COGNITIVE DIVERSITY IN THE CLASSROOM: AN INQUIRY THROUGH INDIVIDUAL DIFFERENCE IN COGNITION

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Abstract

The purpose of this study is to explore the cognitive diversity in the classroom especially focusing on individual differences in cognition through different perspectives.Cognitive diversity plays an influential to form a diverse team to perform tasks requiring creativity. Every learners' has a unique and distinctive way of concept formation, problem-solving techniques, and shared meaning because of their diversity in terms of personality, ethnicity, economic status, gender, the ability of comprehension, personal values, attitudes, information-dispensation style, and most significantly how much learners' rely on various aspects of multiple intelligence such as visual-spatial, linguistic-verbal, logical-mathematical, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligence. Individuals vary in their cognitive performance because of their cognitive differences. This qualitative research employed descriptive methodology and documentary analysis along with using relevant secondary sources for the claim, supporting reasons, and finally to develop argumentation. The finding of this study shows that every learner has a unique and distinctive approach in terms of concept formation, problem-solving, information-dissemination, and shared meaning. Cognitive diversity plays a crucial role to enhance academic performance, work efficiency, and to conceptualize the diverse cognitive traits each student brings to the learning environment. However, some studies point out the drawbacks of cognitive diversity as it invites conflict, stress, misunderstanding, lack of collaboration, and gratitude among team members. It is recommended that educators should keep the learners' different intelligence profiles into consideration and design the activities accordingly.

Key words: *cognitive diversity, individual differences, multiple intelligence, classroom learning.*

Introduction

Learners feel uncomfortable when they try to learn something in ways that are not natural or easy for them to learn. Different researches advocate that learners do not learn in the same ways (Anderson & Adams, 1992);(Ewing & Yong, 1992). For Keefe (1985) learning style is distinctive expressive, intellectual, and affective behavior that serves as a reasonably stable indicator of how individuals distinguish, respond to, and interact with learning environments. Every learner has a unique approach to learning and this approach makes him or her feel comfortable. Guilds (1989) assert that there is never one "right" way to teach or to learn. Since the late 1960s, educators have been studying whether individual differences can result in variations in concept formation, problem-solving techniques, and shared meaning (Goodson,1993), they agree that a variety of patterns appear in a typical classroom (Guild,1989). Esfahani (1989) asserts that students learn more readily when

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they process information in their natural, preferred ways, and they vary in how much they rely on visual, auditory, and kinesthetic (or tactile) perception as they learn. Following Reid (1995) learning style is a preferred way of taking in, processing, and maintaining new information and skill for effective learning. Fleming (1995) demarcates learning style as an individual's preferred techniques of collecting, shaping and thinking about information.

Learning styles are classified in many different ways. One classification method emphasizes the track by which students best perceive and recollect information: visual, auditory, or kinesthetic(Higbee, 2003). Learning style inventory to recognize and classify student learning behavior preferences as Avoidant, Dependent, Participant, Independent, Competitive, and Collaborative (Lang et al., 1999).Individuals vary in their cognitive performance(Neeltje J Boogert et al., 2018).The diversity of the learner is well-defined usually by ethnicity, economic conditions, and gender; however, there are other matters of diversity such as the graphic or auditory abilities or the disposition of the learner that can affect learning. A significant feature of considering the variety of the learner is distinguishing that each person has several ways in which he or she acquires best (Adcock, 2014). The learning theory that has fetched light onhow each child learns differently is the multiple intelligence (MI) theory. Multiple intelligences denote a theory relating to the diverse ways students learn and attain information. These multiple intelligences vary from the use of words, numbers, pictures, and music, to the significance of social edges, contemplation, physical movement, and being in tune with nature (Fleetham, 2006). The Multiple Intelligences Theory throws away the idea that intelligence is one sort of general ability and debates that there are eight types of intelligence (Furnham, 2001). One is not more vital than the other, but some may help people flourish at different things. For example, a person with high musical intelligence and low visual-spatial intelligence may succeed in music class but may struggle in art class(Fleetham, 2006).

