CHAPTER 43

TEACHING BIOLOGY CONCEPTS TO STUDENTS WITH VISUAL IMPAIRMENTUSING THINK-PAIR-SHARE STRATEGY

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Introduction

Teaching encompasses utilization of instructional strategies that are most appropriate for the content and the students, and is carried out in an efficient manner that allows for real learning. It affects students academically, physical, socioeconomically and behavioral wellbeing. Teaching occurs best when all educational stakeholders, including parents, policy makers, community members and educators share responsibility for continuous improvements and students' achievement, particularly in sciences.

Science education is the teaching and learning of science to school children, college students, or adults within the general public. The field of science education includes work in science content, science process (the scientific method), some social science, and some teaching pedagogy. Science education deals with sharing of science content and process with individuals who are not considered traditionally to be member of the scientific community; the individuals could be students (special need students inclusive), farmers, market women or a whole community. Science education in Nigeria concentrates on the teaching of science concepts, method of teaching and addressing misconceptions held by learners regarding science concepts. Science education is very important to the development of any nation [Omosewo 2009], that is why every nation must take it very serious in all institutions of learning. Many of the developed world were able to achieve so much in science and technology because of science education. Launching of sputnik by the Russian government in October, 4 1957 would not have been possible if not for the position they placed physics in science education [Omosewo 2009]. Science education comprises three subjects namely biology, chemistry and physics.

Biology is the study of living organisms which include their structure both gross and microscopic, functioning, origin and evolution, classification, inter-relationships and distribution. Biology for which there is a strong interest in issues mainly related to the increase of social problems, environmental issues, new deceases, vaccinations, hygiene, malnutrition and reckless use of natural recourses which has an impact on the life of people, has become a beehive of activities. It is estimated that for every twenty-four hours something new is being discovered in

the biology laboratory (IdodoUmeh, 2010). Apart from the erroneous belief that biology education is meant to enable students pass prescribed examination and meet the requirement for admission into tertiary institutions, it plays vital role of individual emancipation and national development (Obi, 2011). Communication Technology would be impossible, Science and technology will not be possible without science education; for instance, engineering, medicine, architecture etc. will not be possible if there is no one to teach the students the core subjects needed for these courses. Biology education is very important to any growing economy like Nigeria. Many graduates of biology education are self-employed and employers of labour; many owned schools for themselves where people works and earn their living while some are in to fish business (Kola 2013). According to Neboh (2011) the role of Biology in national development are as follows: **Promotion of good health practices, Management of refuse and household wastes, Reduction of ecological problems, Promotion of good nutritional practices, Conservation of Nigerian natural resources, Overcoming misconceptions and myths, Promotion of family planning.**Considering the importance of the knowledge of biology for national development, it is expedient that the teaching of biology be done with innovative strategies that enhance effective teaching / learning process and improve students' achievement Altun, (2015).

Biology achievements by students' needs innovative and activities-based teaching and learning for improved achievement. Innovative teaching methods are activity based and are characterized by student sharing some degree of responsibility for making decision in learning process, in innovative teaching methods; the teacher is often described as a partner and a facilitator in the teaching and learning process. Some innovative teaching strategies are: Flip the Classroom, Personalized Learning, Project-Based Learning (PBL), Inquiry-Based Learning, Jigsaws and think-pair-share.

Think-pair-share is one of the varieties of cooperative learning strategy, which promotes learning and understanding of materials among students. According to Sanjini (2015) think-pair-share is a learning strategy that gives the student opportunity to work independently and collaborate with others. Think-pair-share (TPS) is a learning strategy where students work together to solve a problem or answer a question about an assigned reading or task. This strategy requires students to (1) think individually about a topic or answer to a question; and (2) share ideas with a partner, (3) discuss with the whole class to maximize participation, these enhances focused attention and engages students in comprehending the learning material. The strategy has been found to promote and support thinking ability and active class participation by normal students and those with special needs.

Special need students are students that have special educational needs such as, learning problem or disability that make it more difficult for them to learn than most children of their age. Students with special need may have problems with schoolwork, communication or behaviour. According to Korir, (2015) people with

special needs are someone with mobility impairment, or someone who requires support to succeed in an educational environment and someone who has a sensory impairment (such as vision or hearing).

. Visual impairment is any visual condition that impacts an individual's ability to successfully complete everyday life activity. Students with visual impairment are infants, toddlers, children and youths who experience impairments of the visual system that impacts their ability to learn Oduntan(2008). Visual impairment is categorized into three based on the level of functional vision of the students. They are;

1. Low vision- in which case the students use their primary secondary channel.
2. Functional blind- in this case the student use limited vision for functional task but need tactical and auditory channel for learning.
3. Totally blind- students use tactical and auditory channel for learning and functional task. Despite the Visual impairment, these students need to read and write to become useful to themselves and the society at large (National Research Council. 2012). To achieve this, teachers must adopt a teaching strategy that enhances understanding during teaching and learning process.

