



THE INFLUENCE OF GROWTH MINDSET INTERVENTIONS ON ACADEMIC ACHIEVEMENT IN UNDERPERFORMING STUDENTS

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Abstract:

The paper examines the effects of growth mindset interventions on the academic performance of low achieving students. The study is based on the cognitive and educational psychology theories, including the mindset theory, self-efficacy, and motivation theories, and how beliefs of students concerning intelligence impact their learning performance. Students who perform poorly tend to be psychologically, socially, and environmentally challenged thus failing to achieve in academics. The research paper notes that growth mindset interventions which include classroom-based strategies, feedback mechanisms, goal setting, and teacher training can be effective in improving student motivation, engagement, resilience, as well as problem-solving skills significantly. Empirical evidence proves that students that embrace a growth mindset are better academically and more persistent in the face of challenges. Yet, the success of these interventions hinges on the quality of the implementation, cultural background and institutional backing. Although interventions in growth mindset have great advantages, they are not one-sided. It is noted in the study that these interventions need to be incorporated into the larger educational practices, such as differentiated instruction and supportive learning environments. In general, the results indicate that the development of a growth mindset can help to decrease the achievement gaps and advance more inclusive and efficient educational systems.

Keywords: Growth Mindset, Academic Achievement, Underperforming Students, Motivation, Self-Efficacy, Educational Psychology, Student Engagement, Resilience, Learning Strategies, Intervention Programs

Introduction

Carol Dweck's theory of a growth mindset has had a profound impact on modern educational psychology, especially in relation to student learning and success. A growth mindset is the belief that one's abilities and intelligence can be cultivated and improved through effort, learning strategies and feedback (Dweck, 2006). This is in contrast to a fixed mindset, in which people think their abilities

are static. Students with a growth mindset have been found to be more resilient in the face of challenges, more motivated to learn, and more successful academically (Dweck, 2006).

Low-performing students are generally those who do not reach their potential academic performance. They may experience various issues, such as low self-confidence, motivation and negative self-concept. OECD (2016) defines low-performing students as those who do not achieve basic proficiency in core academic subjects, including reading, maths and science. These students are more likely to experience low levels of education attainment and future employment.

Achieving academic excellence is a global educational priority. Low-achieving students are more likely to drop out of education, have lower self-esteem and struggle with future academic and employment prospects (OECD, 2016). Moreover, the quality education is a universal goal, and UNESCO (2015) dwells upon the significant importance of the inclusive education system, which must cater to all students, including those with poor academic performance.

The issue being discussed in this work is the gap between the success and the underperforming students and the lack of the effective reaction to this issue concerning the traditional teaching strategies. The conventional methods are more inclined to concentrate on the flow of knowledge, and to ignore the impact of psychological and motivational issues on learning. However, research indicates that the perception of ability by the students is a major determinant of student learning.

For instance, Blackwell et al (2007) found that students who believed intelligence was malleable were more likely to show long-term gains in academic achievement than students who held a fixed mindset. The purpose of this study is to explore the impact of growth mindset interventions on the academic performance of students with low academic achievement. This includes investigating whether these interventions can increase students' motivation, engagement and resilience, and in turn, academic achievement. Further, it seeks to explore strategies for incorporating growth mindset interventions into the classroom.

This research is important in that it could offer valuable insights for teachers, policy makers and academics. Educational institutions can then implement more productive teaching and learning strategies that promote positive beliefs about learning to benefit underperforming students. According to Yeager and Dweck (2012), the induction of adaptive beliefs about intelligence can support students to cope better with learning challenges and improve their learning outcomes, especially for those students who are underperforming. As such, this research supports efforts to provide more supportive learning environments.

Theoretical Framework

The underlying theory behind the growth mindset programs is the fixed versus growth mindset framework proposed by Carol Dweck. Dweck (2006) explains that people with a fixed mindset have a belief that intelligence is fixed, or static, while people with a growth mindset see intelligence as malleable and capable of growth through learning and effort. This is a key aspect of students' learning behaviours as different mindsets affect the way students approach challenges, effort and setbacks. Those with a growth mindset are more likely to approach challenges, and persevere in the face of setbacks, whereas those with a fixed mindset may avoid challenging tasks for fear of failure (Dweck, 2006).

