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IMPROVING THE ENGAGEMENT OF STUDENTS WITH LEARNING DISABILITIES IN STEM DOMAINS THROUGH USING UNIVERSAL DESIGN FOR LEARNING

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Abstract

Students with learning disabilities (LD) often encounter an array of barriers when they start studying the field of science. Universal Design for Learning is a pedagogical framework that can address all needs of students with learning disabilities. This article includes qualitative and secondary data analysis to identify the potential benefits of UDL principles in improving the engagement of students with learning disabilities in the field of STEM education. This scientific research was conducted by analyzing scholarly articles regarding the implementation of the UDL method to meet the needs of all students with diverse educational backgrounds. By checking and analyzing several studies which have been carried out by professional researchers and pedagogues.

Keywords: Universal Design for Learning, STEM education, inclusive learning, students with learning disabilities (LD), pedagogical skills, science, pedagogical framework.

INTRODUCTION

Many students with LD face several problems in science, technology, engineering, and mathematics (STEM) education during their academic development. This phenomenon occurs due to several reasons, including limited instructional diversity and science teachers with a lack of pedagogical skills for teaching students

with LD. According to Lee and Erdogan (2007), students with LD may develop a negative viewpoint toward the field of science when they have to solve complex scientific tasks, difficult descriptive texts, and other instructional materials that limit their ability to approach and follow scientific data (Matthew T, 2013). Consequently, only 5% of students with LD enter STEM education even though their personalized elements are often applicable to succeeding in these career paths. In a thorough analysis of the literature on students with LD and technology use in secondary science classrooms, Marino (2010) found substantial empirical evidence suggesting that the use of inaccessible media, such as expository texts, to present complex vocabulary and phenomenological constructs makes it difficult for students with LD to engage with secondary science curriculum materials. Furthermore, inefficient pedagogical strategies are the primary cause of students' struggles. For instance, some secondary science teachers often fail to accurately assess students' declarative skills at the outlet of analytical processes. Implementing ineffective teaching methods and unconscious prejudices about the kinds of students who would be the most successful in the field of science are determined as the underlying cause of LD students' negative attitudes toward science. Some secondary science teachers set low expectations for students with LD. As a consequence, LD students often accomplish scientific achievements corresponding to that expectation. National Assessment of Educational Progress (NAEP) proved that situation in 2011: students with learning disabilities accounted for 68% of those who scored below the basic level, while students without disabilities made up 31% of the group. Clearly, it is necessary to meet the needs of all students and provide all students with alternative materials to make students succeed in STEM education.

Since David Rose, Meyer, and Hitchcock revealed seminal text, Universal Design for Learning has been gaining the world's attention as a curriculum and pedagogical framework that can help teachers equally assess all students and address student diversity in today's inclusive classrooms. Center for Applied Special Technology (CAST) was established in 1984 and it was founded by a group of

researchers and educators who were concerned about the lack of access to education for students with disabilities. Cast develops and promotes Universal Design for Learning (UDL), a framework for creating learning environments that are accessible to all learners.

Universal Design for Learning is increasingly recognized as a valuable framework for creating inclusive learning environments worldwide. While some countries are leading in UDL implementation, others are still in the process of adopting UDL principles.