Thesis Statement

The thesis statement of this chapter includes: Think-pair-share, teaching Biology concepts to students with visual impairment with think-pair-share strategy, Relevance of teaching students with visual impairment with think-pair-share strategy, challenges of teaching students with visual impairment with think-pair-share strategy.

Think-Pair-Share- Think-pair-share (TPS) is a cooperative learning strategy where students work together to solve a problem or answer a question about an assigned task. This strategy requires students to (1) think individually about a topic or answer to a question; and (2) share ideas with classmates. (3) discuss with the whole class to maximize participation, focuses attention and engages students in comprehending the reading material. Professor Frank Lyman was the first educationist who proposed this strategy, Think-Pair-Share in 1981.(Prahl, 2017)

Think-pair-share consists of three steps (thinking, pairing and sharing) which make the strategy more adequate and suitable for teaching student with visual impairment. The time given for "thinking" integrates the conceptual thoughts regarding the subject matter. The thinking phenomena excites when instructor offers a problem or question regarding the lesson he had taught. During the first stage, students are giving specific time to think and resolve the problem, duration is based upon the learner's previous knowledge, complexity and nature of question. - In second step, learners are asked to get themselves into pairs to exchange opinions and ideas about the posed question or learning task, to achieve same set of views regarding a given topic. Finally, the sharing step, student of each pair goes for demonstration with other class mates and share ideas generated or arrived at during discussion time. This way, half of the total strength can describe

the ideas as a whole class (Khaleel, & Hamdan, 2017).Adopting think-pair-share strategy for visually impaired learners, teacher acts as a "resource" to students, by emphasizing the following: planning stage and Implementation stage

On planning stage-

Before using think-pair-share strategy, the teacher needs to take into account that, all children learn at different rates whether disabled or not. Secondly, learners have to be put into small working groups of either with mixed abilities or in groups according to their abilities while looking at their strength and weaknesses being observed in learners. Thirdly, teachers need to set tasks according to the abilities of learners.

On Implementation stage

The teacher starts the lesson with the whole class by looking at the common points in the lesson.

Then, this will be followed by breaking up the class into smaller groups already created.

Then tasks have to be given to each group according to group level of performance.

The teacher then goes round guiding learners and assisting those experiencing difficulties while discussing in groups.

Then the whole class can be brought together and summarize the key points in the lesson at times, through question and answer, giving of reports, or looking through what each group did. The method helps learners participate in the classroom and perform well academically because it helps them remain on task or concentrate on their work for a long period. Students learn at their own pace. It is learner centered approach and not teacher centered hence learners are not easily lost or confused in the course of the lesson (Rosenberg, Westling, &Melesky (2011).

Teaching Biology Concepts to Student with Visual Impairment with Think-Pair-Share Strategy

The majority of information we gain about the world it through vision. Students with visually impairment have to use and rely on their remaining senses for gaining knowledge and understanding of the world around them. This means using their hearing, touch and smell for sensory learning. A skillful teacher of Biology can effectively teach biology concepts for example living and non-living things to visually impaired students, using non-visual information. These senses become vitally important when learning mobility and orientation skills, using touch for trailing, feeling tactile paving and hearing for sound.

Teacher gives vivid description of the characteristics of the object to be learnt, (living things) then bring the object to the student to feel based on the characteristics outlined by the teacher, and this helps the students to gain clues about the object to be learnt. That is to say, teaching and learning of Biology concepts can be facilitated by preparing tactile and audio materials (Kizilaslan,

Sozbilir,&Zrluoglu 2019). Blind learners battle with observations during the mediation of life sciences due to the fact that observation activities are less meaningful and less motivating to them. They advised that "activities in the process of teaching and learning need to be meaningful and motivating." Students become totally excluded from the acquisition of valuable information when they do not receive explanations and interpretations from educators and fellow learners. This supports the argument that the learning mediation of biology depends on one's visual ability, thus making it difficult for blind learners to access information through visual observation.

Adopting an appropriate instructional strategy, such as cooperative strategy (think-pair-share), and activity-based lesson, will capture the interest of the learners and enhances learning. Erwin, Perkins, Ayala, Fine, and Rubbin (2001) opined that, "You don't have to be sighted to be a scientist. All that is needed is a creative teacher. Here are tips for teaching biology to visually impaired students as proposed by Richard (2017)

1. Use names. Always use a visually impaired student's first name when addressing them. This way they will know you are talking to them and not someone else.
2. It's okay to use words that reference sight. Don't avoid words like "see" and "look." Just like their sighted peers, these words should be part of a blind or visually impaired student's vocabulary to connote how they see, whether by touch, bringing things close or in normal conversation.
3. Don't gesture, always verbalize. When writing on the board, always verbalize what you are writing so the student has access to that information and to follow along.
4. Avoid asking if a student can see something to avoid embarrassment.
5. Be a confident sighted guide.