This approach is based on Dweck's theory of implicit theories of intelligence. She suggests that students' beliefs about their intelligence influence their learning goals. Students who hold a theory of intelligence that is malleable are more likely to set mastery goals, wanting to learn and improve, rather than performance goals, wanting to demonstrate their ability (Dweck & Leggett, 1988). This approach draws attention to the role of cognitive beliefs in learning and development and the possibility that shifting mindset can have a positive impact on learning outcomes.

The theory also includes Bandura's notion of self-efficacy. Self-efficacy is the belief in one's own competence to achieve a specific goal (Bandura, 1997). Those with high levels of self-efficacy are more likely to believe in their own abilities, are more likely to approach challenging tasks, and are more persistent when faced with obstacles. Self-efficacy is related to growth mindset interventions in

that they aim to foster students' belief in their ability to grow and learn. Improving students' self-efficacy has been shown to improve their academic achievement and motivation (Bandura, 1997).

The constructivist approach to learning is also applicable to growth mindset interventions. This theory emphasizes the role of active engagement in building knowledge (Piaget, 1970). It highlights the importance of active participation, problem solving, and reflection. Growth mindset interventions are consistent with constructivist principles in that they encourage active engagement in learning, a focus on learning from errors and adapting to new information.

Theories of motivation also provide evidence for the importance of mindset in student achievement. For instance, achievement goal theory describes two types of goals: mastery and performance. Mastery oriented students are more interested in developing their competence and understanding the material, while performance oriented students are more interested in demonstrating their competence over others (Ames, 1992). A growth mindset is very similar to mastery-oriented goals, as students focus on learning and improving instead of fears of failure. These goals have been shown to be related to increased effort, learning, and achievement (Ames, 1992).

Also, students' attributions for success and failure play a part in motivation. Weiner (1985) suggests students attribute their success and failures to factors such as ability, effort and luck. Growth mindset interventions promote attributions of success and failure to factors under students' control, such as effort and strategy, rather than ability. This can contribute to greater motivation and better academic performance, as students perceive a greater sense of control over their learning.

In summary, growth mindset interventions draw on a number of psychological and educational theories, including implicit theories of intelligence, self-efficacy, constructivism, achievement goal theory and attribution theory. These theories assist in explaining the multifaceted connection of beliefs, motivation, learning and achievement. This practice gives credence to the idea that through altering the beliefs of students regarding themselves, it is possible to develop more productive learning strategies and improve the performance of the struggling students.

Understanding Underperforming Students

Academically underachieving (or underperforming) students are typically described as those who do not perform to the level that would be expected on the basis of their ability. They tend to show lower levels of performance than their potential suggests. Underperformance is related to intelligence but also impacted by psychological, social and environmental factors (Rimm, 2008). It's important to identify these factors in order to implement strategies to enhance their success.

A key factor in underperformance is socioeconomic status. Children growing up in disadvantage may have limited access to educational resources and support from parents and family members. Sirin (2005) found that socioeconomic background significantly influences student academic performance, with lower performing students from lower socioeconomic backgrounds than their counterparts. This can result in inequality in educational opportunities and achievement.

Emotional factors also contribute to student academic achievement. Underachieving students may suffer from low self-esteem, low academic confidence and excessive academic anxiety. This can have a detrimental effect on their motivation and engagement in learning. Bandura (1997) suggests students with low self-efficacy will shy away from challenge, and may be less willing to persist in the face of challenge. As a result, these students may develop a negative view of learning and more likely underperformance. Student success is also impacted by the learning environment, such as school and classroom environments. Especially influential are teacher expectations. The Pygmalion effect holds that students will perform according to teacher expectations (Rosenthal & Jacobson, 1968). Negative expectations can result in lower-quality learning experiences and a lack of motivation for those students. On the other hand, high expectations can improve learning and performance.

