



ORIGINAL RESEARCH PAPER

Education

ASPIRING FUTURE TEACHERS' METACOGNITIVE AWARENESS: A CONCEPTUAL INQUIRY ALIGNING WITH NATIONAL EDUCATION POLICY 2020 AND NATIONAL PROFESSIONAL STANDARDS FOR TEACHERS

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Rucha Sohankumar Brahmhatt*

Junior Research Fellow & Research Scholar, Indian Institute Of Teacher Education *Corresponding Author

Dr. Bhavesh Raval

Associate Professor & Supervisor, Indian Institute Of Teacher Education

ABSTRACT

Metacognition, or the ability to reflect on and regulate one's own thinking processes, is a requirement for effective teaching. Focusing on both education and psychology, this paper discusses the theoretical basis of metacognition and its implications for teacher education. The primary objective of this research paper is to focus on future teachers' metacognitive awareness and considers the possible benefits for their professional development and classroom effectiveness which mentioned in NEP 2020 followed by NPST guidelines December 2023 and to examine the theoretical foundations of metacognition. This study was done by content analysis of some previous studies and applying the following research questions. What types of studies have been conducted thus far to validate the metacognition theory and why aspiring future teachers are need to enhance metacognitive awareness? Present conceptual perspectives are beneficial to understand importance of metacognition for aspiring future teachers and teacher educators.

INTRODUCTION

John Flavell is known for introducing the term "metacognition" in the 1970s while studying how children understand their memory. Flavell defined it as being aware of and controlling cognitive, emotional, and perceptual processes. Metacognition means understanding and managing your own thinking, which is crucial but often overlooked in education. The term "meta" comes from Greek, meaning "beyond." Educational psychologists emphasize that metacognition is vital for effective teaching, and teacher programs should develop these skills for future teachers, improving their methods and student outcomes. Models by (Flavell 1979 and Schraw & Moshman 1995) explained that metacognitive awareness includes both understanding and regulating your own thinking. Developing these skills is essential for future teachers to be effective and grow professionally. (NEP 2020) A key focus is on developing critical thinking and metacognitive skills in students and teachers. It seeks to improve teacher education through reflective practices and continuous professional development, enhancing both basic skills and higher-order thinking. For students in Grades 9-12, the policy proposes a four-year multidisciplinary study with more depth, critical thinking, and flexibility. Curriculum content will be streamlined to focus on essential concepts, making room for inquiry-based and interactive learning. Integrating humanities and arts with Science, Technology, Engineering and Mathematics (STEM) in undergraduate education has shown benefits like increased creativity, innovation, critical thinking, problem-solving, teamwork, and communication skills, along with deeper learning and greater enjoyment of education.

NEP 2020 and Teacher Education

The National Education Policy (NEP 2020), introduced by the Government of India, aims to make education more holistic, flexible, and multidisciplinary. NEP 2020 aims to improve metacognitive awareness in future teachers. It focuses on reflective practice, ongoing professional development, and using technology to help teachers develop effective teaching skills. Implementing these changes will require continuous effort and cooperation among everyone involved in education. NEP 2020 supports teacher education that encourages metacognitive awareness in several key ways:

Holistic And Multidisciplinary Education: NEP 2020 encouraging future teachers to engage in diverse learning

experiences that enhance critical thinking and metacognitive skills.

Continuous Professional Development: The policy emphasizes the need for ongoing professional development, encouraging teachers to reflect on their practice and commit to lifelong learning.

Emphasis on Reflective Practice: NEP 2020 calls for teacher education programs to include reflective practice, allowing future teachers to critically analyze and improve their teaching methods continuously.

Use Of Technology: The policy encourages using digital tools and online platforms for teacher training, which can help develop metacognitive skills through interactive and reflective learning experiences.

NPST and Metacognitive Awareness

The National Professional Standards for Teachers (NPST) Fig 1 set guidelines for teacher quality and professional development to ensure that educators have the skills, knowledge, and attitudes needed to support student learning. Developing metacognitive awareness in future teachers aligns with these standards, helping them reflect on and improve their teaching methods. The NPST highlights key areas where metacognitive awareness is essential.

Professional Knowledge: Teachers need to understand the content they teach and reflect on their teaching methods to improve.

