SENSORY AND PLAY-BASED LEARNING: HOW INNOVATIVE METHODS HELP CHILDREN WITH SPECIAL NEEDS LEARN ENGLISH

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Abstract. *The article focuses on analyzing sensory and play-based learning as innovative methods that enhance the acquisition of English by children with special educational needs in an inclusive setting. The aim of the study is to assess the effectiveness of implementing sensory and gamified teaching approaches in the foreign language learning process for students with various individual needs within the context of inclusive education. The research employed general scientific methods of cognition, such as analysis, synthesis, comparison, observation, generalization, modeling, and a systems approach. The findings show that the growing development of inclusive education increases the demand for modern pedagogical technologies that ensure equal access to knowledge for all learners, regardless of their individual characteristics. This is especially relevant in the field of foreign language education, where perceptual, communication, and adaptation barriers can hinder effective learning. The study confirms that sensory techniques and gamified tools hold significant potential for overcoming these challenges, as they help create a motivating, adaptive, and individualized learning environment. The focus is placed on the sensory approach, which involves stimulating visual, auditory, tactile, and kinesthetic perception channels. The multisensory impact improves the quality of material retention and supports long-term memory in students. The study also reveals that tailoring sensory input to match a child's personal characteristics allows educators to leverage students' strengths, reduce anxiety levels, and support the development of their personal potential. Gamification, in turn, enhances interactivity, which plays a key role in motivating learners. The practical value of the study lies in the possibility of integrating sensory and gamified technologies into educational programs to create an inclusive space that promotes both comprehensive development and successful socialization of students.*

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Introduction. There is a steady global increase in the number of students with special educational needs, including in the United States, which highlights the need to improve inclusive educational practices. According to data from the National Center for Education Statistics (NCES), during the 2022–2023 academic year, 7.5 million children aged 3 to 21 received services under the Individuals with Disabilities Education Act (IDEA), representing 15% of all students in U.S. public schools. This trend emphasizes the importance of adopting effective teaching methods that address the unique needs of every student (National Center for Education Statistics, 2024).

In response to these challenges, educational institutions across the U.S. are actively introducing innovative approaches, particularly sensory and gamified methods, to enhance motivation and engagement among students with special needs. Sensory methods help adapt the learning process to students' individual sensory profiles by activating visual, auditory, tactile, and kinesthetic perception channels. Gamification creates an interactive learning environment that fosters emotional engagement and reduces anxiety, which is particularly important for learners who are highly sensitive to stress. The combination of these methods not only improves academic performance but also supports the overall development of students with special educational needs.

Literature review. The use of sensory and play-based approaches in teaching English to children with special educational needs is a well-explored topic in international academic literature. A significant contribution to the field has been made by scholars such as Marco et al. (2011), who examine the neurophysiological aspects of sensory processing in children with autism, emphasizing the importance of integrating sensory input into the learning process. Sousa (2011) and Wolfe (2001) explore the neuroscience behind learning and highlight that successful language acquisition in children with special needs is possible when multiple sensory channels are activated.

Innovative techniques that rely on digital technologies are discussed in the works of Ramadani (2024) and Rizk & Hillier (2022), who demonstrate how digital tools can enhance students' motivation and engagement. Attention should also be paid to more practical, non-academic resources such as Cambridge English materials (Learn English through games, n.d.) and the Online Learning College platform (Online Learning College, 2024), which reflect current practices in applying game-based strategies and adaptive methods in English language instruction for children with special needs. These sources serve as examples of expert literature showcasing innovative solutions in real-life educational settings.

Despite the considerable volume of literature on this subject, there remains a lack of systematized material that integrates research findings into a cohesive methodological framework. For this reason, various scientific methods were applied to analyze, group, and organize the available information and present it within the scope of the research topic.

Aim of the study is to determine the effectiveness of implementing sensory and gamified teaching approaches in the process of foreign language acquisition by students with diverse individual needs in the context of inclusive education.

Methodology. The research employed general scientific methods of cognition, such as analysis, synthesis, comparison, observation, generalization, modeling, and a systems approach.

Results. In the United States, the term "children with special needs" or "exceptional children" is commonly used to describe students who have significant learning differences and require specialized support and adapted educational strategies. This terminology underscores the importance of inclusive education, which involves the full participation of children with various abilities in the learning process within general education settings (Ramadani, 2024).