Relevance of Teaching Students with Visual Impairment with Think- Pair-Share Strategy

The relevance of teaching students with visual impairment with think pair-share strategy cannot be over emphasized. This strategy increases classroom participation by learners with visual impairment because; it allows all students to share their ideas, thoughts and concerns. Think-Pair-Share allows learners with visual impairment to have a voice and prepare them to engage in meaningful discussions. According to Vygotsky, students learn best through interaction and collaboration with others. This strategy allows student to be collaborative in sharing ideas with others to gain a better understanding, as well as wait time, which is essential in learners thinking process and understanding (Gunning, 2012). Think-pair-share strategy involves the student in brainstorming process during lesson and discussion time. It also provides directions and instructions using the student's preferred and strongest mode of communication, which facilitate and enhance the understanding of visually impaired learners. Teaching visually impaired learners,

allow opportunities for repetition and practice of previously introduced material which makes it easy for recall thereby making learning permanent.

Challenges of Teaching Students with Visual Impairment with Think-Pair-Share Strategy

Students with visual impairment face many difficulties in learning science particularly Biology concepts, due to disadvantages arising from disability (Isscson, Supalo, Michael & Roth 2016). Abstract nature of the concepts in Biology lessons can prevent students' active participation in Biology activities (Kizilaslan, Zorluoglu, Sozbilir 2020). Visual impairment affects academic, conceptual development and life skills of students. In this sense, long processes of concept mastering and skill development require long process (Lee & Templeton 2008). Negative attitudes prove to be barriers within the course of learning and acquisition of knowledge. Visually impaired students do experience problems in listening, speaking, reading, writing, understanding the concepts and even in communicating with others. Due to these problems, they may develop negative attitudes towards educational institutions, subjects, materials, teaching-learning methods and instructional strategies. Due to negative attitudes, they may even discontinue their education and drop out of school (Mwakyeja, 2013).

Listening and Speaking Challenges- Students with visual impairment significantly rely on auditory data, so they are required to become skillful listeners to surface listening and speaking skills to analyse the incoming data, facts, figures, structures, forms and details.

Speaking is also another challenge as pears do not always listen to them, and this makes the learners discouraged, loss focus, and begin to feel inferior (Ghafri, 2015).

Implications of Teaching Students with Visually Impairment Biology with Think-Pair-Share Strategy

For our country to meet her educational standard where all children whether normal, or children with special need irrespective of background, religion affiliation will be educated, knowledgeable and be useful to self, family, community and the society at large. This will require a major shift from traditional mode of instruction to innovative and cooperative mode of instruction that embraces the world best practices in teaching and learning. Ensuring universal access to education is an effective and sustainable means of empowering people with visual impairment and blindness. Literature confirms that blindness of a person is not a barrier for learning,

Gone are the days where people with visual impairment were relegated to the background where they are often stuck at home or limited to low-skilled jobs. Today, with the introduction of innovative and cooperative strategies particularly think-pare-share strategy, adopted for teaching and learning, and advancement in science and technology, many special need students particularly, those with visual

impairment graduate with distinctions in various fields, and there are found all over doing high-tech jobs.

One of the goals of a development agenda is that of ensuring universal access to education. Achieving quality education by 2030 is stated as goal number four in the Sustainable Development Goals (SDGs). Sri Lanka, along with 192 other countries are signatories to this agenda (United Nations, 2015). Thus, education can play a substantial role in narrowing the inequity between and within the community.

Conclusion

The main purpose of this research paper is to find out how to teaching biology concepts to visually impaired students with think-pair-share strategy. Students with visual impairment use their other senses at different degrees and frequency depending on the insufficiency in their vision. By taking into consideration the individual needs of the students, it is possible to facilitate the access to scientific knowledge to individuals with visual impairment by means of different senses in the teaching and learning process. Teaching students with visual impairment with think pair-share allows learners to have a voice and prepare them to engage in meaningful discussions. The three stages of think-pair-share strategy helps the students to think individually, pair with a partner to discuss about a giving task so as to have a common view and then share their views with the general class. This strategy enhances understanding of Biology concepts to visually impaired students because; they rely on their sense of hearing and other senses rather than sense of vision. The knowledge acquired makes these students useful to themselves, family, community and the society at large. However, Students with visual impairment face many difficulties in learning science particularly Biology concepts due to disadvantages arising from disability. Some of the challenges are: inability to read and write, lack of self-confidence and feeling inferior to pears. These challenges affect academic, conceptual development and life skills of students.

Suggestion

1. The use of cooperative strategy such as think pair share and others should be encouraged for teaching learners with visual impairment
2. Biology as a science of life should is embedded with abstract concept, it should be taught by creative teachers that can introduce innovations that will help learners to achieve more.
3. Institutions of learning should encourage carrier guidance for the visually impaired students.
4. Government should encourage training and retraining of teachers.
5. Teachers should train visually impaired learners to integrate and use other sense organs than sense hearing alone.

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