Howard Gardner's multiple intelligences theory (MIT) is a significant input to cognitive science and constitutes a learner-based philosophy which is "an increasingly popular approach to characterizing how learners are unique and to developing instruction to respond to this uniqueness" (Richards & Rodgers, 2014).The theory of multiple intelligence (MI) proposed by Gardner and Hatch proposes that human beings have seven distinctive units of intellectual functioning and that these units are separate intelligence with their own noticeable and measurable capabilities. This intelligence was recognized as logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. These units, however, bear striking resemblance to cognitive style makes and intelligence quotient factors acknowledged by others in united notions of intelligence(Morgan, 1996).Multiple Intelligence Theory is one of the most debated issues of the 21st century(Aborn, 2006). The reason is to be accepted significantly high by society because of the considered assumption that people cannot be intelligent in a specific area and so they can be intelligent and adroit in different areas. There can be some weaknessesin considering this theory, which has been entering quickly in curriculum and the

instruction research, as a mere truth. However, it should be focused that Multiple Intelligences (MI) theory is one of the theories that can clarify giftedness (Armstrong, 2009). The multiple intelligences according to Howard Gardener are:

Visual-Spatial Intelligence: People who aregood in visual-spatial intelligence are noble at visualizing things. These individuals are often good with directions as well as maps, charts, videos, and pictures(Hegarty, 2010)

Linguistic-Verbal Intelligence: People who are strong in linguistic-verbal intelligence are capable to use words well, both when writing and speaking. These persons are naturally very good at writing stories, remembering information, and reading(Gardner, 1983).

Logical-Mathematical Intelligence:People who are strong in logical-mathematical intelligence are good at thinking, recognizing patterns, and logically evaluating problems. These individuals incline to think theoretically about numbers, relationships, and designs(Nur et al., 2018).

Bodily-Kinesthetic Intelligence

Those who have high bodily-kinesthetic intelligence are said to be good at body movement, performing actions, and physical control. People who are strong in this area tend to have outstanding hand-eye coordination and handiness(Gardner, 1983).

Musical Intelligence

People who have strong musical intelligence are good at thinking in patterns, rhythms, and sounds. They have strong gratitude for music and are often good at musical composition and performance (Nolen, 2003).

Interpersonal Intelligence

Those who have strong interpersonal intelligence are good at understanding and interacting with other people. These individuals are skilled at assessing the emotions, motivations, desires, and intentions of those around them(Richburg & Fletcher, 2002).

Intrapersonal Intelligence

Individuals who are strong in intrapersonal intelligence are good at being conscious of their emotional states, feelings, and inspirations. They tend to enjoy self-reflection and analysis, including daydreaming, exploring relations with others, and evaluating their powers(Grant, 2009).

Naturalistic Intelligence

Naturalistic is the freshest addition to Gardner's theory and has been met with more resistance than his innovative seven intelligences. According to Gardner, individuals who are high in this type of intelligence are more in tune with nature and are often interested in development, exploring the environment, and learning about other species. These individuals are said to be highly aware of even delicate changes in their environments (Gardner, 2006).

Methodology

This is an argumentative academic paper that has been prepared to explore the cognitive diversity in the classroom especially focusing on individual differences in cognition through different perspectives. This qualitative research employed descriptive methodology and documentary analysis. Moreover, to make the argument about the claim that has been made in each theme, relevant literature (finding from previous) studies has been brought so that the claim could be supported strongly. Therefore,

present study exclusively relied on a secondary source of data for the claims, supporting reasons, and finally to develop argumentation. Moreover, at first, a claim has been made and it has been supported by the claim which consisted of findings of the previous studies.

