

**EFFECTIVENESS OF SOCIO-EMOTIONAL LEARNING ON
METACOGNITIVE AWARENESS AMONG SECONDARY SCHOOL STUDENTS**

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Abstract

Socio-Emotional Learning (SEL) has gained considerable attention in contemporary education due to its potential to foster students' social, emotional, and cognitive development. The study aimed to determine whether instruction based on SEL could significantly enhance students' metacognitive awareness compared to instruction based on the Activity-Oriented Method. A quasi-experimental method employing a pre-test–post-test non-equivalent group design was adopted. The sample comprised 90 9th-standard students following the Kerala State Syllabus from Ernakulam district. The experimental group received instruction based on Socio-Emotional Learning, while the control group was taught using the Activity-Oriented Method. Metacognitive Awareness was measured using the Metacognitive Awareness Scale developed by Sindhu (2020). The collected data were analysed using descriptive statistics, independent sample t-test, paired sample t-test, Analysis of Covariance (ANCOVA), and effect size measures. The findings revealed a significant improvement in the Metacognitive Awareness of students exposed to SEL-based instruction.

Keywords: socio-emotional learning, metacognitive awareness, secondary school students

Introduction

Socio-Emotional Learning (SEL) emerged as a formal educational framework in 1994 through collaborative efforts of educators, researchers, and health professionals to enhance students' social, emotional, and academic competencies (CASEL, 2012; Weissberg et al., 2015). The CASEL framework identifies five core competencies—self-awareness, self-management, social awareness, relationship skills, and responsible decision-making—which enable students to regulate emotions, build positive relationships, make responsible choices, and engage effectively in social contexts (CASEL, 2003, 2015, 2020). Extensive research has demonstrated that SEL contributes significantly to academic engagement, improved classroom climate, enhanced social-emotional competence, and reduced behavioural and emotional problems (Durlak et al., 2011; Sklad et al., 2012). Meta-analytic evidence further indicates that the benefits of SEL interventions extend beyond programme completion, with positive effects persisting for at least six months (Taylor et al., 2017). The growing emphasis on student-centred and constructivist educational approaches has increased the relevance of SEL in promoting both academic and social-emotional development, particularly when SEL skills are explicitly taught, practised, and integrated with academic instruction (Martin, 2012; Weissberg et al., 2015; Elias et al., 1997). Closely associated with SEL is Metacognitive Awareness, which refers to learners' ability to monitor, regulate, and evaluate their own thinking and learning processes. Students with high metacognitive awareness are better able to plan, monitor, and assess their learning strategies, thereby becoming more effective and self-regulated learners. Research suggests that metacognitive awareness contributes significantly to independent learning, reflective thinking, problem-solving, and self-regulation (Flavell, 1979; Schraw & Dennison, 1994). Recent studies indicate that effective SEL programmes are those built around core competencies and implemented through flexible, evidence-based

approaches that support learners' cognitive and emotional development (Lawson et al., 2019). Furthermore, empirical validation of the CASEL framework among adolescents has confirmed the stability of its five-factor structure and its positive relationship with educational and developmental outcomes, supporting its applicability beyond elementary education (Ross & Tolan, 2018).

Need and Significance of the Study

Socio-Emotional Learning (SEL) plays a vital role in education by helping students regulate emotions, develop positive relationships, cope with challenges, and create supportive learning environments that foster both academic and personal growth. The Collaborative for Academic, Social, and Emotional Learning identified five core SEL competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2020). Research indicates that SEL improves behaviour, motivation, confidence, engagement, and overall well-being. Closely related to SEL is Metacognitive Awareness, which encompasses metacognitive knowledge, metacognitive monitoring, and metacognitive regulation, enabling students to reflect on, monitor, and control their own learning processes (Flavell, 1979; Schraw & Dennison, 1994). These metacognitive processes contribute to effective learning strategies, self-regulated learning, and independent problem-solving. Although substantial evidence supports the individual benefits of SEL and metacognition, limited research has examined the influence of SEL on the development of metacognitive awareness among secondary school students. Kumari (2020) reported that a socio-emotional learning programme significantly improved students' openness and interpersonal interaction skills, thereby supporting their overall development. Similarly, Ross and Tolan (2018) provided evidence that SEL positively influences adolescents' developmental and educational outcomes. However, the effectiveness of SEL interventions depends greatly on the quality, sustainability, and systemic implementation of programmes within schools (Meyers et al., 2019). Research further demonstrates that SEL strategies promoting self-awareness,