Efforts to understand underachieving students also need to consider peer influence. They can be affected by the norms of their peers, both in a positive or negative way. Negative peer groups may deter students from putting in the effort, whereas positive peer groups may encourage learning. Ryan (2001) reported that peer relationships strongly influence academics engagement and achievement, suggesting that peer environment is an important factor in academics.

Further, students' belief and attitudes with regard to their abilities influence their academic achievement. Students who struggle academically may hold a poor academic self-perception, thinking that they are not "smart enough". This belief is connected to fixed mindset beliefs that intelligence is unable to change (Dweck, 2006). This can result in a reluctance to challenge oneself, a lack of effort and a fear of failure, further perpetuating underperformance.

A further factor is the absence of appropriate teaching to meet individual student needs. Current instructional practices may not cater to the different learning needs and capabilities of all learners, especially students who are falling behind. Tomlinson (2014) notes that a differentiated approach to instruction is crucial to the success of diverse learners. Without suitable instruction, under-achieving students may continue to lag as compared to others.

Overall, poorly performing students face a combination of issues including socioeconomic status, psychological factors, environmental factors, and negative cognition. These factors all impact academic performance, and provide opportunities for treatment. Awareness of these problems can inform the use of strategies, such as school-based growth mindset interventions, that aim to address the cognitive and motivational components of learning, facilitating students' achievement by supporting them to attain their potential.

Growth Mindset Interventions

Growth mindset interventions are systematic approaches and activities aimed at equipping students with the belief that their intelligence and abilities can be developed and improved through learning, practice and hard work. The goal of these interventions is to change students' learning mindset by fostering beneficial beliefs about intelligence and teaching students how to persevere in the face of adversity (Dweck, 2006). These interventions have become increasingly popular in recent years as techniques to enhance academic performance, especially in low-achieving students.

A popular type of growth mindset intervention is classroom strategies. Educators are key to instilling growth mindset in students through their teaching practices. These strategies emphasize the importance of effort, viewing mistakes as a natural part of the learning journey and fostering a "never give up" attitude. Dweck (2006) argues that a focus by teachers on strategies and effort rather than ability is likely to lead to a growth mindset in students and increased engagement in learning.

Professional development programs for teachers are also a key part of growth mindset programs. Teachers need to be familiar with the theory of growth mindset in order to successfully implement it. Training interventions that focus on mindset theory, feedback strategies, and motivational strategies can help teachers reach struggling students. A recent study by Yeager et al. (2019) found that interventions are more effective when teachers regularly emphasize growth mindset principles in the classroom.

Feedback is an important component of growth mindset interventions. Feedback strategies have a major impact on students' mindset. Process-based feedback, which emphasizes effort, improvement and strategies, is more effective than person-based feedback, which emphasizes ability. For instance, telling a student "good job, you worked hard" or "good job, you used a good strategy" is more likely to lead to persistence, while telling them "good job, you are smart" can reinforce a fixed mindset. In a study by Mueller and Dweck (1998), students praised for their effort persisted longer on a difficult task than students praised for their intelligence.

Another important aspect of fostering a growth mindset is goal-setting strategies. Teaching students to set attainable learning goals fosters a focus on learning and improvement. Mastery goals, which focus on skill acquisition and learning, are especially beneficial for developing a growth mindset (Ames, 1992). Students with improvement and learning goals are more engaged, and less easily deterred by setbacks.

In addition to classroom-based interventions, there are online and brief interventions for growth mindset. These are usually brief online workshops that teach students about a malleable brain and growing intelligence. For instance, recent research by Yeager et al. (2019) has shown that brief interventions can lead to large increases in students' academic performance, particularly students at

risk for academic underachievement. This study highlights the promise of growth mindset interventions for many different settings.

