Peer-Assisted Learning to Improve Social Skills and STEM Achievement in Students with Emotional Behavioral Disorder

LINDA IFECHUKWU ONWUBUYA[1], OMOLARA OLAJUMOKE ADEYEMO[2], AWELE MARY-ROSE ILUSANMI[3]

[1]*Department of counseling Education and Student Affairs, Kutztown University.*

[2]*Department of Human Services and Educational Leadership, Stephen F. Austin State University*

[3]*Department of Services and Educational Leadership, Stephen F. Austin State University.*

Abstract- ***Peer-Assisted Learning (PAL) has been increasingly used as an effective method to support students with Emotional and Behavior Disorders (EBD) to support collaboration, social interaction, and academic success. This paper assesses the literature on how PAL can be utilized as a strategy to promote social skills as well as STEM (Science, Technology, Engineering, and Mathematics) achievement in students with EBD. The paper reviews various interventions, theoretical frameworks, and outcomes related to the use of PAL to help students improve their academic performance, behaviour and social competence. Some studies have examined how PAL may impact students with EBD, with great results. Findings revealed that the students who participated in the PAL made significant improvements in social skills and academic achievement (especially in STEM-related subjects). Results provide evidence suggesting that PAL improves peer interactions, provides peer feedback, interacts socially decreases disruptive behaviors and increases academic engagement. However, to be successful, PAL must be meticulously planned before implementation, teachers need to be trained and the conditions need to be individualized to meet the special needs of students with EBD. Some future research is needed on the effects of PAL on students with EBD long-term and strategies to thwart peer appropriateness as well as group dynamics.***

Indexed Terms: Peer-Assisted Learning, Social Skills, STEM, Emotional Behavioural Disorder

I. INTRODUCTION

Emotional Behavioral Disorders (EBD) refer to a group of challenges that hinder students from openly interacting with other students in a social or scholastic setting, to advance intellectually and help them in their overall growth. Students with EBD such as aggression, defiance, anxiety and withdrawal, demonstrate behaviors that interfere with their interaction with peers and academic success (King, 2013; Burns, 2015; Voigt-Zabinski, 2017). Especially in the STEM areas where, not to mention the cognitive skills, one must have good communication, collaboration, and problem-solving skills, these challenges can be quite pronounced.

Due to these issues, Peer Assisted Learning (PAL) has been proposed as a very good pedagogical approach. PAL is a strategy in which students learn with peers in pairs or small groups. The strategy exploits social interactions: using peer assistance, feedback, and encouragement (Johnson & Johnson, 1999; Sinclair et al., 2019; Carter, 202). In this paper, we explore the possibilities of PAL to help students with EBD in terms of social skills as well as academic outcomes, especially in subjects related to the STEM area.

Structured peer learning such as Peer Assisted Learning (PAL) is one type of structured peer learning based on the Supplemental Instruction (SI) framework that was first developed at the University of Missouri–Kansas City in 1973 as an assistance programme for improving student academic performance and retention in modules that are deemed as traditionally difficult (Martin & Arendale, 1992b, 1992a). Specifically, PAL has been underpinned by various learning theories, including Dale's (1969) and Kolb's (1974) experiential learning theories, Bandura and Walters's (1977) self-efficacy theory, and Vygotsky's

(1978) scaffolding theories, to encourage student collaboration and mutual assistance in high-risk courses with conceptually difficult subject material (Capstick & Fleming, 2004). Student study is facilitated by more senior cross-year students who act in this capacity as tutors in the form of regular guided study sessions offered by PAL. The closeness of such peer tutors to the learners (sometimes referred to as near-peer tutors) in PAL sessions builds self-efficacy by having learners witness the demonstrations of competence by socially and culturally similar people (Bandura & Walters, 1977; McKenna & Williams, 2017).

While they continue to focus more on the academic benefits of PAL programmes, they also contribute to social aspects that can be referred to as a collaborative learning community and increased learner confidence (Black & MacKenzie, 2008). Like the PAL leaders, Keenan (2014) also improves their subject knowledge and higher-level skills in the personal and professional lead. As such, there is evidence that students in PAL initiatives develop better relationships by working collaboratively through the PAL environment with peers so that they feel less isolated; are more supported; or have better access to what they term the 'hidden curriculum' of course expectations and norms (Bailey, 2021; Ginty & Harding, 2014; Herrmann-Werner et al., 2017; McKenna & Williams, 2017). For instance, PAL was shown to be an effective tool for computing programming students of the novice level, as the environment promoted cognitive learning by increasing the engagement of active learners (Altintas et al., 2016).

The key objective of this review is to examine the adoption of PAL as an intervention for students with EBD and its impact on the development of social skills and STEM achievement.

II. LITERATURE REVIEW

Emotional Behavioural Disorder (EBD)

Students with Emotional Behavioral Disorders have struggled with developing relationships, regulating emotions, and customary socialization that consequently impacts academic productivity (Guo et al., 2023). Essentially, students with EBD often are not compliant, aggressive, or withdrawn, making it difficult for them to participate in the traditional classroom (Burns, 2015). First of all, these behaviours not only have an impact on one's academic performance but also restrict chances for academic positive peer interaction as well. Several behavioural and cognitive challenges, not exclusive to EBD, combined with research (Wiseman, 2018) indicate that students with EBD are at higher risk for academic underachievement, specifically in STEM subjects.