Professional Practice: Good teaching involves regularly assessing and adapting teaching strategies, which requires metacognitive regulation.



Fig. 1 Illustration on Teachers Readiness NSPT guidelines December 2023

Sources: <https://ncte.gov.in/Website/PDF/NPST/NPST-Book.pdf>

Professional Engagement: Teachers must be aware of their learning needs and progress to engage in professional learning and contribute to the educational community.

Various studies have been conducted to validate the metacognition theory:

Developmental Studies: These studies examine how metacognitive skills evolve with age. For instance, Flavell's early work on metacognition highlighted that even young children have some metacognitive awareness, but these skills become more sophisticated with age. Studies by (Veenman, et al., 2006) further elaborate on the stages of metacognitive development in children.

Linguistic and Cognitive Differences: Research by (Vygotsky 1978) and subsequent studies highlight the role of language in cognitive development. Language structure and use in different cultures can influence how people express and reflect on their thoughts, affecting metacognitive awareness.

Educational Studies: Research by (Cross and Paris 1988) showed how metacognitive strategies improve reading comprehension and learning in children. They found that children who are taught to use metacognitive strategies perform better academically. (Azevedo 2005) demonstrated how metacognitive training can help children become better at self-regulated learning, particularly in complex learning environments like hypermedia.

Experimental Studies: These studies often involve tasks designed to measure children's metacognitive abilities, such as problem-solving or memory tasks. Researchers like (Schneider and Pressley 1997) have used such tasks to show how metacognitive monitoring and control improve with age and training.

Intervention Studies: These studies test the effectiveness of teaching metacognitive strategies to children. For example, (Dignath, et al., 2008) conducted a meta-analysis of intervention studies and found that teaching metacognitive strategies significantly improves students' learning outcomes. Another example is a study by (Kramarski and Mevarech 2003), which showed that metacognitive training in mathematical problem-solving improved students' problem-solving skills and self-regulation.

Observational and Case Studies: Qualitative studies involve observing children in naturalistic settings or detailed case studies to understand how they use metacognitive strategies. For example, (Whitebread et al., 2009) conducted observational studies in classroom settings to see how children plan, monitor, and evaluate their learning activities.

Neuroscientific Studies: These studies use brain imaging techniques to investigate the neural basis of metacognition in children. Research by (Ghetti and Bunge 2012) used fMRI to show that certain brain regions involved in metacognition, such as the prefrontal cortex, develop significantly during childhood.

Cross-cultural studies: Cross-cultural studies on metacognition examine how metacognitive processes and awareness vary across different cultures and how these differences impact learning and teaching practices.

Metacognition in Teacher Preparation Programs
Teacher preparation programs are essential for helping future teachers develop metacognitive awareness. This

section explores how including metacognitive instruction can be beneficial. Methods like self-reflection, cognitive apprenticeship, and collaborative inquiry improve future teachers' skills. According to (Schraw and Moshman 1995), specific training and reflective practices can enhance metacognitive awareness. For instance, using reflective journals, peer observations, and self-assessment techniques helps future teachers better understand their own thinking and teaching methods. (Veenman, et al., 2006) Teachers with stronger metacognitive awareness can adapt their strategies, reflect on their practices, and continue learning throughout their careers.

Strategies for Cultivating Metacognitive Awareness:
Reflective Practice: (Larrivee, 2008) Encouraging preservice teachers to engage in reflective practice is one of the most effective ways to develop metacognitive awareness. Reflective journals, peer discussions, and self-assessment activities help preservice teachers think critically about their teaching experiences and identify areas for improvement.

Metacognitive Prompts and Questioning: (King, 1991) Using metacognitive prompts and questioning techniques in teacher education programs can help preservice teachers become more aware of their thinking processes. For example, instructors can ask questions like, "What strategies did you use to solve this problem?" or "How will you know if your lesson was successful?".

Modeling Metacognitive Strategies: (Schraw et al., 2006) Teacher educators can model metacognitive strategies during their instruction. By thinking aloud and demonstrating how they plan, monitor, and evaluate their own teaching, educators provide preservice teachers with concrete examples of metacognitive practices.

Collaborative Learning: (Brown & Campione, 1994) Collaborative learning environments encourage preservice teachers to share their thoughts and strategies with peers, fostering a community of practice where metacognitive skills can be developed collectively.

