Library Progress International
Vol.44 No. 3, Jul-Dec 2024: P.1386-1393

Print version ISSN 0970 1052
Online version ISSN 2320 317X

Original Article

Available online at www.bpasjournals.com

Facilitating Edward de Bono's Six Thinking Skills for Students with Learning Disabilities

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How to cite this article: Ladimae Mauline Daoayan Biaddang, Jeramie Molino (2024) Facilitating Edward de Bono's Six Thinking Skills for Students with Learning Disabilities, 44(3), 1386-1393.

ABSTRACT
The need to enhance higher-order thinking abilities among students, especially those with learning disabilities, remains a global concern. This study aims to explore and identify the relationship between the Six Thinking Hats of Edward de Bono and the higher-order thinking skills (HOTS) among students with disabilities. The thinking hats encourage critical thinking and problem-solving by breaking down viewpoints into six "parallel" or "lateral" areas encompassing emotions, facts, and creativity. The research findings highlighted the importance of professional development for successful implementation. Incorporating the Six Thinking Hats approach into individualized educational programs can enhance the higher-thinking skills of students with disabilities. This study can potentially contribute to advancing approaches that foster inclusivity and diversity in medical education. Incorporating these thinking hats aligns with cultivating cognitive abilities crucial for a proficient healthcare workforce.

KEYWORDS
higher-order thinking skills, approaches in teaching, professional development

Introduction

Over the years, there has been an exponential focus on nurturing higher-order thinking skills (HOTS) within educational contexts, driven by concerns over the poor academic performance of U.S. students compared to their international counterparts. The PISA 2018 (International assessments such as the Program for International Student Assessment) and the 2019 TIMMS or the Trends in International Mathematics and Science Study have consistently shown the U.S. lagging in math and science. In 1967, the U.S. ranked 11th out of 12 nations in international math rankings, with Germany, England, France, and Japan ahead. Sweden was the only country behind the U.S. The latest 2018 rankings by PISA revealed that the U.S. still ranks behind the same group of countries, except for Israel and Sweden. The U.S. ranks 36th out of 79 participating countries and regions in math. The average score of fourth-grade students in the United States on Science in 2019 of the TIMSS assessment was 539. This score exceeded students' average scores in 47 education systems while falling short of the scores achieved by students in 7 education systems. Among the 64 education systems that participated in the study, the average TIMSS science score of fourth-grade students in the United States was the eighth highest.

Furthermore, the United States Department of Education's 2022 report card highlights a significant achievement gap between students with specific learning disabilities (SLD) and those without disabilities. The NAEP 2022 (National Assessment of Educational Progress) 2022 reveals that a considerable percentage of students with SLD perform below proficiency levels in math and reading. National Assessment of Educational Progress (NAEP) indicated the performance of students with disabilities and those without disabilities in Grade 4 Math. Among

students with disabilities, two students demonstrated advanced proficiency, while 11 students were deemed proficient. Notably, there were no students in the proficiency category, but a concerning 57 students scored below basic levels.

In contrast, students without disabilities showed a slightly higher level of proficiency, with eight students achieving advanced proficiency and 30 performing at the proficient level. However, a more significant % of students without disabilities, 40 in total, fell into the basic proficiency category. Additionally, 21 students without disabilities scored below basic levels, indicating room for improvement even in this group. These results underscore the need for targeted support and interventions to enhance math education outcomes, particularly for students with disabilities, to ensure a more equitable learning experience. To effectively access the curriculum, these students must develop essential skills, including higher-order thinking skills (HOTS).

To address this achievement gap, schools must prioritize teaching HOTS to students with learning disabilities. Higher-order thinking skills (HOTS) are advanced mental abilities that enable individuals to analyze, synthesize, and evaluate information meaningfully. These skills help us think critically, solve complex problems, and make well-informed decisions. Improving the achievement gap, which refers to the disparities in educational performance among different groups of students, can significantly benefit from the development of these skills.