One of the key theories about EBD concentrates on the interactions of biological and psychological factors with the environment. Following social cognitive theory (Bandura, 1986), students with identified EBD may be at risk of not being able to model appropriate behaviour and learn social skills because of defeat in self-regulation and the use of coping strategies. Furthermore, the transactional model of development (Sameroff, 2009) involved in the social and emotional development of a child, is a result of interactions with caregiver, peers, and school environment, which makes it imperative for PAL shrewd interventions to transform these development pathways.

Social Skills

Social skills are life skills (UNICEF, 2012). They are essential skills for the acquisition of children. Generally speaking, children who are helpful and empathic and can adaptively regulate their emotions tend to do better on most social arenas in life, from school (for instance, Hamre & Pianta, 2001; Zsolnai, 2002). Observation of social skills is a representation of a larger social competence construct. The social competence construct, social competence is a multidimensional construct that includes cognition, affect motivation, and behavior to perform social tasks and for positive developmental outcomes (Ogden, 2015). According to most definitions, social skill is made up of some related inter- and intrapersonal skills which may be fitted into overt subdimensions of cooperation, assertion, self-control, empathy, and responsibility (Elliott & Gresham, 1990). The characteristics of the context in which social skills are developed are learned and impact how one's social skills develop. In this study, we examined how much school-related factors impact the first level and growth of social skills in elementary school children such as student-student relationships, teacher-student relationships, level of problem behaviour in class and teachers' collective efficacy.

Social skills are valuable in and of themselves and be associated with other critical areas of development, both emotionally (Humphrey & Wigelsworth, 2012) and behaviorally (Bijstra & Jackson, 1998) as well as academically (M. Welsh et al., 2001). Socially skilled children tend to have more positive attitudes toward school, adjust more easily to the role of the student as well as have better grades than children who are not socially skilled (Hamre & Pianta, 2001; Zsolnai, 2002). Several problem outcomes have been associated with low social skills, including externalizing behaviour, delinquency, depression, social anxiety, academic failure, and unemployment (Masten et al., 2010; Obradović et al., 2010).

Acquisition of social skills is an essential developmental process during which children in infancy acquire the ability to act and respond socially in an appropriate way and form and maintain healthy relationships with others (Ogden, 2015). With the continuous expansion of the social environment which children go through, school becomes an arena for learning and social skills learning and exercise. Children's social skills are challenged and shaped at school in many ways, both in and between dyads, small and large groups, as well as with peers and teachers. Although social skills and evidenced relations to critical child outcomes are rarely systematically promoted in schools in contrast to academic skills (OECD, 2015).

Peer-Assisted Learning (PAL)

Peer Assisted Learning is a structured form of learning in which students collaborate to help each other in the learning process (Slavin, 1995). The central idea of PAL is that students can acquire particular social and cognitive skills should they be taught to and/or help other students. PAL offers students with EBD the opportunity to interact positively with their peers, learn from them, and increase their confidence in their capabilities in the academic areas (Fuchs et al., 2000; Bowman-Perrott et al., 2023). The literature supports that PAL benefits in particular to help EBD students improve better communication, problem-solving and self-regulation skills necessary to succeed in STEM fields.

A key theoretical model that integrates PAL into its constructs includes social constructivism (Vygotsky & Cole, 1978), which focuses on social interaction as an essential element in cognitive development, and the theory of reciprocal teaching (Brown et al., 1984) that involves students teaching each other to build on their knowledge on the content. In terms of its application to students with EBD, PAL provides a means for the acquisition of both academic and social-emotional learning while students are working in an academic context and interacting with peers on appropriate terms.

Social Constructivism Theory

This review hinges on Vygotsky's social constructivism theory (1978) which centres around guided and unguided learning of learners from one other. For instance, it encourages learners to build their knowledge and thereby share it with others. It also stimulates learning situations where the learners become active participants in learning. For this reason, the roles of the teacher and learner have changed; teachers work with learners to assist in learning. For this reason, learning becomes a cooperative affair between the learner and the teacher.

Vygotsky (1978) emphasizes culture and interaction in the development of cognitive ability in social constructivism theory. First, it is argued that individuals are active participants in forming their knowledge (Kalina & Powell, 2009; Schreiber & Valle, 2013). To put it another way, the theory of social constructivism asserts that learning occurs mainly due to social exchange with other people, for example, with his teachers and his classmates. Vygotsky's research and theory as a whole include the notion of social constructivism and language development, such as cognitive dialogue, the zone of proximal development, social interaction, culture and inner speech (Vygotsky, 1962). Effective classroom development would come from understanding his theories or creating a classroom where interaction is present.

Empirical Findings

Experiments are being conducted on the impact of PAL on STEM education, however, the findings are suggestive. According to Sinclair et al. (2019), PAL increases academic engagement and decreases disruptive behaviour during STEM activities. Nevertheless, Wiseman (2018) identified that STEM

subjects need tailored interventions to address the challenges that students with EBD face.

Another study by Etobro and Fabinu (2018) revealed that students who did peer-assisted learning strategies tended to outperform than a conventional show with the average mean scores of about 10.92 and about 7.44 respectively.