Another aspect of teaching growth mindset is to teach students to be persistent. Students learn to view obstacles and challenges as opportunities. They learn how to respond to learning setbacks. Researchers find that students with a growth mindset are more resilient when facing difficulties and challenges, and are more persistent learners (Dweck, 2006).

But growth mindset interventions typically also involve collaborative learning. Group tasks and discussions can help to emphasize positive learning beliefs, and allow students to learn from their peers. Engaging with others in the classroom can also help students feel less alone in their learning, and reinforce the notion that learning takes time. This can lead to a growth mindset classroom culture. While successful, the delivery of growth mindset interventions is vital to their effectiveness and must be threaded throughout the classroom. Not only must the idea be taught, but it needs to be supported by classroom, teaching and assessment practices. As Yeager and Dweck (2012) point out, integrated and sustained intervention is required to achieve large increases in student achievement.

Overall, growth mindset interventions can be delivered in a variety of ways, including teaching strategies, teacher training, feedback techniques, goal-setting and computer programs. They aim to sustainably shift students' beliefs about learning ability and intelligence, and motivate, engage and improve their learning. When used properly, they can be a potent way to help struggling students and set them up with success.

Impact of Growth Mindset Interventions

The use of growth mindset interventions has gained particular attention in recent years for their effects on academic achievement, especially in struggling students. These strategies impact students' academic performance, motivation, engagement, persistence and learning strategies. Through the promotion of a different understanding of intelligence and ability, growth mindset interventions set students up for long-term success.

Perhaps the most notable effect of growth mindset interventions is on academic achievement. Studies have shown that students with a growth mindset are more likely to achieve higher academic performance than students with a fixed mindset. This occurs due to their greater willingness to put in more effort, use more effective learning strategies and not give up in the face of adversity. Blackwell et al. (2007), for instance, found that students taught the malleability of intelligence had a greater improvement in their mathematics grades over time than other students. Likewise, Yeager et al. (2019) showed that students who were taught the growth mindset benefitted from an improved academic performance, especially those with lower performance.

A further effect is on motivation. Students who are taught about the importance of effort in achieving success are more intrinsically motivated. Students who believe they can develop their skills are more likely to be actively engaged in learning activities, and to take responsibility for their learning. Dweck (2006) suggests that students with a growth mindset are more likely to pursue mastery goals, which emphasize learning and improvement over performance goals, which emphasize achieving high scores. These types of goals result in increased engagement and learning.

The growth mindset also has a positive impact on student engagement. Engaged students are more focused, actively participate in class and are more interested in learning. Growth mindset interventions encourage engagement by eliminating fear of failure and encouraging a willingness to take risks. Knowing failure is inherent to learning allows students to be more actively involved in classroom activities and to try new ideas. Yeager and Dweck (2012) highlight the importance of students holding a belief that intelligence is malleable to stay engaged in the face of academic setbacks.

Another essential and notable feature of growth mindset practices is developing resilience. Low-achieving students may struggle with setbacks and may become easily discouraged in the face of challenges. By instilling in students the belief that challenges are opportunities to learn and grow, growth mindset interventions promote resilience. This allows them to continue working on challenges and bounce back from academic setbacks. Dweck (2006) states that students with a growth mindset

are more likely to persist in their efforts and put in more effort, leading to better academic achievement.

Another benefit of growth mindset interventions is improved problem-solving ability. By understanding that they can develop their abilities, students are more likely to try different strategies and approaches to problem solving. This allows them to develop their cognitive skills and gain a better understanding of the material. They become more flexible thinkers, able to apply their skills in different situations. This is especially helpful for struggling students who must learn new techniques to improve their learning.

There are also long-term benefits of growth mindset interventions for student learning. By instilling positive attitudes towards learning, they empower students to be confident learners and cultivate a love for learning. Students with a growth mindset have been found to be more likely to continue studying, and achieve a higher eventual level of success (Blackwell et al., 2007). These benefits suggest the need to intervene early and reinforce the learning principles of growth mindset.