One way to address the achievement gap is by focusing on critical thinking. This skill allows students to question information, consider different perspectives, and understand the reasoning behind concepts. For instance, instead of memorizing historical dates, students can critically analyze the events, understand their causes and effects, and relate them to the present day. By encouraging students to think critically, educators empower them to navigate challenging subjects more effectively, leading to improved academic performance. Problem-solving is another essential higher-order thinking skill. By enhancing problem-solving abilities, students can tackle real-life situations with confidence. For example, in mathematics, students can learn to approach word problems methodically, identify the problem, consider possible solutions, and choose the best one. Mastering problem-solving boosts academic achievement and equips students with valuable life skills.

Additionally, creativity plays a significant role in narrowing the achievement gap. Encouraging students to think creatively fosters innovation and a deeper understanding of various subjects. In art classes, for instance, students can explore different techniques and materials to express their ideas, allowing them to develop creative problem-solving skills. Creativity nurtures a love for learning and encourages students to engage with their education actively.

Scholars such as Watson (2019) advocate for core curriculum reform and increased emphasis on HOTS to help students reach their fullest potential. Enhancing higher-order thinking Skills (HOTS) is paramount in providing students with the necessary cognitive abilities, such as critical thinking, problem-solving, and creative thinking, which are vital for success in the contemporary era. According to Forster (2004), higher-order thinking skills encompass numeracy, critical literacy, and cross-curricular skills. Detglio (2022) argues that student disabilities and limited subject matter knowledge should not restrict students, as all students can and should learn critical thinking applications. However, many educational institutions do not explicitly teach these skills, necessitating teachers' incorporation of HOTS into the curriculum to better prepare students for college and careers that demand independent thinking.

The Six Thinking Hats approach, developed by Edward De Bono, successfully teaches higher-order thinking Skills (HOTS) to students with learning impairments. This paradigm offers educators a pragmatic and organized framework for cultivating the skill of critical thinking. According to Payette and Barnes (2017), the Six Thinking Hats is a practical and comprehensive system with the potential to boost necessary thinking skills. According to the findings of Ercan and Bilen (2014), using the Six Thinking Hats method has been demonstrated to augment critical and creative thinking capabilities. This technique offers a more organized alternative to other pedagogical strategies. According to Kivunja (2015), the Six Thinking Hats model is proposed as an educational technique that can effectively enhance thinking skills and foster student involvement. According to Alkhateeb (2015), it is suggested that teachers undergo training to effectively utilize the six thinking hats to enhance the learning process.

Although there is a lack of research on the facilitation of Edward de Bono's Six Thinking Hats, specifically in the context of students with disabilities, the objective of this study is to investigate and identify the correlation between Edward de Bono's Six Thinking Hats and higher-order thinking skills (HOTS) in students with disabilities. This study aimed to explore the various elements that impact the implementation of the Six Thinking Hats approach among students with learning difficulties. Additionally, the study aimed to assess the potential

correlation between the utilization of this approach and the development of higher-order thinking skills (HOTS) in these students. The primary objective of the research is to enhance the educational experience of students in special education through the cultivation of critical thinking, problem-solving abilities, and creativity. Additionally, the study can help other professions like health force workers by providing them valuable strategies in dealing with patients with learning impairments.

1. Materials and Methods

The study's design was quantitative, and the researchers used Google Forms to administer a questionnaire survey that allowed for simple data retrieval and direct analysis. By using Google Forms, responses were recorded accurately.

Sample

In the survey conducted during the 2021-2022 academic year, most of the Special Education teachers at Reginald School, precisely eight out of ten, who were responsible for instructing children with learning challenges, actively participated. All participating teachers taught core self-contained English, Math, and Science classes.

Data Gathering Procedure

The special education teachers received a survey and consent form from the researcher via Google Forms. Participants participated after being informed of the study's goals. The participants answered the survey, and data was gathered through Google Forms.

Data Analysis

The collected items were presented in percentages, allowing the researchers to determine the factors that impact implementing the Six Thinking Hats approach. Additionally, the study aimed to examine the hats chosen by instructors concerning the development of higher-order thinking abilities in the students.

2. Concepts and Definitions

The study concentrated on Edward de Bono's (1999) "Six Thinking Hats" framework. These hats stimulate higher order thinking and facilitate creative conversations. According to the De Bono Thinking Hats framework, various modes of thinking are symbolized by different colored hats. The white hat embodies objectivity, the red hat signifies intuition, the black hat denotes caution, the yellow hat represents optimism, the green embodies creativity, and the blue represents organization, management, and control (De Bono Thinking Hats, n.d.)