The integration of innovative technologies into the learning environment creates new opportunities for the successful education of students with special educational needs, particularly in the context of foreign language learning. Sensory and play-based methods that incorporate digital tools help boost student motivation, engagement, and concentration.

Findings from numerous studies, including those by Drexler (2010), confirm the effectiveness of sensory and gamified technologies as a means of supporting English language learning among children with special needs. This group of learners requires individualized educational approaches that promote both effective content acquisition and opportunities for self-expression. The use of digital resources opens new avenues for active classroom participation.

One of the main barriers for these students is a lack of motivation to learn a foreign language. However, as shown in the research conducted by Costley (2014), the use of technology in the classroom significantly increases the interest and motivation of children with special needs. Observations conducted as part of an empirical study (Ramadani, 2024) also demonstrate that students show greater engagement and interest in learning materials when innovative technological tools – particularly sensory tools and platforms based on gamification principles – are used, compared to traditional textbook-based lessons.

These conclusions are further supported by the work of Rizk & Hillier (2022), who emphasize that technology allows students with special needs to be more deeply involved in the learning process, helps sustain attention, and fosters effective peer collaboration during group activities.

The specifics of multisensory learning have been widely examined in academic literature. According to Wolfe (2001), multisensory learning is a didactic approach that involves engaging multiple sensory channels simultaneously, including sight, hearing, touch, and, in some cases, smell, taste, and physical movement. This strategy activates the brain's natural neural networks, promoting deeper processing of information, increased motivation to learn, improved comprehension, and better retention and recall of knowledge. This approach is particularly effective when working with children with special educational needs, as it takes into account their individual cognitive and sensory profiles.

Scientific research confirms that each sensory system has a distinct neural representation in the brain. Their simultaneous activation stimulates broader areas of brain activity, which contributes to more effective learning Wolfe (2001). Presenting

information in a multisensory format helps reduce cognitive load and enhances understanding and retention, which is especially relevant for students with learning difficulties.

In this context, several key types of sensory modalities are identified:

1. *Visual modalities*. Visual elements such as charts, diagrams, infographics, maps, and photos play a crucial role in visualizing complex information. They support the formation of associations, highlight logical connections, and help develop concepts – especially for learners with visually dominant learning styles.

2. *Auditory modalities*. Auditory sources – spoken language, music, rhythmic structures – provide additional support for learning and activate auditory memory. This approach is particularly effective for children with dyslexia or other speech and language disorders (Supriatna & Ediyanto, 2021).

3. *Tactile and kinesthetic modalities*. Learning through touch, manipulation of objects, and movement is effective for children with heightened sensory needs. Physical activity, gestures, modeling, and working with tangible materials activate sensorimotor integration, which aids in consolidating knowledge and skills (Sousa, 2011).

4. *Other modalities*. In certain contexts, olfactory (smell-based) and gustatory (taste-based) stimuli may also be used to build associative memory. This is especially relevant for children with multiple disabilities, where traditional modalities are limited.

Table 1. Sensory learning technologies used in English language instruction for children with special educational needs

Category of technology	Examples	Benefits for children with SEN in learning English
Text editors	Google Docs, Microsoft Word	Support in developing writing skills, spell-check features, font and color customization for students with dyslexia.
Organizational and brainstorming tools	MindMeister, Web Inspiration	Aid in organizing vocabulary and grammar structures, support for categorization and associative thinking.
Data collection and analysis tools	Survey Monkey, Microsoft Excel, Poll Everywhere	Encourage communication through creating surveys, foster critical thinking, visual interpretation of data.
Communication and collaboration tools	Skype, Zoom, Google Meet, Padlet	Support for social interaction, practice in speaking and listening, inclusion in interactive groups, safe communication.
Educational media (student as consumer)	BrainPOP, Discovery Education, Khan Academy	Audiovisual reinforcement for understanding new vocabulary, individualized learning pace, access to material review.
Multimedia creation (student as creator)	PowerPoint, Canva, iMovie, VoiceThread	Development of creativity, integration of language skills (reading, speaking, writing, listening), visual grammar and vocabulary support.
Interactive learning resources	LearningApps, Kahoot!, Duolingo	Motivation through gamification, personalized pace, increased engagement and active participation.
Databases and reference resources	Wikipedia, Cambridge Dictionary, Multitran	Independent exploration of new vocabulary, reference skills development, navigation support in the information space.
Kinesthetic technologies	Xbox Kinect, Nintendo Switch, AR/VR apps	Motor skill support, integration of movement and speech, reduced anxiety through physical interaction with content.