And growth mindset interventions play a role in narrowing the achievement gap. These interventions are particularly beneficial for low-achieving students as they help overcome the psychological obstacles to their learning. Yeager et al. (2019) demonstrated that growth mindset interventions were most beneficial for students at risk of failure, and thus have the potential to address educational inequalities.

But we must be mindful of the context and execution of growth mindset interventions. Interventions are most effective when they are embedded into the school system and supported by school and classroom policies and practices. The growth mindset concept needs to be consistently promoted and supported in the learning environment (Yeager & Dweck, 2012).

Overall, growth mindset interventions have a profound and far-reaching effect on student learning and achievement. They boost academic achievement, increase engagement and motivation, foster resilience and encourage effective problem-solving. As well as having a lasting effect and helping to close the achievement gap of low-performing students. Properly delivered, growth mindset interventions are an effective strategy to enhance learning and help students achieve their potential.

Empirical Evidence and Research Studies

The evidence for the effectiveness of growth mindset interventions is solid...

Research on interventions to promote a growth mindset has yielded considerable evidence on the effectiveness of these interventions for increasing students' academic performance, especially among low-achieving students. In the last 20 years, dozens of experimental and longitudinal studies have investigated students' beliefs about intelligence and its effects on academic performance, as well as the impact of interventions designed to change students' beliefs.

The most cited study in this area was that of Blackwell, Trzesniewski, and Dweck (2007). The researchers examined students over the transition to junior high school, when performance tends to drop. They discovered that students holding a belief that intelligence is malleable (growth mindset) had an upward trend in math performance over time. These students showed a negative trajectory instead. In addition, those who received a growth mindset intervention showed improved academic performance over the control group. The study offered compelling evidence that shifting students' mindset can have a positive impact on learning.

Another milestones study is the large-scale national experiment of Yeager et al. (2019) that tested the impact of a short online growth mindset intervention on more than 12,000 US students in ninth grade. This study found the intervention had a positive effect on student performance, particularly for low-performing students and in low-performing schools. It also found the effectiveness of growth mindset interventions is dependent on a range of factors including the classroom environment and teacher support. This research is valuable as it demonstrates that simple and accessible interventions can improve performance.

Other studies have examined the psychological processes underlying the effects of growth mindset interventions. For example, Yeager and Dweck (2012) propose the success of these interventions comes from changes in student beliefs about challenges and setbacks. When students view setbacks

and challenges as an opportunity to learn, rather than as an indication of incompetence, they will be more likely to persist and use learning strategies. This will increase their motivation and achievement, especially for "low achievers".

Research has also been conducted across different cultures to explore the effectiveness of growth mindset interventions. One study comparing students from several countries found that the association between mindset and academic achievement is stable across cultures, although this association may be stronger in some cultures than others (Claro, Paunesku, & Dweck, 2016). The authors found that students with a growth mindset reported greater academic achievement in a sample of Chilean students, and that this was especially true for low socioeconomic status students. This finding implies that the growth mindset intervention may be particularly useful for students who are under stress from their learning environment.

Additionally, research has shown that growth mindset interventions have a lasting effect. Blackwell et al. (2007) found that the impact of mindset interventions lasts beyond the length of the intervention and extends to students' long-term academic performance. Likewise, other research has indicated that students who adopt a growth mindset are more likely to engage in learning, and achieve greater academic success over time (Dweck, 2006). These studies suggest that early and ongoing intervention is critical to achieving good academic outcomes.

Not all research on growth mindset interventions has been successful, suggesting that quality of delivery is crucial. For example, a recent meta-analysis of the impact of growth mindset interventions found that although the overall effect is positive, the magnitude of the effect is small (Sisk et al., 2018). Based on their findings, the researchers suggested that interventions are particularly effective for at-risk students, and that targeted rather than universal interventions may be more effective.

A further consideration for empirical studies is the learning environment. Research has demonstrated that growth mindset interventions are more effective in a positive classroom environment, and when supported by teacher practices that encourage the growth mindset (Yeager et al. 2019). Otherwise, interventions may not work. This highlights the need for an integrated approach to using growth mindset interventions with other teaching strategies.