emotional regulation, interpersonal competence, and responsible decision-making positively affect student engagement, motivation, and learning experiences (Saroya & Buck, 2025). Moreover, metacognitive awareness has been found to be strongly associated with effective learning and self-regulation. Rahman et al. (2010) reported a significant positive relationship between metacognitive awareness and students' learning performance, indicating that learners with higher metacognitive awareness are better able to monitor and regulate their learning processes. Collectively, these findings suggest that SEL can create conditions that support the development of metacognitive awareness by fostering self-reflection, emotional regulation, responsible decision-making, and self-directed learning. Therefore, the present study is significant as it seeks to examine the effectiveness of Socio-Emotional Learning on Metacognitive Awareness among Secondary School Students. The findings may provide valuable insights for educators, curriculum developers, and policymakers in designing interventions that promote both socio-emotional competencies and metacognitive development.

Recent research has provided substantial evidence regarding the effectiveness of Socio-Emotional Learning (SEL) interventions in enhancing students' social, emotional, and cognitive development. Classroom-based, mindfulness-oriented, technology-assisted, culturally responsive, and physical education-based SEL programmes have consistently improved self-awareness, self-management, social awareness, relationship skills, and responsible decision-making among learners (Wintermantel et al., 2025; Carpendale et al., 2025; Sindiani et al., 2025; Yang et al., 2025; Cipriano et al., 2025). Studies further indicate that therapy dog-assisted interventions, mindfulness-based programmes, and teacher professional development initiatives contribute to emotional regulation, reflective thinking, stress reduction, and improved classroom engagement,

thereby creating conditions conducive to metacognitive development (Wepener & Moen, 2025; Konishi et al., 2025; Masry-Herzallah, 2025). The integration of digital technologies and artificial intelligence within SEL programmes has also demonstrated positive effects on empathy, emotional regulation, and responsible decision-making (Henriksen et al., 2025; Afridi et al., 2025; Candeias et al., 2025). Meta-analyses and systematic reviews consistently support the effectiveness of SEL in improving emotional awareness, behaviour, academic performance, and reflective capacities that are closely associated with metacognitive growth (Brunner et al., 2025; Stubbs & Sorensen, 2024; Campos, 2024; Palamar et al., 2024; Lim et al., 2024). Similarly, studies on Metacognitive Awareness have established its significant role in promoting self-regulated learning, reflective thinking, problem-solving, and academic success. Research demonstrates that pedagogical approaches such as flipped classrooms, POGIL, phenomenon-based learning, metacognitive instruction, and POEP models enhance students' metacognitive knowledge, monitoring, and regulation while simultaneously strengthening several SEL competencies (Chan et al., 2022; Ilma et al., 2022; Balashov et al., 2021; Bourdeaud'hui et al., 2021; Akkaş & Eker, 2021; Abdelrahman, 2020; Akaydın et al., 2020; Amin & Adiansyah, 2020; Bakkaloglu, 2020). Furthermore, higher levels of metacognitive awareness have been associated with improved reflective thinking, self-regulated learning, and effective problem-solving abilities (Çini et al., 2020; Rahayu & Hertanti, 2020; Novia et al., 2019; Limueco & Prudente, 2019; Cascolan, 2019; Adegoboye, 2019). Despite these findings, the literature reveals a notable gap in understanding the direct relationship between SEL and Metacognitive Awareness. While SEL competencies such as self-awareness, self-management, and responsible decision-making appear conceptually linked to metacognitive processes, most studies have examined these constructs independently. Furthermore, existing research is predominantly conducted in Western settings and frequently relies on correlational

designs, limiting causal interpretations and contextual applicability. Very few studies have employed experimental approaches to investigate whether SEL-based interventions can directly enhance Metacognitive Awareness among Secondary School Students, particularly in the Indian educational context. Therefore, there is a need for empirical studies examining the effectiveness of Socio-Emotional Learning in developing Metacognitive Awareness among Secondary School Students.

