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## CHAPTER 39

### TEACHING SCIENCE TO STUDENTS WITH SPECIAL NEEDS USING KWL STRATEGY

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#### **Introduction**

Scientific development, technology, and psychological and educational theories changed the role of a teacher from a person who taught student to memorize and the source of knowledge to a person who facilitate learning , guide students , advise them and provide them with strategies to solve problems and encourage them to be self-directed learners (Aisrah,2010), according to those teachers, they should be aware of knowledge development, practicing the best teaching methods and must be change makers in students way of thinking (Hashimi and Gazawi,2009).

The increase in teacher's knowledge about teaching strategies will make learning process more enjoyable, more appropriate to student's needs, and highly correlated to their abilities, their daily lives, preferences and aspirations of the future. The new teaching strategies and methods transferred the educational process from teacher centered to be students centered which enhanced student' self-directed learning (Melhem,2006). Metacognitive strategies are one of the recent development teaching strategies, it focused upon learners themselves and considered them self-regulated thinkers, self-assessors and direct their learning to achieve their goals.

Education is that aggregate of ideas, methods and personnel designed and deployed by society to teach its members how to get through life by doing or pursuing and realizing set goals. It is a social force that can be compared to the rays of the sun or to the showers of rain which different plants and trees harness and use according to its own nature. Education if properly conceived and executed should equip the whole man to go through life achieving not only those goals that society approves but also those goals that will make the individual realize himself and God. Education that is properly executed should bring positive changes, induce knowledge and understanding, help the learner to develop the inbuilt powers nature endows the human body: mind and intellect which has link with nature of science.



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Science education is a core part of the school curriculum. Science instruction is also one of the oldest pillars of academia; holding a special place among the disciplines as a vital area of learning. Researchers contend that the subject of science serves as an effective vehicle for students with special needs to engage in disciplinary understandings as most students, irrespective of achievement level, are able to develop an awareness of, and interest in, themselves and their immediate surroundings and environment through science (Burgin, & Sadler, (2016). Additionally, the practical and social aspects of the discipline, e.g., hands-on activities and working with peers, provide students with opportunities to illustrate ideas through investigations, and develop an understanding of science concept. Inquiry based science experiences are exceptionally well suited for the diversity of learners within a special education setting. Science taps into a different way of thinking and exploring- excellent ways for students who may struggle with other academic subjects to experience success, particularly special need learners (Council of Chief State School Officers. (2011). There are benefits of teaching science to special needs students. It enables them to develop abilities for observation, manipulation, classification and drawing inference. Teaching science to special needs children provides more opportunities for the students to understand their environment and increase knowledge about the world. Science learning helps special needs student to development problem solving and reasoning skills.

Special need student commonly refers to students who require additional supports for learning (Cawley, Foley, & Miller, 2003). They are students that require special attention and specific necessities that other children do not. Students with special needs include learners with a wide variety of conditions including physical ailments, terminal illness and learning disabilities. Special needs education is the one that educates student in a way that accommodates their individual differences, disabilities and special needs ( Brigham, Scruggs, & Mastropieri, 2011). It is designed to help individuals with special needs to achieve a high level of personal self-sufficiency. Special needs education provides education for learning disabilities, communication disorders, emotional and behavior disorder and intellectual disabilities etc. Their characteristics:

- (1) They are unable to apply certain learning or concept in different situations without help
- (2) They are easily distracted by external stimuli
- (3) Socially, they are immature and unstable in behavior
- (4) Can be aggressive about petty issues
- (5) Are self-conscious, day dream, love to spend time in solitary
- (6) They are antisocial, being forgetful.
- (7) They have difficulties in identifying sounds, and also give irrelevant answers to questions
- (8) They have difficulty organizing task and activities.
- (9) Cannot differentiate between objects and sizes
- (10) They find it hard to express themselves verbally



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(11) Have poor handwriting and learn in Parts not whole