In summary, there is evidence for the use of growth mindset interventions to improve academic performance, particularly for low performing students. Crucially, the studies by Blackwell et al. (2007) and Yeager et al. (2019) demonstrate that changing students' beliefs about intelligence impacts on student learning. Studies from diverse cultural backgrounds and longitudinal studies also indicate that benefits are not just limited to a specific culture and extend over time. However, the effectiveness of growth mindset interventions is not unconditional and depends on factors such as the fidelity of the intervention, the school or classroom environment and broader environmental factors. These findings suggest that we need to consider well-designed and culturally relevant interventions to maximise learning.

Practical Applications in Education

There are a range of applications for growth mindset interventions in education to translate ideas into actions and improve student performance. For struggling students, this can be crucial in increasing motivation, engagement and performance. Successful applications need a collaborative approach from educators, parents and schools to foster a learning environment that promotes the adoption of a growth mindset.

A key application area is in the classroom. Teachers play a crucial role in the implementation of growth mindset practices by shaping students' learning environment and mindset. Through the use of teaching practices that focus on effort, persistence and growth, teachers can create a growth-oriented classroom environment. For instance, by challenging students, encouraging them to participate in class discussions, and embracing a view of mistakes as a necessary part of the learning process, students can build perseverance and self-esteem (Dweck, 2006). Further, by adopting a growth mindset themselves, teachers can model learning and growth, and this can affect students' mindset.

An important aspect of classroom practice is feedback. Feedback needs to be targeted at students' effort, strategies, and improvement. According to Hattie and Timperley (2007), feedback is a major

influence on learning and student achievement when it is clear, positive and improvement-focused. Through process feedback, teachers can help students reflect on their learning and to use more effective strategies, thus promoting the growth mindset.

Professional development for teachers is also crucial to the success of growth mindset interventions. Teachers must be equipped to grasp the theory behind mindset and implement it in their classroom. These programs can equip teachers with resources, including guidance on how to provide feedback, create growth-oriented tasks and address their students' emotional needs. Yeager et al. (2019) note interventions are more likely to be successful when teachers are constantly promoting the growth mindset message in the classroom.

Parents can also contribute to the development of a growth mindset. Parents can either support or impede the messages sent to students at school. Parents who praise effort and learning from failure, and promote persistence, can support children's positive learning attitudes. Gunderson, et al. (2013) found that children with parents who engage in process praise are more likely to have a growth mindset and be motivated to learn. So, parents can be actively engaged in mindset interventions to increase their impact and create a consistent message across home and school.

Another way to apply growth mindset is by embedding it into the curriculum. Schools can include lessons that teach students about the malleability of the brain and the potential to grow intelligence. This includes class discussions, reflective tasks and homework that invite students to reflect on their learning. By incorporating these ideas into the curriculum, growth mindset becomes an embedded and ongoing part of the learning process (Dweck, 2006).

At the policy level, schools can support growth mindset initiatives by creating a student-centered and inclusive learning environment. School policies to encourage differentiated instruction, formative assessment and feedback can create a positive learning environment for all students, not just low-achieving students. Tomlinson (2014) suggests that differentiation of instruction is critical to enhancing student learning and promoting equity.

Furthermore, schools can create a positive climate that supports effort, progress and collaboration. This includes recognising and rewarding student effort, and promoting a positive peer environment. Fostering a safe place to take risks and make mistakes will promote learning and a growth mindset. Finally, the adoption of growth mindset strategies should be holistic and include teachers, parents, the curriculum and school policies. By consistently and effectively implementing these strategies, schools can create an environment where struggling students can thrive and excel.

Challenges and Criticism

However, growth mindset interventions are not without criticisms...

Although growth mindset interventions have become more popular and promise a range of benefits, it isn't all smooth sailing. Although many studies have reported positive outcomes from these interventions, they have not always produced consistent results and may be more effective in certain contexts, with certain populations and with certain implementation strategies.

