projects and online communities of practice provide pathways for democratising access and fostering global collaboration among educators.

Looking ahead, the potential of robotics in ELT is vast. Hybrid approaches that combine robotics with virtual reality, artificial intelligence, and adaptive learning systems may provide even richer, more personalised experiences for learners. Empirical research and evidence-based practice will be crucial in demonstrating its long-term effectiveness and guiding its pedagogical integration.

Ultimately, robotics has the potential to transform language classrooms into spaces of creativity, collaboration, and autonomy. By placing learners at the centre of the educational process, robotics not only supports linguistic proficiency but also nurtures essential 21st-century skills such as problem-solving, critical thinking, and intercultural communication. As educators continue to explore and innovate, robotics stands as a powerful catalyst for student-centred language education.

REFERENCES

[1] Bailenson, J. N. (2018). *Experience on Demand: What Virtual Reality Is, How it Works, and What It Can Do*. W. W. Norton & Company.

[2] Dalton-Puffer, C., & Smit, U. (2007). *Empirical Perspectives on CLIL Classroom Discourse*. Peter Lang.

[3] Dourda, K., Bratitsis, T., Griva, E., & Papadopoulou, P. (2012). Combining Game-Based Learning with Content and Language Integrated Learning Approaches: A Research Proposal Utilizing QR Codes and Google Earth in a Geography-Based Game. In P. Felicia (Ed.), *Proceedings of the 6th European Conference on Games-Based Learning* (pp. 115–123). Academic Publishing Limited.

[4] Eguchi, A. (2014). Robotics as a Learning Tool for Educational Transformation. In *Proceedings of the 4th International Workshop Teaching Robotics, Teaching with Robotics, and the 5th International Conference Robotics in Education* (pp. 27–34). Padova, Italy.

[5] Holden, C. L., & Sykes, J. M. (2011). Leveraging Mobile Games for Place-Based Language Learning. *International Journal of Game-Based Learning, 1*(2), 1–18. https://doi.org/10.4018/ijgbl.2011040101

[6] Kukulska-Hulme, A., & Shield, L. (2008). An Overview of Mobile Assisted Language Learning: From Content Delivery to Supported Collaboration and Interaction. *ReCALL, 20*(3), 271–289. https://doi.org/10.1017/S0958344008000335

[7] Littlewood, W. (1981). *Communicative Language Teaching: An Introduction*. Cambridge University Press.

[8] Misirli, A., & Komis, V. (2014). Robotics and Programming Concepts in Early Childhood Education: A Conceptual Framework for Designing Educational Scenarios. In C. Karagiannidis, P. Politis, & I. Karasavvidis (Eds.), *Research on e-Learning and ICT in Education* (pp. 99–118). Springer. https://doi.org/10.1007/978-1-4614-6501-0_8

[9] Oxford, R. L. (1990). *Language Learning Strategies: What Every Teacher Should Know*. Heinle & Heinle.

[10] Oxford, R. L. (2003). Language Learning Styles and Strategies: An Overview. *Learning Styles and Strategies/Oxford, GALA*, 1–25.

[11] Papert, S. (1980). *Mindstorms: Children, Computers, and Powerful Ideas*. Basic Books.

[12] Peachey, N. (2016). *Virtual Reality and Language Learning*. The Round.

[13] Peterson, M. (2016). Virtual Worlds and Language Learning. *Language Learning &*

Technology, 20(3), 1–12. http://llt.msu.edu/issues/october2016/peterson.pdf

[14] Pinker, S. (1994). *The Language Instinct*. William Morrow and Company.

[15] Stepp-Greany, J. (2002). Student Perceptions on Language Learning in a Technological Environment: Implications for the New Millennium. *Language Learning & Technology, 6*(1), 165–180. http://llt.msu.edu/vol6num1/steppgreany

[16] Sweller, J. (1988). Cognitive Load during Problem Solving: Effects on Learning. *Cognitive Science, 12*(2), 257–285. https://doi.org/10.1207/s15516709cog1202_4

[17] Troncale, N. (2002). Content-Based Instruction, Cooperative Learning, and CALP Instruction: Addressing the Whole Education of 7–12 ESL Students. *Journal of the California Association for Bilingual Education, 24*(1), 23–34.

[18] Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.

[19] Warschauer, M., & Kern, R. (2000). *Network-Based Language Teaching: Concepts and Practice*. Cambridge University Press.

[20] Zhao, Y. (Ed.). (2005). *Research in Technology and Second Language Learning: Developments and Directions*. Information Age Publishing.

[21] Ziouzios, D., Chatzisavvas, A., Chaschatzi, A., Baras, N., Bratitsis, T., & Dasygenis, M. (2021). Utilizing Robotics for Learning English as a Foreign Language. *SHS Web of Conferences, 102,* 01013. https://doi.org/10.1051/shsconf/202110201013