In a study by Carter (2022), six high school students with EBD were used to evaluate a multi-component intervention of PAL and positive peer reporting. Positive social behaviours increased, and academic engagement increased as a result of the intervention, but at ceiling effects during baseline measures.

The PALS were applied to eight fifth-grade students, including three boys identified with EBD by a study by Wiseman (2018). The intervention was created to boost reading fluency and comprehension as well as social skills. However, the study knows that the intervention does not give significant gains, which is why more research needs to be done and PAL strategies are adapted to students with EBD.

Out of 23 studies on emotional peer support interventions for students with Special Educational Needs and Disabilities (SEND), this systematic review by Van Der Meulen (2021), was able to identify some studies. The review also discussed the good things about peer support systems such as increased social interaction, social acceptance and positive effects on self-esteem, the need was highlighted for school-wide support and the student plays an active role.

Tokunbo's study (2023) evaluated the role of peer group activity-based learning on academic achievement of integrated science courses among junior secondary school students. It was shown that using this strategy to teach students led to them having more academic success as compared to traditional teaching methods.

Another study also looked into the effect of a peer collaborative learning strategy on students' motivation and academic performance in physics at the senior secondary school level (Maina & Moses, 2024). It was found that peer collaborative learning strategy had a significant effect on learning physics both in terms of motivation and academic performance.

III. METHODOLOGY

This review hinges on existing literature on peer-assisted learning, social skills, STEM and students with emotional behavioural disorders. Relevant and credible journals were used from reliable databases, including Google Scholar, Academia, Semantic Scholar, ResearchGate, Taylor and Francis, Science Direct, Web of Science, and PubMed, to form the dataset. Keywords such as "peer-assisted learning", "social skills", "STEM achievement", and "emotional behavioural disorder" were utilised to search for relevant journals and materials. Gathered data were analysed using document analysis and findings were presented thematically.

IV. RESULT AND DISCUSSION

Students with Emotional and Behavioral Disorders (EBD) are well-documented as suffering from both academic and social challenges. Rates of these students struggle with the regulation of emotions, attention, and positive peer interactions often come out to be very high (Kauffman & Landrum, 2018). Often, these behavioural and emotional difficulties interfere with both academic achievement and particularly, the development of critical social skills (Freeman et al., 2019), especially in demanding areas of STEM. In search of effective interventions, Peer Assisted Learning (PAL) becomes a promising, evidence-based strategy that meets both the academic and social-emotional needs simultaneously.

A. Benefits of Peer-Assisted Learning for Students with EBD

The following are the gathered key benefits of Peer-Assisted Learning for students with Emotional Behavioural Disorder (Figure 1).

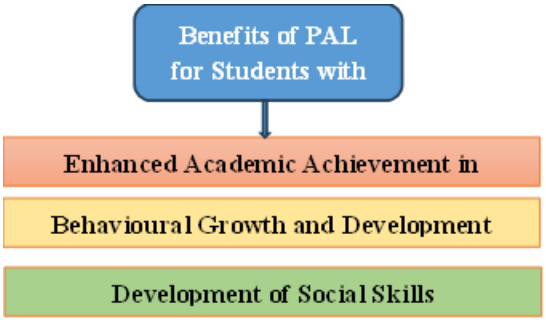

Figure 1: *Benefits of PAL for Students with EBD*

Enhanced Academic Achievement in STEM

STEM education necessitates a load of teamwork, significant thought, and complicated problems. PAL creates an environment where academic achievement in STEM can be improved for students with EBD. According to research conducted by Anwar and Menekse (2020), learning and retention of concepts in STEM subjects is enhanced by peer tutoring or group learning for students, and that is also accompanied by higher academic performance in STEM subjects. Additionally, PAL social support adds to stress and anxiety reduction associated with academic tasks in students with EBD.

There have been studies that show that PAL has a positive impact on improving academic achievement in STEM fields. For instance, Roscoe and Chi (2007) found that when students worked together in mathematics peer-assisted learning, they gained more in terms of academics than students who worked alone. In STEM contexts, PAL fosters students' work together on projects, ask questions, explain concepts, and solve problems together. Using students peer-based is advantageous for increasing students' understanding of complex STEM content and development of critical thinking skills.

Additionally, PAL provides students with EBD with strategies for coping with academic stress and anxiety that are typical of students majoring in STEM fields (Guo et al., 2023). Emotional support, and pressure to persist in solving problems and to reduce frustration and inadequacy come from peer interaction. Consequently, students with EBD gain benefit from improved performance in STEM subjects as in academic skills but also in motivation and self-efficacy.

Behavioural Growth and Development

In the behavioural interventions designed for students with EBD, it is commonly stressed that positive behaviours should be reinforced. For the reinforcement to occur, PAL gives an opportunity through peer interaction. Easing these difficulties is documented by Wiseman's (2018) study, which showed that students with EBD performing in a PAL program have less disruptive and more prosocial behaviours. PAL is structured, and supportive, and allows the learning of how to regulate one's emotions and behaviour in a social context.

Furthermore, PAL occasions positive reinforcement since students get encouraging feedback from their peers, enhancing self-esteem, and reinforcing prosocial behaviours. Students with EBD may have negative perceptions of their abilities and social worth and these students often have little positive peer interaction (Wang, 2021). Students with EBD who succeed in peer-assisted settings may develop more positive self-conceptions and thereby become increasingly motivated to demonstrate appropriate behavior.

