



CHAPTER 53

ADAPTING NUMBERED HEAD TOGETHER STRATEGY IN FOSTERING SPECIAL NEEDS STUDENTS CRITICAL THINKING IN BASIC SCIENCE AND TECHNOLOGY

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Introduction

Basic science and technology is a field of knowledge that deals with the theoretical and experimental scientific research of fundamental natural phenomena. It further deals with the creation and the use of technical means and their interrelation with life, society, and the environment. Science and technology is the main force behind economic growth. It is an essential and fundamental prerequisite for adding value to both people and raw resources. It offers the key to unlocking any nation's potential in terms of cutting down on outsourcing overhead expenses and generating job possibilities. Education in science and technology will not only equip young people with meaningful employment opportunities but will also teach their minds to approach societal issues with a scientific perspective. The importance of Science and Technology to national development cannot, therefore, be over-emphasized. Yet, students with special needs still score significantly below their peers in science achievement (Villanueva, Taylor, Therrien & Hand, 2012) and tend to demonstrate poor performance on standardised measures of science.

Special needs children are those children who cannot benefit maximally from the regular classroom teaching/learning experiences on account of physical, mental, emotional, and other sundry disabilities. Therefore, special needs children need to be given special attention in the classroom. Kanu (2008) categorised special needs students as persons with Mental retardation, Learning disabilities, Emotional and behaviour disorders, Communication disorders, Hearing loss, Blindness, low vision, Physical disabilities, Autism, Severe disabilities, Multiple disabilities, Deaf/blindness, Gifted and talented. In this study special needs students refer to students with learning disabilities, learning disability is a disorder in one or more of the basic psychological processes that include language comprehension and use of speech or writing. Learning disabilities may also cause difficulties with organizational skills, social perception and social interaction.

One area that has not been given the pride of place in Nigeria's educational system is special needs children. Special needs children are those who because of their unique features and endowment, cannot be adequately and satisfactorily catered for in the regular classroom. For a long time, the assumption has been that



the children we find in the classroom can be taught using the same approach or methods. However, experience has shown that each child comes from a different home background and some may have some special needs to be given special attention. Unfortunately, public schools in Nigeria are often overcrowded and lack the qualified personnel and facilities to identify children with special needs and design remedial or intervention programmes to handle same. The result is that such special needs children are forced to go through the regular classroom without having their special needs met let alone benefiting from the teaching-learning experiences. Many factors have been attributed to the underachievement of special needs students in Basic Science and Technology and the most common one is poor teaching methods. The realization of the dream in recent times has been a mirage given the strategies of teaching used by teachers (Ajayi, 2017). Most teachers use the conventional lecture method to teach the students.

Conventional lecture strategy is usually the dominant approach used by teachers in Nigeria and students are not actively involved in developing knowledge; this is a method in which the instructors are imparting information to the students in the classroom, and the students generally remain passive listeners throughout the lesson. Hence, the strategy is not favorable to all students especially those with special needs. This now leads us to adapt the numbered head together in fostering the critical thinking of children with special needs. Adapting is a process of changing the way teaching is carried out to allow a learner equal opportunity to demonstrate mastery of concepts and achieve the desired learning outcomes. Adapting numbered head-together strategy will help special needs students who have learning difficulties or are compelled to require additional help to achieve their full educational potential within the science curriculum.

Number Head Together is a cooperative learning-based educational strategy that attempts to make the classroom a lively place where kids may actively participate in their everyday learning activities. The NHT learning method is one kind of cooperative learning model that aims to improve students' social interaction and academic results through active engagement. Aside from that, it replaces the conventional classroom setup. In NHT students work in small groups after getting a personal number from the teacher, after doing a discussion, the teacher calls the students one by one randomly to present the results of their discussion and receive rewards based on their group performance (Kagan, 2017). Critical thinking is the process of actively conceptualizing, analyzing, and applying the information gathered through observation, experience, or reflection (Haber, 2020). It relies on rationality and reasoning. Critical thinking is the ability to find solutions based on evaluation, logic, and evidence. A person who thinks critically can ask appropriate questions, gather relevant information, efficiently and creatively sort through this information, reason logically from this information, and come to reliable and trustworthy conclusions about the world that enable one to live and act successfully in it.