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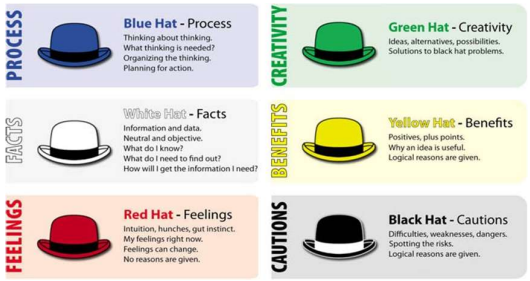
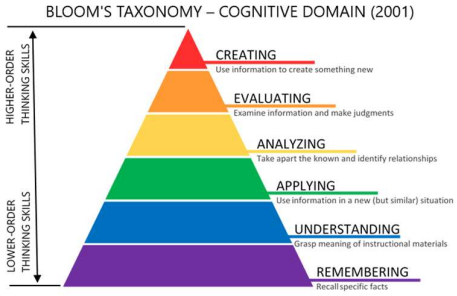


Higher-order thinking skills (HOTS) refer to cognitive abilities essential for critical thinking. These skills include analysis, synthesis, application, reasoning, understanding, and assessment. Higher-order thinking abilities encompass the cognitive capacities within Bloom's taxonomy's highest tiers. Three cognitive processes often used in academic contexts are analysis, assessment, and synthesis. Analysis involves the careful examination and dissection of information, while evaluation entails making judgments and assessments based on specific criteria. Lastly, synthesis refers to integrating various elements to generate new ideas or create something novel (**Higher Order Thinking: Bloom's Taxonomy & Ndash; Learning Center**, 2022).



As stated by the Learning Disabilities Association of America (n.d.), a learning disability refers to a cognitive deficit that has the potential to hinder the development of fundamental abilities, such as reading, writing, and mathematical proficiency. The term "specific learning disability," synonymous with learning disability, is utilized in the Individuals with Disabilities Education Act (IDEA, 1990). "Under Section 300.8 (c) (10), IDEA defines a **specific learning disability** as a disorder affecting the basic psychological processes involved in language understanding or usage, both spoken and written. This disability may manifest as a deficiency in listening, thinking, speaking, reading, writing, spelling, or performing mathematical calculations. Conditions that include perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia fall within the scope of specific learning disabilities.

It is crucial to note that specific learning disabilities, per the IDEA definition, do not encompass learning difficulties primarily arising from visual, hearing, or motor disabilities, intellectual disability, emotional disturbance, or environmental, cultural, or economic disadvantages. This definition highlights the importance of comprehending the underlying psychological processes and recognizing the distinct nature of specific learning disabilities, different from other factors that might affect learning outcomes.

3. Result and Discussion

Factors affecting the facilitation of the Six Thinking Hats for students with learning disability.

Teachers' knowledge and facilitation of the Six Thinking Hats:

The survey of teachers revealed that 87.5% of respondents were unfamiliar with or had yet to encounter Edward de Bono's Six Thinking Hats model. Only 12.5% of the participants demonstrated knowledge about the concept and facilitation of the six thinking hats. These results highlight the crucial role that teachers' lack of knowledge and training plays in impeding the implementation of the six thinking hats.

Various studies have emphasized the importance of teacher knowledge and training in higher-order thinking skills. Thompson (2008) highlights teachers' crucial role in understanding HOTS and its instructional and educational strategies. In the 21st century, HOTS is essential for problem-solving and applying prior knowledge to solve novel problems (Thomas & Thorne, 2009). To introduce students to HOTS activities, teachers should employ active learning approaches, such as incorporating the six thinking hats, as a skill-building tool.

Developing students' HOTS skills relies on teachers' active role in planning, implementing, and evaluating instructional strategies. Bartell (2013) suggests that teachers must possess various ways, strategies, and methods to train students in HOTS effectively. Equipping teachers with the necessary understanding and skills enables them to plan better and deliver instruction that promotes HOTS development.