Development of Social Skills

A major feature of EBD is deficits in social skills, which hinder communication, collaboration, and conflict resolution skills. PAL allows students to interact with peers to practice and fine-tune these skills. Zhang et al. (2022) found that students with EBD benefit very much from peer-assisted activity. PAL instructs students how to feel empathy, active listening, and cooperative problem-solving on a critical basis for academic and personal development.

It is proven that the PAL intervention can greatly improve the social habits of students with EBD. An example of such is the study that Vallis (2015) noted that students who had emotional disorders benefited from peer tutoring as this brought about improved interpersonal skills and reduced aggressive behaviour. Peer-assisted activities, for instance, group discussions or collaborative problem-solving tasks, present some chances to rehearse sociable activity in a less stressful setting, assisting students in constructing confidence in their sociable skills.

In addition, PAL ensures that students with EBD are not marginalized or excluded from the social environment of their peers, given that these students might otherwise be excluded. PAL activities can help the students have stronger relationships with peers, which leads to them feeling better connected to their peers and emotionally well (Williams et al., 2021).

B. PAL and Academic Achievement in STEM

Students with Emotional and Behavioral Disorders (EBD) tend to continuously encounter walls to academic success, especially in STEM subjects, which need to maintain attention, critical thinking, and solving problems (Whitley, 2020). Behavioural difficulties, such as impulsivity, defiance, and poor self-regulation exacerbate these challenges (Kauffmann & Landrum, 2018). Thus, students with EBD tend to have lower achievement in STEM than other students. To bridge these disparities, Peer Assisted Learning (PAL) as a promising method of instructional combining academic instruction with structured peer interaction has appeared.

Academic Intervention

Structured collaboration between two students (or sometimes a few) supporting each other's learning through PAL typically requires that a student 'teach' the other or at least explain in detail how they would teach the other one. The cooperative structure of PAL may be particularly well suited for helping students with EBD engage with STEM disciplines that they normally fail to perform well in, due either to cognitive overload, low motivation or difficulty with followingmulti-step processes (Calhoon & Fuchs, 2003). PAL enables content acquisition through multiple opportunities to practice, verbal explanationsmodellinger modelling, all under best practices in STEM education (Gong et al., 2022).

For instance, Calhoon and Fuchs (2003) reported that PAL combined with curriculum-based measurement successfully increased the the math scores of students with disabilities such as EBD in secondary schools. Credit was given to time on task and also to the reciprocal teaching model that requires active processing of mathematical concepts. Also, peer-mediated instruction improves problem-solving and computational accuracy, which are important skills for STEM (Kunsch et al., 2007).

Addressing Behavioural Challenges in STEM learning

When students with EBD view the task to be too difficult or not related to them, they tend to disengage from academic tasks (Sutherland & Wehby, 2001). While all the subjects that I have stated above are helpful at least to our everyday life without which it is impossible to imagine our future, some subjects are particularly frustrating... This is mitigated by PAL by embedding social motivation into learning such that working with a peer can improve task persistence, lessen feelings of isolation, and additionally make otherwise difficult content easier to learn (Kunsch, Jitendra et al., 2007). Also, the peer dynamic can foster positive behaviour modelling in the sense that students notice that their peers modify their behaviour using academic language, strategies, and cooperative ways.

Furthermore, PAL is a form of collaborative work that is by constructivist theories of learning relying on social interaction in knowledge construction (Vygotsky & Cole, 1978). In PAL, the provision of scaffolds from peers in STEM tasks in the student's zone of proximal development (ZPD) enables guided participation of students with EBD. And this is particularly helpful in inquiry-based science and math classes where the emphasis is on peer explaining and solving problems to get the conceptualities down.

Addressing Academic Deficits

As such, the EBD students often experience difficulties with foundational STEM skills as they have been inconsistently engaged, and have scarce access to effective instructional strategies. Thus, according to Wiseman (2018), PAL offers an interactive platform where students can get instant feedback and assistance from peers.

C. PAL and Social Skills Development

Through PAL, studies show the students with EBD make improvement in their social interactions. In a qualitative study, Wiseman (2018) found that having PAL helped students with EBD become better at reading comprehension, as well as with their communication skills and with building peer rapport. Likewise, Carter (2022) reported that academic engagement and the occurrence of more often kindness, cooperation and mutual respect among

students with EBD who participated in PAL and positive peer reporting programs.

PAL also helps reduce social isolation by linking people up with other people in a meaningful way. There is rejection or stigmatization of many students with EBD, resulting in an alienation of students within the classroom (Molgaard & Read, 2024). Peer interactions structured provided a more inclusion victim and support learning environment, and essential for both social emotional growth and academic success (Van Ryzin, 2018).

In addition, PAL offers students with EBD opportunities to practice and internalize the prosocial behaviors. EBD is often accompanied by social skill deficits (for example, aggression, withdrawal, or poor sensitivity to social cues) and as such students with EBD often have great difficulty forging positive peer relationships (Gresham et al., 2001). Repeated, low risk opportunities to cooperate through PAL settings, especially when structured, give turn taking, listening, sharing ideas, and giving feedback.