Result and Discussion:

Learning in cognitively diverse classroom

Learning, according to many scholars of education and psychology, is synonymously taken as a form of cognition. It is because, without cognition, learning cannot take place. In this sense, cognition is the capability to know and to have the knowledge, and this rubric includes the structures and procedures that support knowing/knowledge. Cognition involves many procedures: sensory registration, sensitivity, appraisal, decision making, memory, learning, concept formation, perceptual organizations, language, and many more(Gruszka et al., 2010).The term "cognitive diversity" can be used to conceptualize the different cognitive traits each student brings to the learning environment (Shinn & Ofiesh, 2012).

Learning in the cognitively diverse classroom demands different activities on one side, and on the other, it enables learners to be competent in different fields of study and as such. For example, Luo et al. (2018) asserted that a cognitively diverse classroom enables learners to able to process information differently, deal with the new situation according to their preferences (preference is determined by their learning style or problem-solving method), and involves the adaptation of new culture or learning how something is done in another culture. Even if there could be cultural barriers in learning in those classrooms where there is a diversified environment but if it is taken positively, it enables the students to learn from their peer which they do not need to study in the textbook on one side and the other, such action enables them to adopt new learning style for cognition too (Hurtado et al., 2009). If it can be done, students learning in a cognitively diverse situation can be accelerated, which eventually enables them to have a new cognitive style as well (Franco et al., 2013).

Moreover, cognitive learning in the classroom enables an enthusiastic teacher to ask the learner reflect on his/her experience, helping students finding new solutions to the problems, encouraging them to discuss what is being taught and its implication, helping them explore how ideas are interconnected and taken ahead, asking them to justify and explain why something is in that particular way, visualizing the learning process and forecast what to be expected next (Choy & Cheah, 2009). Additionally, such practice enables the teacher to identify whether the learner is visual, auditory, or kinesthetic; helps the child retain and utilise new concepts successfully, and enabling the student to identify how similar concepts go together (Sadler?Smith et al., 2006).

The literature above discussed the importance of learning in the cognitively diverse situation and if it is taken positively, a teacher can identify the cognitive ability of the student on one side and on the other type of learning style a particular student adopts which classroom teaching and learning process is going on.

Role of Cognitive Diversity on Learning and Team-building

Churngchow et al. (2020)argued that students' cognitive diversity is the inclusion of individual differences such as differences of thinking, diverse viewpoints, skills, and expertise to develop new

perspectives. He further emphasized the significance of practiced-based teaching along with course content and classroom size to succeed at the university level. Earlier, Khademolhosseini (2014) suggested that cognitive diversity assisted the learners to improve the level of their interactions and work efficiently with others interpreting the environment in the present complex world. Moreover, he further argued that cognitive differences are considered as the various ways of thinking styles of problem-solving regarding information processing especially in the area of cognitive psychology and management. However, Pöyhönen (2016) found that cognitive diversity and heterogeneity of learning brought efficiency among the scientific community. This is because of their differences in terms of mental frameworks to solve the problem. His point was a good result was the outcomes of the collective efforts of diverse groups of the scientist. Earlier, Aggarwal and Woolley (2013)found that a reasonable amount of cognitive differences encouraged the collective intelligence of a team, which indirectly impacted team learning through shared intelligence. They further argued that collective intelligence played a crucial role in the enhancement of team' performance and the decision-making process. Similarly, Shalley and Perry-Smith (2008)opined that cognitive diversity played an influential role to form a diverse team to perform tasks requiring creativity. They further reasoned that teams are the center of creativity and innovation because of their diverse skills, knowledge and expertise.