Fostering is a process of encouraging the development and growth of ideas and fostering critical thinking requires challenging students' views and engaging actively in the classroom, therefore the need for an NHT strategy that can foster critical thinking and make special needs students share ideas and consider the best answer to their learning problems. It also facilitates students to prepare in group presentations so that all students including slow and students with special needs are trying their best. NHT learning strategy can improve students learning outcomes and students' activeness in the classroom and make teaching and learning activities more fun

The thesis statement of this chapter is based on the fact that special needs students are not given much attention in Science education as teachers use the conventional method of teaching to teach in classrooms that do not carry the special needs students along, this makes students' performance in basic science and technology to be low. Therefore the need to identify a method of teaching that can help special needs students to achieve better in science, outline the procedure for using NHT strategy, discuss ways NHT can be used to foster critical thinking of special needs students, draw up implications of NHT for SNS in Basic Science and Technology, then conclusion and recommendations.

Procedure for Adapting Numbered Head Together

The numbered head-together approach aims to increase innovation and academic achievement for students; it creates the social element and helps to increase the ability of all students, allowing students to explore constructive and productive engagement. The Basic science teacher who uses this strategy should follow this procedure:

1. **Create teams:** The teacher breaks the class into groups of four persons. Teams are formed systematically and are heterogeneous in terms of gender, ethnicity, and achievement. Ideally, each team includes a mix of high, intermediate, and low-achieving students. In the numbering phase, students should be divided into groups of three to five students, and each member of the group is given a number. For example, if the teacher wants to divide the class into 5 groups, each student counts from one to five according to their seats. The students mentioning the same number gather into one group. By this, the students are allowed to interact with other students and are not allowed to choose specific friends. In addition, teachers can divide groups based on the student's level of ability, for example, the students having higher ability than other students are divided earlier and appointed as the group leader, while, the other students can be chosen randomly.
2. **State a question:** Pose separate queries to the class. After each question, the teacher advises the students to put their heads together, think of the best answer, and make sure that everybody in the group knows the answer. In the phase of asking questions, the teacher should share learning materials



and the Students Discussion Sheet (SDS) then students should be assigned to read learning materials and work independently. It is intended to train students in self-employment, facing tasks diligently, as well as finding and solving problems. The learning materials given contained concepts and materials related to the topic under study. In the questioning phase, the teacher poses questions or problems to students about the material to be studied. The question posed should be the same as the questions in SDS. This step aimed to encourage student's interest in a variety of problems.

3. **Timing for thinking:** The teacher gives 30 seconds to students in their groups to discuss the answer. This step takes place in the learning process, which consists of thinking together, and answering questions. In the phase of mutual thinking, students answered questions asked by the teacher by discussing in groups and guided by learning materials. This phase aimed to train students to find and solve problems and keep their opinions.
4. **Choosing the right answer:** In the phase of answering questions, the teacher called certain numbers at random by drawing. Some of the students raise their hands, the teacher then asks one student with a raised hand to respond and answer questions. Next, the teacher guides class discussions to discuss students' answers and determine the correct answers.
5. **Feedback:** The teacher provides feedback on the answer by checking that the answer is correct, elaborating on the answer, and offering corrective feedback on the wrong answer. In this step, students should be guided to conclude with class discussions. The class discussion aimed to train students in keeping their opinions, as well as finding and solving problems.

How to Use Numbered Head Together Strategy to Foster Critical Thinking in Special Need Children

Numbered Head Together is one of the active learning strategies that help special needs students to take accountability for their learning and it promotes class participation with maximum interaction (Herdian, 2009; Leasa&Corebima, 2017). Being able to think critically is an essential skill. You need to wade through what everyone is saying and pick out the truth from the nonsense. So being able to think critically about matters can make a huge difference in one's life. Basic science teachers can use numbered head together strategy to foster critical thinking in students with special needs through:

- i. **Encouraging the pursuit of curiosity:** The students should engage in checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, and monitoring. In the classroom, the student judges, disputes, compares, critiques, questions, argues, assesses, decides, selects, and justifies in the process of critical thinking. Encourage children to explore and ask questions. When students are divided into groups and questions are posed to them, the teacher advises the students to put their heads together, think of the best answer, and make sure that everybody in the



group knows the answer. Asking questions enhances children's critical thinking in learning.