Use of Technology: (Darling-Hammond & Bransford, 2005) Digital tools and platforms, such as e-portfolios and online discussion forums, can support the development of metacognitive awareness by providing preservice teachers with opportunities to document and reflect on their learning experiences.

Assessment of Metacognitive Awareness
(Schraw and Dennison 1994) The Metacognitive Awareness Inventory (MAI) developed by is a widely used tool to assess metacognitive awareness. The MAI includes items related to both metacognitive knowledge (declarative, procedural, and conditional knowledge) and metacognitive regulation (planning, monitoring, and evaluating). (Pintrich, 2002) Research using the MAI has shown that aspiring future teachers often exhibit varying levels of metacognitive awareness, with some demonstrating strong skills in planning and monitoring, but weaker skills in evaluation.

Factors Influencing Metacognitive Awareness
Several factors are influence the development and application of metacognitive awareness among aspiring future teachers.

Prior Knowledge and Experience: (Nietfeld et al., 2005) Teachers with more experience or background knowledge in education tend to have higher levels of metacognitive awareness.

Training and Professional Development: (Zohar 2013) Targeted professional development programs focusing on metacognition can significantly enhance teachers'

metacognitive skills.

Reflective Practices: (Kramarski & Michalsky, 2009) Encouraging reflective practices such as self-assessment and peer feedback fosters greater metacognitive awareness.

Implications For Professional Growth

Studies of (Livingstone 2003) (Hartman, 2001), (Paris & Winograd, 1990). shows that teachers with strong metacognitive awareness are better at:

Lesson Planning: They set clear goals and plan activities that align with these goals.

Adaptation And Flexibility: They can adapt their teaching strategies based on student feedback and learning needs

Student Engagement: They use diverse strategies to engage students and facilitate deeper learning

Challenges And Considerations

Integrating metacognitive instruction into teacher programs shows promise but faces challenges like limited time, resources, resistance to reflection, and the need for support.

Lack of Awareness: (Schraw, 1998) Some aspiring future teachers may not be aware of the importance of metacognition or how to develop these skills.

Insufficient Training: (Zohar, 2013) Teacher education programs may not provide enough opportunities for developing metacognitive skills.

Cultural And Contextual Factors: (Lee & Loughran, 2000) Different educational contexts and cultural backgrounds can influence how metacognitive strategies are perceived and implemented.

Resistance To Reflective Practice: Some preservice teachers may be resistant to engaging in reflective practice due to a lack of experience or understanding of its importance.

Time Constraints: Teacher education programs are often intensive, leaving limited time for in-depth reflection and metacognitive activities.

Variability In Implementation: The effectiveness of strategies to develop metacognitive awareness can vary depending on how they are implemented by teacher educators.

Future Directions And Recommendations

Developing metacognitive awareness is essential for effective teaching, as it enables teachers to reflect on and improve their methods, leading to better student outcomes. Recommendations of future researches and practice to enhance metacognitive awareness in future teachers. It helps how teaching metacognitive skills can improve effectiveness in teaching-learning. For teacher educators, policymakers, and practitioners emphasize including metacognitive awareness in teacher training programs. Training programs should focus on building these skills through reflective practices, specialized training, and continuous professional development, ultimately creating more effective teachers by addressing challenges related to metacognitive awareness.

CONCLUSION

This paper explains why it's important for future teachers to develop metacognitive awareness. Reflecting on their teaching can make them more effective and adaptable in various settings. Building metacognitive skills is key for their growth and success in the classroom. Teacher programs should use strategies like reflection, metacognitive prompts, teamwork, modeling, and technology. Overcoming

challenges in these methods requires ongoing research and innovation. The review covers why metacognitive awareness matters, how to develop it, and the challenges involved.