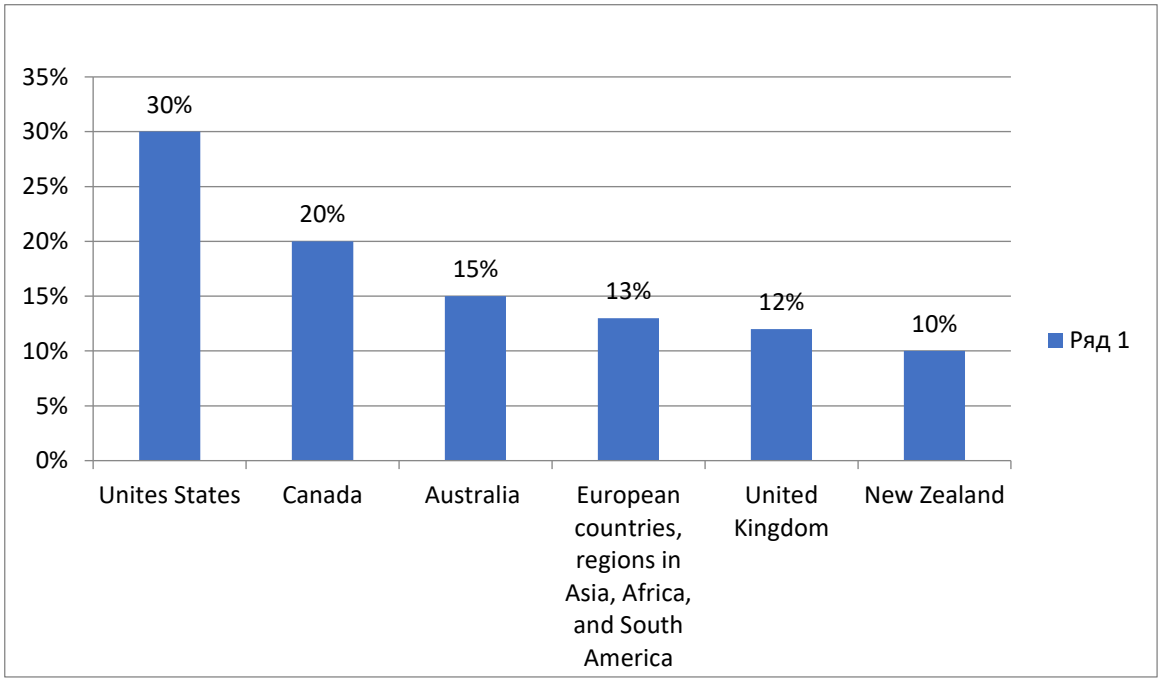

Table1: Globally use of UDL principles

Over the past years, many scholars all around the world attempted to implement UDL principles in STEM education. For example, in 2009, King-Sears claimed that UDL principles can provide teachers with the chance to proactively incorporate intelligent pedagogical skills in their classrooms which in turn leads to students having access to the most appropriate materials according to their needs. UDL principles: multiple means of representation, engagement, action, and expression can promote the inclusion of students with learning disabilities. Most importantly, UDL principles can identify curricular, environmental, and instructional barriers that prevent the

opportunities for students with LD to attain meaningful access to instructional experience.

However, the implementation of the UDL method worldwide is somehow lagging (Ok, Rao, Bryant, & McDougall, 2016). Several professional organizations, UDL-implementation projects, Research Networks, educational research and development organizations, and CAST are promoting efforts to enhance the implementation of this framework. According to Fixsen and his colleagues, implementing educational programs processes always takes time. As he claimed, the expected positive impacts of these programs and approaches with fidelity are always complex and lag behind the attempt to analyze scientifically effective frameworks and practices.

There are several ways of applying the UDL method in classrooms, including the following:

- **Apply step-by-step**. Teachers should not worry about starting using UDL principles in one or two classes gradually. They should not try implementing this method in all of their classrooms. After incorporating the UDL method gradually and becoming more comfortable with the process, they can start utilizing UDL principles in their all classes successfully.
- **Ask for help from colleagues**. Teachers should be encouraged to collaborate with their co-workers who are integrating UDL principles in their classrooms. They can provide the teachers with support, advice, and help. As a result, teachers who are planning to incorporate the UDL method in their classrooms can benefit from this process and develop skills that are necessary for using UDL successfully.
- **Use open educational resources**. As we are living in a technologically developed era, there are limitless resources to learn how to employ different teaching methods. By using open educational resources available on the Internet, teachers can gain insights regarding the implementation of this method and save time.

- **Start adapting existing materials.** Teachers are not required to create new materials or resources for their UDL lessons. They can adapt existing materials to make them more accessible to all students, including students with learning disabilities in their UDL lessons.

Integrating UDL into classrooms can be a challenging process, but it is a rewarding task. By implementing multiple means of representation, multiple means of engagement, and multiple means of action and expression, teachers can create a more inclusive and engaging learning environment for all learners and students with learning disabilities.

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THE IMPORTANCE OF USING GAME TECHNOLOGIES IN TEACHING EFL AT SCHOOL

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Abstract

Game technologies are increasingly being used in education as a way to engage students and make learning more fun and effective. This is especially true in the teaching of foreign languages, where games can be used to practice vocabulary, grammar, and pronunciation in a more natural and interactive way. This article explores the importance of using game technologies in the teaching of English as a foreign language (EFL) at school. It begins by discussing the benefits of using games in the classroom, such as increased motivation, improved engagement, and better retention of information. Furthermore, this work also discusses the challenges of using game technologies in the classroom, such as the need for teacher training and the potential for students to become addicted to