- ii. **Learning from others.** Help children think more deeply about things by instilling a love for learning and a desire to understand how things work. With the use of Numbered Heads Together, children can learn from each other and everyone in the team must take equal responsibility to ensure safe and meaningful learning. They must jointly work and help each other to understand and answer the question. Children in the group must know that to have a successful outcome of the group activity depends on the hard work of each member of the group (Sim & Ananthi, 2017)
- iii. **Helping children evaluate information.** We are often given lots of information at a time, and it is important we evaluate that information to determine if it is true and important and whether or not we should believe it. Teachers can help children learn these skills by teaching them to evaluate new information. Having them think about where or who the information is coming from, how it relates to what they already know, and why it is or is not important, can help foster special needs students' critical thinking
- iv. **Promoting students' interests.** When children are deeply vested in a topic or pursuit, they are more engaged and willing to experiment. The process of expanding students' knowledge brings about a lot of opportunities for critical thinking, so encouraging this activity helps special needs students invest in their interests.
- v. **Teaching problem-solving skills.** When dealing with problems or conflicts, it is necessary to use critical thinking skills to understand the problem and come up with possible solutions; working with teams provides individual members of the team with ample opportunities to discuss the topics that they are unclear about and what they gain from lessons. Moreover, they can learn new things from peers through experience. They tend to develop the required social skills. When students encounter difficulties in working in groups, it depicts minimum interaction. Thus, they should be made to participate in more group activities to process, identify, define and solve their problems through cooperation.
- vi. **Participating in discussions:** Critical thinking in students with special needs can be developed through social experiences where students are allowed opportunities to participate in discussions. This will help them come across different perspectives, it will introduce those children to new information, that they will face disagreements and more. Putting the head together with other classmates can give the student a lot to think about and analyze.



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- vii. **Practicing active learning:** if you want to remember what you studied through understanding and not just by reciting it innumerable times, then you must practice active learning. Through group learning, the "numbered head together" method of learning can be accomplished, in which each group member actively participates in solving the subject being studied. It ensures that teammates take charge of their shares of the task in the team. Members of the team are liable to one another for sharing concepts and ideas, so students are required to master other members' ideas. Every student must be able to give the group response to the question as it is never sure whose number will be called to represent the group. Thus, it encourages active engagement which fosters critical thinking in students.

The implication of Numbered Head Together Strategy for Special Needs Students

1. Special needs students practice working in teams. Teamwork-building exercises teach students to trust each other to achieve more together than would otherwise be possible.
2. Special needs students comprehend, maintain, and have a better feeling about themselves and their classmates. This provides an atmosphere in the classroom that encourages students to be in charge of their learning.
3. Equally prominent in the teachers' belief was that NHT provides struggling students with a more secure, less stressful learning environment.
4. Special needs students become more autonomous in their life and free from the dependency on teachers, the activities that the teacher provides through NHT group work assist students to become more self-dependent learners
5. When special needs students are taught in a small group, it reduces anxiety among the students. When a student takes the leadership of the group and reports to the whole class, he or she feels less anxious, because the response is not his own, but the product of the whole group.

Conclusion

The failure of our students with special needs to develop critical thinking is blamed on its failure to improve the way we teach and learn Basic Science and Technology subjects and makes them important to our daily realities. There are sound policies on the ground by the government and the teachers on how to improve teaching to suit all kinds of students, but in terms of implementation; we have failed due to our inability to use the available resources both human and material to translate what we do to improve the students. Using Number Head Together can have a great effect on students' critical thinking. NHT as a learning and teaching strategy comprises various types of group activities focusing on different abilities. Besides, it offers a panorama for students to share their thoughts, and ideologies and thinks about the finest response to their learning problems.



NHT also aids students in inculcating the skill of in-group presentation so that everyone in the group gets an equal opportunity to display their talent despite their abilities.

This implies that if Basic Science and Technology teachers use the number head together in teaching, the issue of low achievement as a result of a lack of critical thinking in Basic Science and Technology would have been a thing of the past. Also, the gap created by the methods that are not activity-based in teaching science, especially the lecture method can be bridged by the use of the numbered head-together teaching strategy. Similarly, the continued belief that special needs students cannot do well in Science subjects would have been history. Furthermore, the gap created in students' critical thinking using conventional methods would have been overcome.

Suggestions

1. Basic science teachers of special needs students should use the NHT strategy in their daily teaching to add variety and avoid the monotony of teaching.
2. Teachers should develop their students' critical thinking skills by giving them enough time to interact with each other freely.
3. During the teaching of science, special needs students should be provided with a relaxing, effective, and interactive environment that fosters interaction and helps to develop the student's critical thinking skills

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