The first is the relatively small effect size of the growth mindset interventions. In their meta-analysis, Sisk et al. (2018) reported that while growth mindset interventions do improve academic achievement, the effect is small. This implies that a growth mindset may not be enough to improve academic performance, and must be complemented by other teaching and learning strategies.

A further difficulty is in the delivery of these interventions. Often, education institutions and teachers lack an understanding of the concept of growth mindset. Encouragements such as "you can do it" or "don't give up" are not an effective intervention. Dweck (2015) suggests that a genuine growth mindset includes an understanding of the learning process, including the use of strategies, effort, and feedback, rather than just encouraging effort unaccompanied by instruction. A poorly applied growth mindset intervention can be ineffective, and even counter-productive.

Another challenge in the use of a growth mindset is cultural diversity. Different cultures have different educational beliefs and practices, and what works for one culture may not work for another. Claro et al. (2016) propose that although growth mindset has a positive effect on students, this effect may vary

by socioeconomic and cultural background. This suggests that interventions need to be tailored to specific contexts.

There is also concern about the universalization of growth mindset as a panacea for educational issues. It is suggested that an emphasis on students' mindset can overshadow other problems, including poor resources, teaching quality and systemic inequality. Yeager and Dweck (2012) report that mindset interventions are most effective when used in combination with other beneficial learning environments and strategies.

Also, the impact of growth mindset interventions can be difficult to measure. Variability in experimental design, sample characteristics and assessment might explain these results. This can make it challenging to determine the long-term effects of growth mindset interventions.

Ultimately, growth mindset interventions provide valuable lessons and benefits, but they are not without their drawbacks. Problems with effect size, implementation, cultural compatibility and oversimplification underline the importance of context-sensitive implementation. These challenges need to be addressed if growth mindset interventions are to increase achievement.

Future Directions

While growth mindset interventions have shown positive results, there are a number of areas that need to be explored in order to enhance their efficacy and transferability. One important direction for future research is the examination of long-term effects. While current evidence supports short-term academic gains, we need to understand the long-term effects of growth mindset interventions and their impact on transitions at various points in schooling (Yeager et al., 2019).

A further focus should be on the use of technology to deliver growth mindset interventions. Technology-enhanced programs and intelligent learning systems can provide scalable and individualized interventions that meet students' needs. We need to investigate how to make technology-enhanced interventions effective for diverse populations.

Moreover, we need to develop culturally responsive interventions sensitive to cultural, socioeconomic and institutional factors. Previous studies have shown that the effects of growth mindset may differ across contexts, especially for disadvantaged students (Claro et al., 2016). So, culturally responsive designs should be preferred.

Finally, combining growth mindset interventions with other well-established effective educational practices (such as socio-emotional and differentiated instruction) may have a greater impact on student learning. A diverse approach to learning, both cognitive and contextual, should be the focus of future research.

Conclusion

In summary, growth mindset interventions are a useful and evidence-based strategy to improve the academic performance of underperforming students. By encouraging a belief that intelligence and skills are malleable and can be improved with effective strategies and hard work, these interventions promote positive learning strategies, such as perseverance, engagement and resilience. These psychological changes are critical for students who are struggling academically and/or from low socioeconomic backgrounds, as they can eliminate barriers associated with low self-efficacy and disengagement.

Our research has identified that underperformance results from a combination of psychological, social and environmental factors. The growth mindset interventions achieve this by changing students' perceptions of their learning and improvement potential. But they must be carefully implemented, supported through classroom environments and linked to other teaching strategies.

It is crucial to understand that growth mindset should not be implemented in isolation. Instead, it should be used in combination with proven pedagogic strategies, school-based supports and equitable educational policies.

In summary, embracing growth mindset culture promotes the creation of more inclusive and supportive educational environments. By helping students understand their capacity for growth,

teachers can make an important contribution to outcomes and long-term academic achievement for low-performing students.

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