REFERENCES

1. Brown, A. L., & Campione, J. C. (1994). Guided discovery in a community of learners. In K. McGilly (Ed.), *Classroom lessons: Integrating cognitive theory and classroom practice* (pp. 229–270). MIT Press.
2. Darling-Hammond, L., & Bransford, J. (2005). Preparing teachers for a changing world: What teachers should learn and be able to do. *Jossey-Bass*.
3. Dignath, C., Büttner, C., & Langfeldt, H.-P. (2008). How can primary school students learn self-regulated learning strategies most effectively? A meta-analysis on self-regulation training programmes. *Educational Research Review*, 3(2), 101–129. <https://doi.org/10.1016/j.edurev.2008.02.003>
4. Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906–911. <https://doi.org/10.1037/0003-066X.34.10.906>
5. Ghatti, S., & Bunge, S. A. (2012). Neural changes underlying the development of episodic memory during middle childhood. *Developmental Cognitive Neuroscience*, 2(4), 381–395. <https://doi.org/10.1016/j.dcn.2012.05.002>
6. Hartman, H. J. (2001). Developing students' metacognitive knowledge and skills. In H. J. Hartman (Ed.), *Metacognition in learning and instruction* (pp. 33–68). Springer. https://doi.org/10.1007/978-94-017-2243-8_3
7. King, A. (1991). Effects of training in strategic questioning on children's problem-solving performance. *Journal of Educational Psychology*, 83(3), 307–317. <https://doi.org/10.1037/0022-0663.83.3.307>
8. Kramarski, B., & Mevarech, Z. (2003). Enhancing mathematical reasoning in the classroom: The effects of cooperative learning and metacognitive training. *American Educational Research Journal*, 40(1), 281–310. <https://doi.org/10.3102/00028312040001281>
9. Kramarski, B., & Michalsky, T. (2009). Investigating preservice teachers' professional growth in self-regulated learning environments. *Journal of Educational Psychology*, 101(1), 161–175. <https://doi.org/10.1037/a0013101>
10. Larrivee, B. (2008). Development of a tool to assess teachers' level of reflective practice. *Reflective Practice*, 9(3), 341–360. <https://doi.org/10.1080/14623940802207451>
11. Lee, N., Hart, P., & Ampleman, M. (2000). Teaching pre-service teachers to teach: Emphasizing inquiry in the teacher education program. *Teaching and Teacher Education*, 16(7), 731–745. [https://doi.org/10.1016/S0742-051X\(00\)00023](https://doi.org/10.1016/S0742-051X(00)00023)
12. Livingston, J. A. (2003). Metacognition: An overview. ERIC Clearinghouse on Disabilities and Gifted Education. <https://files.eric.ed.gov/fulltext/ED474273.pdf>
13. Ministry of Human Resource Development, Government of India. (2020). National education policy 2020; English final draft. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
14. Ministry of Education, Government of India. (2023). National professional standards for teachers (NPST) 2023; Guiding document. <https://ncte.gov.in/Website/PDF/NPST/NPST-Book.pdf>
15. Nietfeld, J. L., Cao, L., & Osborne, J. W. (2005). Metacognitive monitoring accuracy and student performance in the postsecondary classroom. *The Journal of Experimental Education*, 74(1), 7–28. <https://doi.org/10.3200/JEXE.74.1.7-28>
16. Paris, S. G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B. F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 15–51). Lawrence Erlbaum Associates.
17. Pintrich, P. R. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Into Practice*, 41(4), 219–225. https://doi.org/10.1207/s15430421tip4104_3
18. Schneider, W., & Pressley, M. (1997). *Memory development between 2 and 20*. Psychology Press.
19. Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science*, 26(1–2), 113–125. <https://doi.org/10.1023/A:1003044231033>
20. Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19(4), 460–475. <https://doi.org/10.1006/ceps.1994.1033>
21. Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7(4), 351–371. <https://doi.org/10.1007/BF02212307>
22. Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education*, 36(1), 111–139. <https://doi.org/10.1007/s1165-005-3917-3>
23. Veenman, M. V. J., Van Hout-Wolters, B. H. A. M., & Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition and Learning*, 1(1), 3–14. <https://doi.org/10.1007/s11409-006-6893-0>
24. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
25. Whitebread, D. et al. (2009). The development of two observational tools for assessing metacognition and self-regulated learning in young children. *Metacognition and Learning*, 4(1), 63–85. <https://doi.org/10.1007/s11409-008-9033-1>
26. Zohar, A. (2013). Elements of teachers' pedagogical knowledge regarding instruction of higher-order thinking. *The New Educator*, 9(4), 266–284. <https://doi.org/10.1080/1547688X.2013.841504>