Objective of the Study

- To test the Effectiveness of Instruction Based on Socio-emotional Learning on Metacognitive Awareness of Secondary School Students over Instruction Based on Activity Oriented Method.

Hypothesis of the Study

- There will be a significant difference on Metacognitive Awareness of Secondary School Students taught through Instruction Based on Socio-emotional Learning compared to those taught through Instruction Based on Activity Oriented Method.

Methodology in Brief

The method adopted for the study was the experimental method. A pre-test post-test non-equivalent group design, which comes under quasi-experimental designs, was selected to examine the effect of Instruction based on Socio-emotional Learning. The study involved independent and dependent variables. The independent variables were Instruction Based on Socio-emotional Learning (SEL) and Instruction Based on an Activity-Oriented Method, while the dependent variable was Metacognitive Awareness. The population considered for the study was Secondary School Students, and the sample comprised 90, 9th standard students following the Kerala State Syllabus from Ernakulam district. A random sampling technique was used to

select the institutions, and intact classrooms were considered for forming the experimental and control groups. Materials used were Lesson Transcript in Chemistry Based on Socio-emotional Learning for 9th Standard Students (Diya & Aswathy, 2025) and Lesson Transcript in Chemistry Based on Activity-Oriented Method for 9th Standard Students. Tool used was adopted Metacognitive Awareness Scale (Sindhu P.G, 2020) (Investigator established the reliability and validity of the test before using it). The data collected for the study were analysed using the following statistical methods such as, Descriptive statistics like mean, median, mode, standard deviation, skewness and kurtosis, Standard error and Confidence interval of the sample statistics, Independent sample t –test, Paired sample t –test, Analysis of Covariance (ANCOVA) and Effect size (Cohen's d and Partial η^2).

Findings of the Study

Hypothesis 1: There will be a significant difference on Metacognitive Awareness of Secondary School Students taught through Instruction based on Socio-emotional Learning compared to those taught using Instruction based on Activity Oriented Method.

The above hypothesis is converted into null hypothesis for the purpose of statistical calculations. The hypothesis is rewritten as:

H₀: There will be no significant difference on Metacognitive Awareness of Secondary School Students taught using instruction based on Socio-emotional Learning compared to those taught using Instruction based on Activity-Oriented Method.

The mean score of the pre-test for the Experimental Group was $M = 130.09$, while the post-test mean increased to $M = 160.24$. The difference between pre-test and post-test scores was statistically significant ($t = 17.18$, $p < .01$), indicating a substantial improvement in Metacognitive Awareness. The calculated effect size (Cohen's $d = 2.40$) confirms a very large effect of the instructional intervention. Hence Metacognitive Awareness is significantly enhanced by Instruction Based on Socio-emotional Learning of Secondary School Students.

scored $M = 138.53$, with a significant difference ($t = 8.32$, $p < .01$, $d = 1.67$). The mean gain score was also greater for the Experimental group ($M = 30.15$) than the Control group ($M = 10.94$, $t = 7.96$, $p < .01$, $d = 1.79$), indicating markedly higher improvement. ANCOVA results controlling for pre-test scores revealed a significant instructional effect ($F = 154.91$, $p < .001$, partial $\eta^2 = 0.640$), with adjusted post-test means showing the Experimental group ($M = 165.36$) significantly outperforming the Control group ($M = 155.59$, mean difference = 9.768 , $t = 12.44$, $p < .001$). Hence Metacognitive Awareness of Secondary School Students is significantly higher when taught using Instruction Based on Socio-emotional Learning compared to the Activity-Oriented Method.