Source: systematized by the author based on (Ramadani, 2024)

The application of a multisensory approach in special education enables the learning environment to be tailored to the individual sensory profiles of students. For children with autism or sensory integration dysfunction in particular, creating such

conditions helps reduce anxiety, increase engagement, and boost motivation for learning (Marco et al., 2011).

Overall, multisensory pedagogy must take into account both the age-specific characteristics of learners and the nature of their cognitive challenges. The success of its implementation depends on the selection of appropriate instructional materials, techniques, and an adaptive environment capable of providing full immersion in the learning process.

Game-based technologies have proven to be highly effective not only for teaching children without special needs but also for those with special educational needs. The University of Cambridge presents recommended game-based strategies that have been shown to improve the effectiveness of foreign language acquisition (Table 2).

Table 2. Gamification tools for English language learning among children with special needs

Name of game/method	Description	Educational benefit for children with special needs
Hidden object	One player hides an item, and the other searches for it using English-language clues.	Supports language comprehension, encourages communication in a playful setting without fear of making mistakes.
Role-play "Who am I?"	A child imagines being a family member while others ask questions to guess who it is.	Develops question/answer skills, social interaction, memory, and imagination.
Scavenger hunt	A list of items that must be found and photographed.	Enhances visual perception, word recognition, integrates physical activity, reduces anxiety.
Fact check	Children are given facts and must decide whether they are true, then verify the answers.	Stimulates critical thinking, attention to detail, and reading comprehension.
Tray game	Students are shown a tray of objects for 30 seconds, then asked to recall and write them in English.	Strengthens memory, visual focus, writing, and spelling.
Board game creation	Children design their own board game with a playing field and question cards.	Encourages creativity, fine motor skills, vocabulary development, and autonomous learning.
News headlines	A child creates a fake headline, and others guess which one is real.	Develops humor, logical thinking, reading and writing skills.
Silly sentence creation	Uses cards with nouns, verbs, and adjectives to form funny sentences.	Supports grammar acquisition, expands vocabulary.
Crosswords/word puzzles	Students create and solve themed word searches.	Improves concentration, lexical memory, and allows learning at an individual pace.
Charades / Pictionary	Students guess words using gestures or drawings.	Enhances non-verbal communication, vocabulary reinforcement, and group participation.

Source: systematized by the author based on (Learn English through games, n.d.; Online Learning College, 2024)

An important factor is the opportunity to organize student collaboration, which is strengthened using technology. Group work and cooperative learning encourage social interaction, mutual support, and the development of communication skills – an especially critical aspect for children with developmental disorders. In this way, technology plays a key role in creating an adaptive, inclusive, and emotionally supportive educational environment in which children with special educational needs can effectively learn English through sensory and play-based approaches.

As a result, the use of innovative sensory and gamified technologies in foreign language instruction helps children with special needs develop emotional engagement

above all, which contributes to reducing anxiety and enhancing social connectedness. These students often experience heightened vulnerability in their environment, making communication and learning more difficult. Platforms such as Kahoot, Duolingo, and LearningApps help create a safe space that supports positive emotional interactions, allowing children to communicate with peers and teachers without fear of punishment or judgment. The use of audio materials and interactive game elements activates emotional responses, which in turn generates interest in the learning process and fosters a sense of belonging through natural, play-based social interaction.

The implementation of innovative technologies contributes to a significant increase in motivation to learn a foreign language. This motivation emerges from involvement in interactive activities and becomes the driving force behind cognitive interest and student engagement. Children with special educational needs are often characterized by low academic motivation, which stems from prior experiences of failure. Innovative technologies, however, provide opportunities for individual progress in the form of play, where each task becomes a challenge that allows the child to experience success. Interactive dialogues with peers or the teacher offer emotional reinforcement from the learning environment, contributing to the development of positive self-esteem and confidence in one's abilities.

Multisensory learning is especially important for stimulating sensory perception channels simultaneously – visual, auditory, tactile, and kinesthetic. Since students with different needs are often grouped together, the use of flexible and individualized approaches becomes crucial. In such settings, providing autonomous learning through digital resources is essential, as it allows students to choose their own pace, level of difficulty, and format for working with materials. Platforms such as PowerPoint, VoiceThread, and Canva enable learners not only to acquire knowledge but also to create and model it.