Peer modeling is one of the main way that PAL helps with social skills. When students observe and imitate the behavior of their peers, students in fact mostly imitate the behavior of their positively reinforced peers (Bandura & Walters, 1977). Students with EBD do not have access to the appropriate models of behavior in their natural environment and this is required for observational learning in students with EBD. Similarly, the structured, predictable format of PAL also diminishes the social ambiguity, an overwhelming or triggering part of speech for many of these students which can have repercussions for proper responses for this speech in a social environment (Riden et al., 2022).

Another consideration is how generalisable them should be. Improvements in social skills in the PAL context are promising but students with EBD may not transfer these skills to less structured environments unless generalization is taught and practiced (Sutherland & Morgan, 2003). Rather, it would strengthen the long-term impact if the research were to be integrated with broader social emotional learning (SEL) curricula or behavioral interventions.

Through the PAL interventions, peer collaboration, empathy and mutual accountability are promoted (Carter, 2022). In terms of high school students with EBD, it has been shown that the Positive Peer Reporting, a part of PAL, has increased prosocial behaviors and has decreased disruptive actions (Carter, 2022).

The use of PAL has been proven to ameliorate peer acceptance and reduce bullying among students with EBD. For example, Burns (2015) found that the skills of empathy and conflict resolution, especially, were significantly improved as a result of the use of Class-Wide Peer Tutoring (CWPT).

D. Practical Implications for Educators

Building a Supportive Classroom Environment

PAL can be made more effective by teaching collaboration, respect, and inclusion among students, and creating this classroom culture. Therefore, it is important to students with EBD to develop a safe and supportive learning environment and also they struggle with anxiety or behavioural issues.

Implementing PAL in STEM Classes

Educators should incorporate PAL effectively in STEM classrooms for students with EBD by:

1. Get structured peer pairs based on what skills and how you behave.
2. Regular progress monitoring is key and pairings can be tweaked as it's going to bring the best results.
3. Explicitly inform students on what they need to do within the learning process to ensure they can understand it.
4. Positive reinforcement and feedback can be encouraged, as well as offered.

Essentially, findings show that PAL may be used as an effective way to address the dual issues of academic underachievement and social difficulties pertaining to students with EBD. The process of implementing PAL interventions may, however, be influenced by such factors as the nature of the program in which PAL is applied and the quality of the training of peer tutors and their particular needs.

E. Challenges and Considerations in Implementing PAL for Students with EBD

Despite the positive contributions of PAL to social skills and STEM achievements of students with EBD, its implementation comes with some associated challenges (Figure 2).

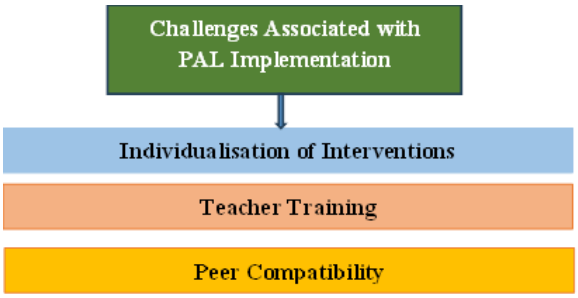

Figure 2: *Challenges Associated with PAL Implementation*

Individualisation of Interventions

As EBD is very different in nature, PAL should be individualized. However, some students might need extra scaffoldings or behavior management strategies to participate effectively in peer-assisted learning. Fuchs et al. (2002) contend that to have success with PAL for students with EBD, we need its use of differentiated instruction and flexible peer groupings. This study further highlights the significance that there is to modify the strength and sort of help which is given to students with EBD primarily based on private wants. For instance, students that have difficulty in social activities can utilize structured role playing activities or peer feedback session based exclusively on the area of social skills.

Individualization is essential. Students with EBD vary in terms of their strengths and needs and need appropriate interventions based on that. For example, linking those with complementary skills, which has stronger academic skills and another student has stronger social skills) can bring better results for both. As mentioned by Godzicki et al. (2006), increasing motivation can be achieved through use of engaging material, incorporation of student interests, and choice.

Teacher Training

As PAL implementation is effective only when teachers can successfully facilitate peer interactions and manage classroom dynamics, it is necessary to train the teachers in the area of facilitating peer interactions and managing classroom dynamics. Teachers too should have the ability to track the progress of these children with EBD and take appropriate measures. According to Hirsch et al. (2022), professional development of the teacher is essential in order that PAL provides for implementation and students with EBD are offered the support they require.

Strategies for student behavior, for positive peer interaction and for constructive feedback should be trained for. In addition, teachers should also be ready to interrupt and stop conflicts or if there is disruptive behavior. Furthermore, teachers should play a major role in creating a favorable classroom environment for students to make PAL activities.

Besides potential benefits of PAL, the implementation is important. In order to train peer tutors, they must be trained both in academic content and behavior management and communication strategies (Farlow, 2024). In particular, teachers monitor interactions, and in particular, ensure equality of participation and scaffolding of academic and social learning. PAL interventions could not be effective without some sort of structure and support for students, thus reinforcing negative social patterns (Sutherland & Wehby, 2001).

Peer Compatibility

To ensure the effectiveness of PAL, a process of careful pairing of students is necessary. Cognition gaps, and mismatches in the ability or temperament of the pupil to learn, may disrupt the learning process, and indeed worsen the behavioral issues. As Prince (2025) note, it is important to make sure that the peer pairs are compatible in skill level and behavior. In students with EBD, additional support and guidance may be necessary to make peer interaction positive and productive.