Student knowledge and use of the Six Thinking Hats:

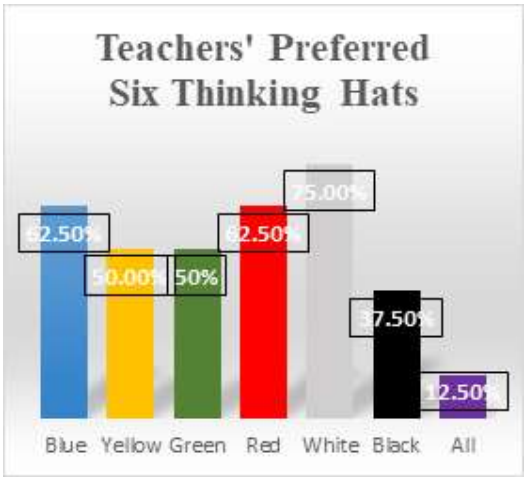
According to the survey responses from teachers, 100% indicated that they had not taught the Six Thinking Hats model to their students. This finding suggests that teachers need more instruction on the model to facilitate the Six Thinking Hats. In addition, previous research highlights the challenges teachers face in incorporating HOTS into their instruction, including developing HOTS-based problems, and identifying appropriate learning activities (Retnawati et al., 2018). With the awareness and training of teachers, this approach can be effectively integrated into the classroom. Consequently, this lack of teacher preparation would adversely impact students, making it challenging to adopt and utilize this approach successfully.

Numerous scholarly investigations have underscored the significance of teacher expertise and professional development in cultivating higher-order thinking skills (HOTS). According to Paul and Elder (2013), there is a significant emphasis on the need to provide teacher training to foster the development of critical thinking abilities. Integrating this training into regular teaching methods may augment students' higher-order thinking skills (HOTS). Tuan, Chin, and Shieh (2005) provide evidence that teacher training programs can improve students' critical thinking abilities, essential in developing higher-order thinking skills (HOTS).

Educational scholars contend that pupils with learning difficulties need individualized education customized to address their unique learning requirements. One of the prominent theories in education is Carol Ann Tomlinson's idea of differentiated teaching. According to Tomlinson, differentiated instruction refers to the practice of customizing instructional strategies and curriculum to accommodate the varied learning requirements of students within a classroom setting. The acknowledgment is that learners possess varying abilities, interests, and backgrounds, rendering a standardized teaching strategy ineffective. Differentiated instruction offers diverse pathways for students to acquire knowledge, comprehend concepts, and exhibit their comprehension. This pedagogical strategy entails modifying the rate, comprehensiveness, and intricacy of teaching, presenting diverse avenues for students to acquire knowledge, and administering mixed evaluations corresponding to individual learning preferences. The primary objective of differentiated instruction is to establish an inclusive and supportive educational setting that facilitates success and maximizes the potential of each student. This theory underscores the need for instructors to consider their students' various learning styles, talents, and interests to provide individualized learning experiences (**Faculty Conversation: Carol Tomlinson on Differentiation**, 2011). Educators can use the Six Thinking Hats approach in the context of HOTS (higher-order thinking skills) development to deliver specialized instruction catered to the needs of children with learning difficulties. Hence, it is imperative to provide educators with the essential information, competencies, and methodologies to effectively instruct kids with cognitive difficulties in cultivating higher-order thinking skills (HOTS). The Six Thinking Hats Method is a pedagogical strategy educators may implement to cultivate their pupils' higher-order thinking skills (HOTS). Through teacher training and the implementation of differentiated teaching, educators can foster critical thinking abilities and augment the academic achievement of children with learning difficulties.

B) Implementation of the Six Thinking Hats for Students with a Learning Disability

Teachers' Preferred Six Thinking Hats for Students with Learning Disabilities



According to the table, teachers prefer white hats the most (75.0%), followed by blue and red (62.50%). De Bono described the white hat as objective, focusing on facts and logic. When used in educational settings, the White Hat Thinking mode promotes the development of critical thinking abilities, encourages an evidence-based and impartial approach to knowledge acquisition, and provides students with vital skills for effectively resolving problems and making informed decisions in academic and real-world scenarios. Compared to Bloom's taxonomy, the white hat is the base of the pyramid, which can be the knowledge and comprehension level. Lewis (Lewis, 2019) analyzed Bloom's taxonomy in his scholarly work. In the first stage, the knowledge level, students are

presented with inquiries to assess their acquisition of understanding from the instructional material. Subsequently, at the comprehension level, students are tasked with interpreting the information they have acquired.
With 37.50% of the responses, black hats are the least popular, followed by green and yellow with 50.00%. The "black hat" or cautious hat signifies a purposeful and analytical assessment of prospective adverse consequences, drawbacks, and issues associated with a specific circumstance, choice, or course of action. Using a black hat for educational purposes enhances critical thinking skills, risk identification, and the cultivation of balanced decision-making. Engaging in this process aids pupils in cultivating a comprehensive comprehension of the intricate nature of many circumstances, thereby fostering their general cognitive advancement and capacity to make well-informed decisions.