The same applies to the selection of multisensory strategies. For children with hearing impairments, it is important that tasks are specially adapted and exclude audio materials. Conversely, for children who have stronger writing than speaking skills, exercises should focus on written communication. Visual learners respond better to charts, diagrams, videos, and maps, while tactile and kinesthetic methods involve physical manipulation of objects or spatial interaction. In these cases, even virtual or augmented reality may be appropriate.

It is also worth noting that cognitive development stimulated through the implementation of sensory and game-based technologies occurs by activating logical thinking, and interactive technologies help further develop these skills. Activities such as "fact check," "hidden object," and "tray game" combine problem-solving tasks with physical movement, strengthening neural connections and supporting the development of cognitive strategies.

All of this ultimately promotes the formation of language skills in children with special educational needs using sensory and game-based technologies. The use of various platforms supports the development of writing and speaking, as well as listening comprehension in a real-language environment. Audio-visual resources support listening and reading skills while addressing students' individual needs.

Discussion. The findings of this study reaffirm the pivotal role of multisensory and gamified approaches in enhancing foreign language acquisition among children with special educational needs within inclusive classrooms. The integration of sensory stimulation through visual, auditory, tactile, and kinesthetic channels not only supports individualized learning pathways but also fosters cognitive engagement by aligning instructional delivery with the diverse sensory profiles of learners. Such alignment appears especially beneficial for reducing anxiety, boosting confidence, and increasing motivation—factors that are often barriers in conventional teaching environments for students with developmental differences.

Gamification, in particular, has emerged as an essential complement to sensory techniques. By transforming language learning into interactive and emotionally resonant experiences, game-based strategies encourage active participation, peer cooperation, and persistent engagement with the material. The study demonstrates that this dynamic can shift learning from a passive process into one characterized by self-expression, exploration, and autonomy, which is critical for learners who may otherwise struggle with traditional instruction.

The dual application of sensory and play-based methods also enables a more inclusive environment that respects learners' individual strengths. For instance, students with strong visual perception can benefit from infographics and mind maps, while kinesthetic learners thrive on movement-based activities like role-play or scavenger hunts. Furthermore, the availability of adaptive technologies and digital tools enriches this framework by offering differentiated formats, self-paced learning, and opportunities for creative expression—ranging from creating multimedia presentations to designing language games.

Importantly, the discussion reveals that inclusive language instruction is not only about accessibility but also about empowerment. The sensory and game-based approaches facilitate social interaction, build emotional resilience, and allow students to experience academic success in a way that validates their capabilities. The positive emotional reinforcement, combined with cognitive stimulation, leads to improved retention, higher participation rates, and better overall language competence.

Finally, this study highlights the potential for these methods to shape broader educational practices. As the demand for inclusive education continues to grow, multisensory and gamified strategies present a scalable, evidence-based framework for reaching diverse learners across varied contexts. Their implementation can thus serve not only as pedagogical innovation but also as a strategic response to the evolving educational needs of the 21st century.

Conclusions. In the context of implementing inclusive education policy, there is a growing need for innovative pedagogical approaches that ensure the effective participation of all students in the learning process, regardless of their individual characteristics. This need is especially urgent in foreign language education, where perceptual, communication, and adaptation barriers can significantly hinder knowledge acquisition. Modern technologies, particularly sensory and gamified methods, demonstrate strong potential in addressing these challenges by enabling the creation of flexible, motivating, and adaptive learning environments.

Sensory techniques that activate visual, auditory, tactile, and kinesthetic channels are especially important for the individual development of students with special educational needs. A multisensory approach not only enhances the depth of material processing but also improves long-term retention. Adapting to a child's specific sensory profile allows educators to build on the student's strengths, create opportunities for personal growth, and reduce anxiety.

At the same time, gamification fosters the development of interactivity, which is a key factor in shaping learning motivation. Involving students in game-based interaction promotes not only emotional reinforcement but also the development of cognitive strategies, confidence, and more active participation in the learning process. The combination of sensory strategies with gamified technologies creates optimal conditions for successful foreign language acquisition, including English, while also contributing to the holistic development of children within an inclusive environment.

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