For addressing this issue, it is important to choose carefully peer partners with good compatibility and preparedness for collaborative learning. When forming peer pairs, teachers should think about students' academic abilities, social skills and behavioral profiles. It may also be necessary to further

change groupings over time to make sure all students have sufficient support.

F. Limitations and Future Research

Although many have contributed to the PAL body of research, there remain some gaps. Most of the existing literature involves reading and basic math, and studies concerning PAL in science, technology, engineering contexts are lacking, especially for EBD students. These longitudinal research gets needed to find out whether improvements in social behavior and academic performance continue.

Additionally, PAL needs to be culturally responsive. The presence of culturally and linguistically diverse backgrounds with EBD may bring to the students' table unique challenges that demand the extra scaffolding and culturally relevant pedagogy (Harry & Klingner, 2014). To maximize PAL interventions' effectiveness in a variety of learning environments it is important that they are inclusive and affirming.

CONCLUSION

Peer Assisted Learning is a promising strategy to improve social skills and academic achievement in the students labeled as Emotional and Behavioral Disorders. The literature shows that PAL is resultant in the encouragement of positive social interactions, increases in STEM results and improvement of behavioral skills. Yet, there is the need for planning, teacher training, and individual interventions to cater for student's needs of those with EBD. More research is needed on how PAL would impact students with EBD in the long term and to evaluate the strategies to be used when PAL will be integrated into educational practices.

REFERENCES

[1] Altintas, T., Gunes, A., & Sayan, H. (2016). A peer-assisted learning experience in computer programming language learning and developing computer programming skills. *Innovations in Education and Teaching International*, 53(3), 329–337. https://doi.org/10.1080/14703297.2014.993418

[2] Anwar, S., & Menekse, M. (2020). Unique contributions of individual reflections and teamwork on engineering students' academic performance and achievement goals. *International Journal of Engineering Education*, *36*(3), 1018-1033.

[3] Bailey, S. (2021). The meaning making journey of Peer Assisted Learning (PAL) leaders in HE. *International Journal of Evidence Based Coaching & Mentoring*, 15, 55–69. https://doi.org/10.24384/wtmm-vf45.

[4] Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

[5] Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1, pp. 141-154). Englewood Cliffs, NJ: Prentice hall.

[6] Bijstra, J., & Jackson, S. (1998). Social skills training with early adolescents: Effects on social skills, well-being, self-esteem and coping. *European Journal of Psychology of Education*, 13(4), 569–583. https://doi.org/https://doi.org/10.1007/BF03173106

[7] Black, F., & MacKenzie, J. (2008). *Quality enhancement themes: The first year experience. Peer support in the first year*. QAA Scotland

[8] Bowman-Perrott, L., Ragan, K., Boon, R. T., & Burke, M. D. (2023). Peer tutoring interventions for students with or at-risk for emotional and behavioral disorders: A systematic review of reviews. *Journal of Applied Behavior Analysis*.

[9] Brown, A. L., Palincsar, A. S., & Armbruster, B. B. (1984). Instructing comprehension-fostering activities in interactive learning situations. *Learning and comprehension of text*, 255-286.

[10] Burns, E. M. (2015). Peer-mediated interventions for students classified with emotional and behavioral disorders [Capstone paper]. Winona State University.

[11] Calhoon, M. B., & Fuchs, L. S. (2003). The effects of peer-assisted learning strategies and curriculum-based measurement on the mathematics performance of secondary students with disabilities. *Remedial and Special Education*, *24*(4), 235-245.

[12] Capstick, S., & Fleming, H. (2004). The learning environment of peer assisted learning. Peer

assisted learning conference, Bournemouth University, UK.

[13] Carter, D. (2022). Peer-assisted learning and positive peer reporting among high school students with emotional and behavioral disorders [Doctoral dissertation]. Lehigh University.

[14] Dale, E. (1969). *Audiovisual methods in teaching* (3rd ed.). Dryden Press.

[15] Etoboro, B. A., & Fabinu, E. (2018). Effects of Peer Assisted Learning Strategies as Pedagogical Approach on Student Academic performance in Basic Science. *Asian Journal of Education and Social Student*, 1-8.

[16] Farlow, D. M. (2024). *Effectiveness of peer-assisted learning strategies on oral reading fluency for students with a learning disability* (Doctoral dissertation).

[17] Freeman, J., Yell, M. L., Shriner, J. G., & Katsiyannis, A. (2019). Federal policy on improving outcomes for students with emotional and behavioral disorders: Past, present, and future. *Behavioral Disorders*, *44*(2), 97-106.

[18] Fuchs, D., Fuchs, L. S., & Burish, P. (2000). Peer-assisted learning strategies: An evidence-based practice to promote reading achievement. *Learning Disabilities Research & Practice*, *15*(2), 85-91.

[19] Ginty, C., & Harding, N. M. (2014). The first year experience of a peer assisted learning program in two institutes of technology in Ireland. *Journal of Peer Learning*, 7(1), 36–56. https://ro.uow.edu.au/ajpl/vol7/iss1/5/)

[20] Godzicki, L., Godzicki, N., Krofel, M., & Michaels, R. (2013). Increasing Motivation and Engagement in Elementary and Middle School Students through Technology-Supported Learning Environments. *Online Submission*.