Preferred arrangement of the Six Thinking Hats: The survey results indicate varying teachers' familiarity with and utilization of the Six Thinking Hats model. However, the willingness to incorporate the approach to enhance students' HOTS is evident. Teachers mentioned implementation strategies such as following the recommended sequence or adapting it to fit their classroom needs.
Paterson (2006) observed that each hat introduced a distinct thinking style, and specific sequential orders have proven more effective than others. For instance, a primary school in Melbourne, Australia, adopted the Yellow Hat first for innovation, the Red Hat second for expressing feelings, and the Green Hat third for prioritizing and discarding ideas. Pohl (1994) suggested a sequence of yellow, black, and red hats to allow students to make choices. Channell (2023) proposed that teachers can use hats in any order during classroom discussions, but a specific order can provide a more logical flow. The recommended order is blue, white, green, yellow, red, and black. However, teachers can reintroduce hats as they see fit for the discussion.
Upon analyzing de Bono's six thinking hats concerning Bloom's taxonomy of higher-order thinking skills, it becomes evident that each hat targets specific categories. Utilizing the black hat facilitates the cultivation of students' critical thinking and problem-solving abilities, as it encourages the provision of substantiating evidence to bolster their assertions. This aligns with the higher-order thinking skills (HOTS) components of examination, assessment, and analysis. The Blue Hat can facilitate organization and control in the lessons' introduction, body, and conclusion. Green-hat thinking fosters creativity and innovation at the highest level. Wearing the red hat fosters the development of critical thinking skills and problem-solving abilities, empowering pupils to articulate their preferences and aversions toward various concepts. White hat wearers learn data-gathering techniques, while the yellow that encourages students to generate valuable and acceptable ideas.
Due to the unfamiliarity of the Six Thinking Hats approach with most teachers and students, additional research is required to investigate the relationship between the Six Thinking Hats approach and HOTS, especially among students with learning disabilities. To effectively facilitate the implementation of the six thinking hats for students with learning disabilities, schools must provide teachers with training on the approach. Additionally, administrators should incorporate this training into their professional learning communities.

4. Conclusion

The Edward De Bono Six Thinking Hats can be a practical approach to teaching students with learning disabilities critical thinking skills. This structured approach can improve their higher-order thinking skills, assist in planning and organizing their thoughts, and enhance their problem-solving abilities. Moreover, the six thinking hats approach offers an organized and structured teaching method that can benefit special needs students by providing consistent routines and structure. However, the survey revealed that most teachers and students needed to familiarize themselves with this approach. Therefore, the study recommends that administrators offer professional development opportunities in the six thinking hats to ensure proper implementation and maximize the potential benefits for students with disabilities. In addition, future research should evaluate the efficacy of this method and its compatibility with the specific skills needed by students with learning disabilities and their Individualized Education Program (IEP). Lastly, to fully leverage the benefits of the six-hat strategy in the classroom, accurate and consistent utilization and application of the hats are essential.

Ethical considerations

Participants were given an orientation explaining the purpose of the study, the methods used to collect the data, and how the data would be used. The participants checked a box at the start of the survey to indicate their consent.

Those who declined were directed to the questionnaire's final section, while those who agreed answered the questions. There were no dangerous or life-threatening procedures used in the study that might have harmed the participants. By omitting personal identifiers from the survey, the researchers protected the participants' privacy and confidentiality. Additionally, the data was kept private, and after data collection, only the researchers had access to the study and results.

Declaration of Conflicting Interests

The researchers declared that no possible conflicts of interest are associated with this study's research, authorship, or publication.

Funding

The researchers received no financial assistance for this paper's research, authoring, or publishing.

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