KWL is an acronym for “what you know, what you want to know and what you learned. It is a correlated and planned steps which are implemented by a learner through organizing summarizing thinking. It is an easy strategy to apply and lead to remarkable improvement in students’ performance and to retain same (ASC, 2002). KWL is a great way to encourage students connect to the science concepts by identifying their own questions, what they already know about the topic and better understand the objectives of the lesson. it is a great preliminary connection to concepts the students have already learned. It can be organized in a chart, either in the class or small group. KWL as a graphic organizer supports a constructivist teaching model i.e the idea that deeper learning happens when students are actively involved in the learning process. It is a simple graphic organizer that empowers students to own their learning and helps teachers achieve the most engaging lessons. KWL charts starts students thinking about what they know about the topic, what they want to know and what they have learned in the end. This strategy raises curiosity and interest of learners and shows evidence of learning. It enables learners to become active participants in their learning, it allows learners organized to engage, guide and review learning, and helps students to reflect on prior knowledge, recall, understand the learning objectives (K-W-L 2014).

The theses statements for this study are: KWL strategy, teaching special need learners with KWL strategy, KWL chart and classroom discussion, relevance of teaching special need learners with KWL strategy, challenged of teaching special need learners with KWL.

### **KWL Strategy for Teaching Sciences to Special Needs Students with KWL Charts**

The KWL strategy was introduced in 1986 by Ogle as a simple, active and powerful reading strategy (Foote et al., 2001). According to Camp (2000), it deepens students’ understanding of topics they find in textbooks, and then, after the reading process, increases their knowledge and helps them organize and arrange the information they have understood. Siribunnam and Tayraukham (2009) pointed out that the KWL strategy generally concentrates on analytical reading through encouraging students in the classroom to use their thinking skills. Stahl (2008) pointed out that KWL is a procedure conducted by the teacher involving creative discussion about the topic of the lesson, followed by the use of papers, charts or a class board to record student information about what they know (K), want to learn (W) and finally what they have learned (L). In Blachowicz and Ogle (2008) explain the procedures that the teacher and his or her students undertake in the KWL strategy, where the teacher firstly starts by using brainstorming with reading and teaching together, with the aim of discovering what they know already about the lesson, which refers to the’ ‘K’ (what the students Know) in the KWL strategy. Secondly, the teacher begins to encourage his/her students through guiding them to examine and check their knowledge data about the topic of the lesson, and to



find other data or partial data related to what they know about the subject they are learning. Thus, the teacher's role is just to write on the board his/her students' knowledge statement data and their ideas about what think they know, and the students' role of thinking of real questions. Therefore, the teacher's main role is to encourage his/her students and motivate them to think about what they should learn, which refers to the 'W' (what the students **Want** to know) in the KWL strategy. Then, thirdly, students write or fill out what they have learned in the classroom in the 'L' column, making sure they focus specifically on the questions and categories that have been developed, paying particular attention to information related to what they want to know. Ibrahim (2012) confirmed that the KWL strategy encourages the activity of reading for students through activating, arranging and organizing students' previous background knowledge, which leads, finally, to students being able to sum up and reflect on what they have learned by using KWL charts. According to Zouhoret al. (2017), the know-want-learn (KWL) strategy suggests using a graphical organizer that helps students organize their information before, during and after a topic, a lesson or even a unit. In addition, it is an instructional scheme that develops active reading of texts by activating learners' background knowledge.

**KWL Chart and Classroom Discussionfor Teaching Sciences to Special Needs Students with KWL Charts**

The KWL chart consists of three main columns, which are:

- First Column: K - What I Know;
- Second Column: W - What I Want to Know;
- Third Column: L - What I Have Learned

The main columns of the KWL are topic of content (Title):

Before learning, learners should insert the details in the first two columns after completing this, fill in the last column

What I Know	What I Want to Learn	What I Have Learned
<b>K</b>	<b>W</b>	<b>L</b>
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Students can fill out KWL charts alone, but teachers frequently have students use the graphic organizer in pairs or small groups. The group note taker can write down what each student knew about the topic, what they wanted to know, and what they learned. Alternatively, students can fill out KWL sheets independently and discuss each step with the group. Students are encouraged to share their results with others to increase understanding, active participation, and interest, which improves overall comprehension and retention of materials read.



