



Short Communication

# Algebra 3-4 for Students with Learning Disability

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## Introduction

Algebra is, arguably, one of the pillar topics in mathematical education, and is, as such, one of the competencies necessary for furthering mathematical education, and a compulsory requirement in the majority of higher education and career paths. One of the main public discourses is whether Algebra 3-4 LS should be a compulsory subject in high schools, including for children with learning disabilities. While some believe that exposure and competency in algebra facilitate problem-solving, logical reasoning, and analytical skills, a good number feel that the high level of abstractness in algebra puts an undue burden on many students with learning disabilities [1]. This problem necessitates careful deliberations on the importance of algebraic literacy, the challenges faced by students with learning disabilities, and possible accommodations and alternative approaches that could bridge the gap between accessibility and rigor, to guarantee equal opportunities for success for all children.

## Importance of Algebra for Students with Learning Disabilities

Algebraic learning is very important for students with learning disabilities since it provides them with many opportunities in their academic and working lives. Algebra is a prerequisite for most advanced math courses, science, and engineering classes, which is why it is crucial for students planning to continue their education in STEM. According to Agostini et al. [1] problem-solving and critical thinking skills that are associated with algebra are transferable and can be applied in different fields and occupations. In the modern world where the job market is constantly changing, critical thinking skills, which involve the abilities to understand relationships between various factors, recognize certain patterns, and make rational decisions, are considered to be rather valuable by employers. Mastering algebra allows students with learning

disabilities to expand the sphere of their interests and improve their future career prospects [2]. Although it might be a difficult process, mastering algebra is a worthwhile endeavor that prepares students, especially those with learning disabilities, for success in their careers and their personal lives.

## Challenges Faced by Students with Learning Disabilities

Many students with learning disabilities experience a great deal of difficulty while trying to understand algebraic concepts. Algebraic learning can be a daunting task, primarily because it involves using symbols that can be difficult to comprehend and manipulate for those with learning disabilities [1]. Students with learning disabilities often struggle with working memory, attention, and executive skills that are necessary to solve algebraic equations and grasp mathematical patterns. According to Bone et al. [2], the thinking strategies that are involved in algebra, for instance, analyzing multiple-step problems and searching for patterns, can be challenging to any learner with learning disabilities affecting his or her ability to reason mathematically.

The inability to understand algebraic concepts affects a student, not just academically, but also psychologically. Negative emotions such as frustration, anxiety, and low self-esteem are associated with failure or perceived incompetence in mathematics. Such pressure creates a negative feedback cycle which in turn affects the student's learning abilities as well as his or her ability to interact with the content emotionally [3]. Furthermore, expectations to perform well in class and the perceived competition with other learners may elevate stress-related factors and lead to issues with social isolation or demotivation [2]. These psychological factors only add to the need for not only meeting the child's academic needs but also helping him or her to receive emotional support and develop the necessary attitude with learning disabilities.

## Accommodations and Support Systems

Given the obstacles that students with learning disabilities encounter in mathematics, it is equally important to ensure that they are given an equal chance just like their counterparts. IEPs are very essential in ensuring that students with learning disabilities are well catered for by implementing effective teaching methods and some modified methods. These may include extra time on tests, the use of a calculator or computer, as well as changes to the method of teaching or the format of the texts and other materials provided by the teacher [2]. Furthermore, various instructional strategies, including multisensory teaching, the use of visuals, and manipulatives can assist in facilitating both the acquisition and understanding of abstract algebras.

In addition to the aspects of individual support, it is critical to provide a range of support services to successfully educate students with learning disabilities in algebra. This includes the availability of special education services, tutorials, and resource rooms manned by professional persons who can offer remedial help [3]. Furthermore, the cooperation of the teachers who teach in general education classrooms, special education teachers, and other staff members is also necessary to regularly assess the student's progress and determine whether certain changes or modifications should be made that would require intervention. Prevention strategies at the primary level and consistent wraparound support to a learner's education process can prevent such challenges and enable a culture that supports learning differences and encourages development [1]. Schools should ensure that the students with learning disabilities are well provided with accommodations and support structures and this enables them to overcome barriers, gain confidence, and perform to the best of their abilities in algebra and other areas.

## Alternative Approaches

Although algebraic literacy has a huge bearing on future career paths and personal growth, it is imperative to address methods and interventions for teaching students with learning disabilities. One possible intervention is to provide other math classes or sequences that teach application-orientated strategies and skills [4]. For example, mathematics courses that are specific to finance, accounting, or computer science may offer students opportunities to develop quantitative thinking and reasoning skills without relying heavily on abstract algebra as in traditional mathematics courses. These concepts-based courses may serve to support students' interest, enthusiasm, and motivation for learning by connecting them to the common experiences they come across in their day-to-day lives.

Moreover, it is also important to note that educational institutions may consider changing course credit requirements for students with learning disabilities. Rather than specifying certain algebra

courses to be taken, Lee, et al. [5] recommend making certain math courses available that equip students with relevant competencies for graduation. Such an approach considers the diversity of learners' patterns and their unique learning capabilities, which allows students to choose a different course that will be most effective for them and meet their future career aspirations [5]. Nevertheless, it is crucial that such other choices retain academic standards and equip the learners for further studies or the job market, as the case may be. Thus, schools should shift from a traditional way of teaching mathematics to students with LD and introduce more individualized approaches; thus, forming students' quantitative skills while making them feel successful.

## Balancing Academic Rigor and Accessibility

Although it is necessary to strive for the inclusiveness and adaptation of different teaching methods, it is important to strike a balance between providing access and maintaining high academic standards. Morin & Agrawal reckon that reducing expectations or degrading the quality of academic work may harm students with learning disability by placing limitations on the type of opportunities they can utilize or setting them up for failure [3]. Instead, the emphasis should be on creatively presenting sound content to meet the learning needs of all the students. This may include using technology aids, employing multisensory teaching methods, providing conceptual chunking, and use of technology that includes a growth mindset where students are encouraged to learn to think positively and keep on trying.

It is imperative to recognize that students with learning disabilities have different strengths and talents that could be used to help them better comprehend algebraic concepts. Practical problem-based learning and involvement in real-life projects can assist teachers in bringing some of these concepts closer to life. Banerjee & Guatam reckons that encouraging group work and peer support forums could help create a group identity where students can learn from both the group and individual perspectives [4]. The focus should be ensuring that all students get equal chances to learn and perform well in rigorous academic activities without denying the fact that each student responds differently to different instructional methods. Hence by creating and promoting a conducive learning environment in schools, students with LD can be enabled to break the circle of disadvantage and gain skills to lead normal lives [6].

## Conclusion

The decision to require Algebra 3-4 LS as a mandatory prerequisite for a high school diploma for students with learning disabilities is a complex and multifaceted issue. As much as fluency in algebra is without a doubt beneficial to students in gaining access to academic and career opportunities, it is equally important not to ignore these students' difficulties. Adjusting to the abstract reasoning involved with the ideas taught in algebra along with possible difficulties in

working memory, information processing, and problem-solving abilities present some serious challenges. Nevertheless, through the provision of extensive accommodations, assistance, and other methods of learning, these institutions ought to empower students to embrace learning with variation and development. Through specific instructional approaches, accommodation, or other means of differentiation, there should always be an aim to offer students equal opportunities to learn difficult content effectively at the same time avoiding watering down curricula. Implementing a positive learning environment, both academically relevant and easy to comprehend, learning disability students can achieve the mathematical skills necessary for their further academic and career success as well as build confidence in their abilities.

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