Similarly, Mello and Rentsch (2015) defined cognitive diversity as individual differences in human characteristics such as individual personality, the ability of comprehension, cognitive style, values, attitudes, and most prominently information-dispensation style. They further reasoned those individual differences were gradually learned over time and situation. In the same connection, Aggarwal and Woolley (2013)argued that cognitive diversity is an individual variation, world view, personal choice, and belief system that differentiates people. They further stated that the significance of cognitive diversity to accomplish team performance through a true understanding of the information from diverse perspectives generating original knowledge, motivating divergent thinking, and also claimed that new knowledge was formed through interactions. However, cognitive diversity is not free from drawbacks besides having positive aspects. For instance: Chow (2018)pointed out negative aspects such as the probability of conflict, misunderstanding, stress, difficulty to come to a consensus, lack of appreciation among team members, low level of contentment and cooperation along with equal chances of generating noble ideas, better creativity, forming skills of problem-solving and most important alternative ways of thinking to address any problems. Earlier, Bender and Beller (2016) argued that cognitive differences do not alone refer to beliefs system but disclosed several procedures of perception that are changed over the time and environment in which the person was raised, the language the person speaks, and the cultural patterns and practices the person followed.

The above literature indicates that cognitive diversity is the inclusion of individual differences, divergent thinking, world view, the ability of comprehension, individual personality and choice and belief system which assisted the learners to solve the problem developing noble ideas and thought along with

improving interactions and work efficiency. However, some other studies suggested that cognitive diversity is not free from criticism such as chances of conflict, stress, difficulty to come into agreement, misunderstanding, lack of gratitude among team members, and low level of satisfaction and collaboration.

Individual differences in Cognition

N. J. Boogert et al. (2018) argued that several factors such as social environment, physical environment, genetic inheritance, individual personality, and brain activity, developmental and behavioral aspects had played an influential role to shape individual differences, cognition, and intelligence. Earlier, Parasuraman and Jiang (2012) claimed that there was a positive relationship between individual diversity in education and task performance. They further reasoned that particular genes, everyday atmosphere, decision-making procedure can be beneficial to appreciate individual diversity in cognition. However, Ofiesh, N. S and Bisagno, J. M argued that diverse students from different racial, ethnic, cultural, physical, immigrant, refugee, mental health disorders as a whole heterogeneous learners' brought greater resources or diversity in the classroom because of their distinct way of perceiving and understanding. However, Oosterheert and Vermunt (2001) argued that student educators needed to consider their exiting frame of reference and contextual differences considering their classroom reality or learning environment by changing their learning habits productively and efficiently.

The above literature shows that individual diversity plays an incredible role to enhance learning such as social, physical, and classroom reality along with genetic inheritage, personality, brain activity, status of the learners' and mind-set of the teachers.

Conclusion

As discussed above there are different causes of cognitive diversity in the classroom since a learner can have a different ability to learn something than others. The majority of the studies emphasised that every learner has a unique and distinctive approach in their cognitive performance which makes them feel comfortable and acquires best. For instance, they vary in terms of concept formation, problem-solving, and shared meaning because of their distinctive capacity on logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal skills. Moreover, some other studies pointed out that cognitive diversity played a crucial role to conceptualize the diverse cognitive traits each student brings to the learning environment. It assisted the learners to process information differently to deal with the new situation along with improving interactions and work efficiency especially the scientific community because of their differences in terms of their mental frameworks to solve the problem. Furthermore, some studies defined cognitive diversity as the inclusion of individual differences in terms of divergent thinking, personality, genetic inheritance, physical and social environments, world views, the ability of comprehension, values, attitudes, personal choice, belief system, and most prominently information-dispensations style to develop new perspectives. Similarly, some studies show that cognitive diversity helps to develop a diverse team to accomplish tasks that require creativity and innovation.

The literature indicates that a judicious number of cognitive differences encourage the collective

intelligence of a team. This is because cognitive diversity supports the learners to accomplish team performance by truly understanding the information promoting diverse perspectives, skills, knowledge through interactions. Collective interactions result better learning, better creativity and better problem-solving skills along with developing alternative ways of thinking. However, some other studies pointed out that negative aspects of cognitive diversity such as chance of conflict, generating cultural barriers, misunderstanding, stress, difficulty to come to a consensus, absence of gratitude among team members, low level of satisfaction and cooperation.

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