Conclusion based on the study is instruction based on Socio-emotional Learning is effective in enhancing Metacognitive Awareness of Secondary School Students compared to the Activity-Oriented Method. Hence null hypothesis is rejected, So the alternate Hypothesis is accepted. There is significant increase on Metacognitive Awareness of Secondary School Students taught using instruction based on Socio-emotional Learning compared to those taught using Instruction based on Activity-Oriented Method.

Discussion Based on Findings

The present study revealed that instruction integrating Socio-emotional Learning (SEL) significantly enhanced Secondary School Students' Metacognitive Awareness ($M = 160.24$ vs. 138.53) compared to Activity-Oriented Method, with large to very large effect sizes. These findings align with prior research demonstrating that SEL fosters self-awareness, self-management, and reflective thinking, which are crucial for developing Metacognitive Awareness (Ilma et al., 2022; Limueco & Prudente, 2019). While both SEL-based and Activity-Oriented Method contributed to learning gains, the Experimental group receiving SEL-based strategies showed markedly higher improvement, indicating that SEL enhances the effectiveness of learning beyond traditional activity-driven methods. These results are

consistent with studies emphasizing the link between SEL competencies and Metacognitive

Awareness (Yanik & Afat, 2022; Balashov et al., 2021; Cascolan, 2019). Integrating SEL into classroom instruction enabled students to regulate their emotions, reflect on learning strategies, and plan their problem-solving approaches less emphasized in Activity-Oriented Methods. Overall, SEL-based instruction proved more effective than Activity-Oriented Method in promoting Metacognitive development highlighting the value of Socio-emotional Learning for holistic learning.

Educational Implications of the Study

The findings of the study indicate that instruction based on Socio-emotional Learning (SEL) significantly enhances Metacognitive Awareness of secondary school students. Based on these outcomes, the following educational implications can be drawn. Teachers should integrate SEL principles such as self-awareness, emotional regulation, and responsible decision-making into science instruction to promote deeper learning and engagement. SEL-based instruction not only improves academic performance but also strengthens students' ability to monitor, regulate, and reflect on their own learning. Educators can use this approach to foster higher-order thinking skills and independent learning habits, leading to sustained academic improvement. Curriculum designers and school administrators may embed SEL-focused modules, activities, and teaching strategies into the science curriculum. This could include collaborative tasks, reflective exercises, and emotion-aware pedagogical approaches that enhance student motivation and understanding. Professional development programs should equip teachers with strategies to integrate socio-emotional competencies alongside traditional subject matter instruction. Teachers can leverage SEL strategies to address individual learning needs, foster a positive classroom climate, and reduce academic anxiety or stress. Large effect sizes in achievement suggest that SEL strategies increase student interest and engagement in learning. Teachers can design lessons that motivate students to participate actively, collaborate meaningfully, and persist in challenging tasks. Teachers can leverage SEL to promote self-

directed learning, where students take ownership of their learning goals and strategies. SEL

fosters a supportive and emotionally responsive learning environment, teachers can reduce anxiety related to challenging subjects like chemistry, improving both achievement and confidence.

Conclusion

The present study investigated the Effectiveness of Socio-emotional Learning (SEL) on the Metacognitive Awareness of Secondary School Students. The findings indicate that instruction based on SEL significantly enhances Metacognitive Awareness compared to Activity-Oriented Methods. This result gives the importance of embedding SEL within the educational framework to foster holistic student development. By integrating cognitive, emotional, and motivational elements into classroom instruction, educators can create supportive learning environments that promote Metacognitive Growth. Overall, this study provides strong evidence that SEL is crucial for enhancing students Metacognitive Awareness, preparing them to become self-regulated, reflective, and motivated learners. The findings support the adoption of SEL-aligned teaching strategies across curricula and encourage further research to explore its long-term impact across diverse educational contexts.

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