[21] Gong, H. J., Kwon, J., & Brock, M. (2022). Experiential learning through a peer learning assistant model in STEM. *Educational Research*, *64*(3), 317-333.

[22] Gresham, F. M., & Elliott, S. N. (1990). *Social skills rating system. Manual*. American Guidance Service.

[23] Gresham, F. M., Sugai, G., & Horner, R. H. (2001). Interpreting outcomes of social skills training for students with high-incidence disabilities. *Exceptional children*, *67*(3), 331-344.

[24] Guo, J., Tang, X., Marsh, H. W., Parker, P., Basarkod, G., Sahdra, B., ... & Salmela-Aro, K. (2023). The roles of social–emotional skills in students' academic and life success: A multi-informant and multicohort perspective. *Journal of personality and social psychology*, *124*(5), 1079.

[25] Guo, J., Tang, X., Marsh, H. W., Parker, P., Basarkod, G., Sahdra, B., ... & Salmela-Aro, K. (2023). The roles of social–emotional skills in students' academic and life success: A multi-informant and multicohort perspective. *Journal of personality and social psychology*, *124*(5), 1079.

[26] Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72(2), 625–638. https://doi.org/https://doi.org/10.1111/1467-8624.00301

[27] Harry, B., & Klingner, J. (2014). *Why are so many minority students in special education?: Understanding race and disability in schools*. Teachers College Press.

[28] Herrmann-Werner, A., Gramer, R., Erschens, R., Nikendei, C., Wosnik, A., Griewatz, J., Zipfel, S., & Junne, F. (2017). Peer-assisted learning (PAL) in undergraduate medical education: An overview. *Zeitschrift Für Evidenz, Fortbildung Und Qualität Im Gesundheitswesen*, 121, 74–81. https://doi.org/10.1016/j.zefq.2017.01.001

[29] Hirsch, S. E., Griffith, C. A., Chow, J. C., Walker, A., & Walters, S. M. (2022). Professional learning and development for special educators serving students with emotional and behavioral disorders in self-contained settings. *Behavioral Disorders*, *48*(1), 62-76.

[30] Humphrey, N., & Wigelsworth, M. (2012). Modeling the factors associated with children's mental health difficulties in primary school: A multilevel study. *School Psychology Review*, 41(3), 326.

[31] Johnson, D. W., & Johnson, R. T. (1999). Making cooperative learning work. *Theory into practice*, *38*(2), 67-73.

[32] Kalina, C., & Powell, K. C. (2009). Cognitive and social constructivism: Developing tools for an effective classroom. *Education*, *130*(2), 241-250.

[33] Kauffman, J. M., & Landrum, T. J. (2018). *Characteristics of emotional and behavioral disorders of children and youth* (11th ed.). Pearson.

[34] Keenan, C. (2014). Mapping student-led peer learning in the UK. The Higher Education Academy.

[35] King, S. (2013). *Choice-Stimulus Preference Assessment for Students At-Risk for Emotional Disturbance in Educational Settings: An Improvement for Practice?* (Doctoral dissertation, University of Pittsburgh).

[36] Kolb, D. (1974). Towards an applied theory of experiential learning. *Theories of Group Process*, 39(4), 33–56.

[37] Kunsch, C. A., Jitendra, A. K., & Sood, S. (2007). The effects of peer–mediated instruction in mathematics for students with learning problems: A research synthesis. *Learning Disabilities Research & Practice*, *22*(1), 1-12.

[38] Maina, Y. Y., & Moses, S. (2024). Effect of Peer Collaborative Learning Strategy on Motivation and Academic Performance in Physics among Public Senior Secondary School Students in Katsina State, Nigeria. *ATBU Journal of Science, Technology and Education*, *12*(3), 193-200.

[39] Martin, D. C., & Arendale, D. R. (1992a). *Foundation and theoretical framework for Supplemental Instruction*. National Resource Center for The First Year Experience.

[40] Martin, D. C., & Arendale, D. R. (1992b). Supplemental instruction: Improving first-year student success in high-risk courses. *The Freshman Year Experience: Monograph Series Number 7*.

[41] Masten, A. S., Desjardins, C. D., McCormick, C. M., Kuo, S. I., & Long, J. D. (2010). The significance of childhood competence and problems for adult success in work: A developmental cascade analysis. *Development and Psychopathology*, 22(3), 679–694. https://doi.org/https://doi.org/10.1017/S0954579410000362

[42] McKenna, L., & Williams, B. (2017). The hidden curriculum in near-peer learning: An exploratory qualitative study. *Nurse Education Today*, 50, 77–81. https://doi.org/10.1016/j.nedt.2016.12.010

[43] Molgaard, L. K., & Read, E. K. (2024). Peer-assisted learning. *Veterinary medical education: A practical guide*, 227.

[44] Obradović, J., Burt, K. B., & Masten, A. (2010). Testing a dual cascade model linking competence and symptoms over 20 years from childhood to adulthood. *Journal of Clinical Child & Adolescent Psychology*, 39(1), 90–102. https://doi.org/https://doi.org/10.1080/15374410903401120

[45] OECD. (2015). Skills for social progress: The power of social and emotional Skills. OECD skills studies.