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The discussion stage builds spirit of boldness in learners and enables them gain the skills of sharing ideas with others and accept other's opinion about a giving task.

### **Challenges of Teaching Sciences to Special Needs Students with KWL Charts**

KWL charts help students see the lesson in a bigger picture. Starting from the prior knowledge, to question, to conclusion. However, there are some challenges, there are:

prior knowledge of the K step is significantly enhanced, when brainstormed collaboratively, oftentimes students will share irrelevant, inaccurate, or incomplete information which may well confuse their reading. Again, because KWL is reader-centered, it is limited by what is shared by students in the W step. Students don't know what they don't know and they similarly don't know what they Want to know. Or, they may Want to know what is inconsequential, trivial, or not available in the reading or available resources.

Teacher preparation programme in Nigeria lack adequate materials, provide limited content about science. also, the time provided for teaching science to special needs students is inadequate to teach science meaningfully. There is also problem with classroom management and collaboration skills development.

### **Implications of Teaching Sciences to Special Needs Students with KWL Charts**

This suggests real learning and long term retention come when students engage with information. Some of the benefits of KWL strategy charts are:

- (a) Motivate and engage students in learning process
- (b) Track progress and learning outcome
- (c) Present a simple method for organizing note taking
- (d) Offer flexibility and be adapted to lesson.
- (e) Keeps teachers and students on the same page.

Science practical is that science arranged for further investigation in details as a guide to the practice of an art. Practical science is necessary because science is not learned until is felt i.e seeing is believing.

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For our country to meet her educational standard all children whether slow learners' average and fast learners, all children with special need should be taught based on their ability. This will go a long way to allows for all students to improve their ability to communicate with one another. With an integrated classroom,

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students are able to interact with a wider range of students with a variety of abilities. This will open up opportunities for them to strengthen their communication skills and adapt to a varied level of social interactions.

Additionally, special need learners will prepare for the after-school world and make the students career-ready. Once students have entered the workforce, they will be working alongside diverse communities with a range of abilities.

### **Suggestions**

1. Teachers should be encouraged to employ cognitive thinking strategies in their teaching due to their effectiveness in developing knowledge and students' skills.
2. It is necessary for the system of assessment and evaluation in schools to be modified to suit the KWL strategy by the curriculum designers and decision-makers in the Ministry of Education.
3. Teachers' abilities in teaching science should be improved by holding training courses to encourage the use of modern and innovative strategies like the KWL strategy.
4. The system of assessment and evaluation in schools should be modified to suit the KWL strategy.
5. It is necessary to provide the tools required by the KWL teaching strategy in schools.
6. Teachers should be encouraged to exchange visits and hold periodic meetings to discuss new teaching strategies such as the KWL strategy.

### **Relevance of teaching special needs students with KWL**

- (1) KWL helps kinesthetic and visual learners to get an overview
- (2) It helps the students to get actively involved in the lesson
- (3) KWL gives students with learning disabilities an opportunity to set an intention for their work, create visual conceptual representations and make connections between life and their learning
- (4) It helps identify prior learning knowledge and encourage students to monitor own progress
- (5) It provides special needs teachers with relevant information to guide lesson planning
- (6) Helps teachers of SNS to complete formative assignments in the classroom
- (7) KWL becomes an interactive record of student learning.

### **Summary**

The paper looked into special needs children and KWL strategy. Special needs education is the one that educates students in a way that accommodates their individual differences in order to achieve high level of personal self-sufficiency.

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The study revealed that KWL is an easy strategy to apply and it leads to remarkable improvements in students' performance and retention. Being a graphic organizer, it empowers students to own their learning, keeps them engaged and prompt previous knowledge

### **Conclusion**

The study confirmed that KWL strategy have positive effect on special needs students' learning and retention of what is learned and help to address all the characteristics of the special needs students.

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