[46] Ogden, T. (2015). *Sosial kompetanse og problematferd blant barn og unge*. Gyldendal Akademisk.

[47] Prince, S. M. (2025). Educators' Experiences with Social Skill Acquisition Through Collaborative Learning Strategies for Students with Emotional and Behavioral Disabilities: A Qualitative Phenomenological Study.

[48] Riden, B. S., Kumm, S., & Maggin, D. M. (2022). Evidence-based behavior management strategies for students with or at risk of EBD: A mega review of the literature. *Remedial and Special Education*, *43*(4), 255-269.

[49] Roscoe, R. D., & Chi, M. T. (2007). Understanding tutor learning: Knowledge-building and knowledge-telling in peer tutors' explanations and questions. *Review of educational research*, *77*(4), 534-574.

[50] Sameroff, A. (2009). The transactional model. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other* (pp. 3–21). American Psychological Association. https://doi.org/10.1037/11877-001

[51] Schreiber, L. M., & Valle, B. E. (2013). Social constructivist teaching strategies in the small group classroom. *Small Group Research*, *44*(4), 395-411.

[52] Sinclair, A. C., Gesel, S. A., & Lemons, C. J. (2019). The effects of peer-assisted learning on disruptive behavior and academic engagement. *Behavioral Disorders*.

[53] Slavin, R. E. (1995). Cooperative learning: Theory, research, and practice. *Allyn & Bacon*.

[54] Sutherland, K. S., & Morgan, P. L. (2003). Implications of transactional processes in classrooms for students with emotional/behavioral disorders. *Preventing school failure: alternative education for children and youth*, *48*(1), 32-37.

[55] Sutherland, K. S., & Wehby, J. H. (2001). Exploring the relationship between increased opportunities to respond to academic requests and the academic and behavioral outcomes of students with EBD: A review. *Remedial and Special Education*, *22*(2), 113-121.

[56] Sutherland, K. S., & Wehby, J. H. (2001). The effect of self-evaluation on teaching behavior in classrooms for students with emotional and behavioral disorders. *The journal of special education*, *35*(3), 161-171.

[57] Tokunbo, D. B., Adejumo, O. O., Frank, S. E., & Oluwagbotemi, A. O. (2023). Effect of Peer Group Activity-Based Learning Strategy on Students' Academic Achievement in Integrated Science in Lagos State, Nigeria. *UNIZIK Journal of STM Education*, *6*(1), 179-187.

[58] UNICEF. (2012). *Global evaluation of life skills education programmes*.

[59] Vallis, R. (2015). Social Skills Instruction for Students with Emotional and Behavioural Disorders. *BU Journal of Graduate Studies in Education*, *7*(1), 45-49.

[60] Van Der Meulen, K., Granizo, L., & Del Barrio, C. (2021). Emotional peer support interventions for students with SEND: a systematic review. *Frontiers in psychology*, *12*, 797913.

[61] Van Ryzin, M. J., & Roseth, C. J. (2018). Cooperative learning in middle school: A means to improve peer relations and reduce victimization, bullying, and related outcomes. Journal of educational psychology, 110(8), 1192.

[62] Voigt-Zabinski, V. J. (2017). Evidence-based interventions for elementary students with emotional or behavioral disorders [Starred paper]. St. Cloud State University.

[63] Vygotsky, L. (1978). Interaction between learning and development. In M. Cole, V. John-Steiner, S. Scribner, & E. Soubermann (Eds.), *Mind in society: The development of higher psychological processes* (pp. 79–91). Harvard University Press.

[64] Vygotsky, L. S. (1962). Thought and Language. Cambridge, MA.

[65] Vygotsky, L. S. (1978). Mind in Society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

[66] Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.

[67] Wang, T. (2021). *Self-Management Interventions for Students with Emotional and Behavioral Disorders: A Meta-Analysis of the Literature*. Indiana University.

[68] Welsh, M., Parke, R. D., Widaman, K., & O'Neil, R. (2001). Linkages between children's social and academic competence: A longitudinal analysis. *Journal of School Psychology*, 39(6), 463–481. https://doi.org/https://doi.org/10.1016/S0022-4405(01)00084-X

[69] Whitley, J. (2020). Evidence-based practices for teaching learners with emotional and behavioral disorders. In *Oxford Research Encyclopedia of Education*.

[70] Williams, C. A., Vidal, T., Carletti, P., Rizvi, A., & Tolchinsky, C. A. (2021). Peer-assisted learning (PAL): perceptions and wellness of first-year medical students. *Medical Science Educator*, *31*, 1911-1918.

[71] Wiseman, N. (2018). *Peer assisted learning strategies and students with emotional/behavioral disorders: A case study*. Kansas State University.

[72] Zhang, B., Liang, S., Chen, J., Chen, L., Chen, W., Tu, S., ... & Chu, L. (2022). Effectiveness of

peer-mediated intervention on social skills for children with autism spectrum disorder: a randomized controlled trial. *Translational Pediatrics*, *11*(5), 663.

[73] Zsolnai, A. (2002). Relationship between children's social competence, learning motivation and school achievement. *Educational Psychology*, 22(3),317–330. https://doi.org/https://doi.org/10.1080/0144341022013854