

CONTEXTUAL TEACHING AND LEARNING: A STRATEGY FOR DEVELOPING GRAIN FULL SKILLS THROUGH SCIENCE AND TECHNOLOGY EDUCATION

By

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Abstract

After several decades of dispensing Science and Technology education in Nigeria schools, the country is still trailing far below her expectation for a vibrant social and economics status. There is high rate of unemployment in the country. One wonders the kind of knowledge and skills that are derived from schooling. A lot of policies and reforms, especially in the area of science and technology have come to stay with little or no impact on the beneficiaries. In view of these, questions are being raised about the quality of science and technology education offered in the country. Arguments have pointed to the fact that science and technology education in Nigeria does not lend itself to easy application to daily life needs and activities. This paper therefore, examines contextual teaching and learning as an instructional delivery system that offers students actual contact with working science and technology, making them acquire and develop skills essential for employment and self-productivity.

In the world today, nobody is just talking about education in terms of certification. What matters is the skill(s) that the individual has acquired and or developed during and from schooling. Skill acquisition may be seeing as a process of acquiring or gaining ready knowledge in developing ones aptitude and ability in a particular field (Ihebereme, 2010). It is ones ability to actually do something well especially because he has learnt and practiced it. Youths who are given adequate training for skills acquisition are likely to become self-employed after schooling. In this way, they will be active partners in both community and national development. It

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is the development of skills that will ensure technology excellence in this era of global economic transformation.

Educational policies and reforms in Nigeria in this 21st century are geared towards result oriented and dependable educational system. The ability of the Nigeria education system to be functional or result oriented is still questionable.

Of course, only blind minds will stand to ask the rationale for skills acquisition rather than paper qualification in this 21st century. Why? Because the new millennium has ushered in a dramatic technological revolution. What this means is that human beings today lives in an increasingly diverse, globalised and complex media saturated society. It appears therefore, that why we live in the 21st century, our schools and what we learn from them are not yet ready to provide solutions for the problems of the century. Our challenge is therefore, to make, appraise or reinvent schools and curricular for the sake of our students, and welfare of our nation; and of course the entire world. The policy maker, the politician and the parent both have their role in making the paradigm shift to 21st century education.

As a teacher I'm most concern with the kind of instructional delivery system that would make the learners acquire the 21st century skills. These skills otherwise referred to as the survival skills were advocated by Wagner in his book, *The Global Achievement Gap*. These include:

1. Critical thinking and problem solving
2. Collaboration across Networks and Leading by influence
3. Initiative and acceptability
4. Inactive and entrepreneurialism
5. Effective oral and written communication
6. Assessing and analyzing information
7. Curiosity and imagination.

The type of schooling students need today is to master the above seven skills to thrive in the new world of work and these same skills are the same ones that will enable students become productive citizens who contribute to solving some of the most pressing issues we face today.

The above is in line with what Mutassa and Wills cited by Nwadukwu (2010) explained when they relate skills development to science education. According to them the process of science lead to the development of four major related skills, namely, thinking skills, practical skills, communication skills and social skills. If you bring the seven survival skills to bear with the above, it will demonstrate that they are not apart with each other. How do we teach science to our students to achieve these? Contextual teaching and learning seem to be the most obvious intervention strategy.

Contextualized Teaching and Learning (CTL)

Pupils employ their academic understanding and abilities in a variety of in-and out of school contexts to solve real world problems. (Eric clearing house on Adult, Career and Vocational Education and ERIC clearinghouse on Teaching and Teacher Education). The authors of this information series have define contextual teaching and learning pointing out its fundamental characteristics. They assert that contextual teaching and learning;

1. is problem based.
2. Occurs in multiple contexts (including schools, homes, worksites, communities etc)
3. Fosters self-regulated learning
4. Anchors teaching and learning in students diverse life context
5. Employs authentic assessment
6. Use interdependent learning groups.

Permit me to briefly explain three out of these characteristics.

Problem based learning is an approach to structuring the curriculum so that students are confronted with problems from practice, which provides a stimulus for learning (Boud and Feleti, 1997). Thomas Duffy (1996) has enumerated eight constructivist principles that can guide those interested in using problem based learning. These include;

1. Anchoring learning on larger task or problems
2. Supporting the learner in developing ownership of the overall problem or task
3. Designing authentic tasks of students development level
4. Providing sufficient task complexity
5. Allowing students ownership of the process used to develop a solution
6. Encouraging teacher questioning and other challenges.
7. Testing ideas in the learning community
8. Providing opportunities for reflection.

Students who are guided properly through problem based learning may acquire without difficulty the 21st century skills earlier mentioned. This is because of their involvement in authentic tasks that challenge their thinking skills that allow them work collaboratively with others, that make them ask questions etc.

One other important characteristic of contextualized teaching involves fostering self-regulated learning. This means that the student is allowed to take responsibility in the learning process by actually analyzing his own cognition and of course setting goals for what he needs to learn.

Linder and Harris (1995) define it as the integration and utilization of cognitive, metacognitive, motivational, perceptual and environmental components in the successful resolution of academic tasks. Learners who are aware of the fact that

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they are agent in their own learning have better opportunities in internalizing their own goals.

Authentic assessment is defined as engaging and worthy problems or questions of importance, in which students must use knowledge to fashion performances effectively and creatively (Waggins, 1993). It is testing or assessment that is conducted under realistic conditions. It requires the application of knowledge to a real-life or world problem. Again, it links the curriculum, in this case the science curriculum to the environment.

It is based on this instructional delivery system that I urge science teachers to design classroom activities, which may be capable of helping the learner to develop skills needed for the world of work..

What Classroom Activities Warrant Skills Development

Remember, that CTL is problem based. Problem based learning on the other hand is guided by constructivist principles (Duffy, 1996). Murphy (1997) summarizes Jonassen (1994) eight principles for guiding instructional design, namely;

1. Providing multiple representations of reality
2. Represent the natural complexity of the real world.
3. Focus on knowledge construction, not reproduction
4. Present authentic task (contextualizing rather than abstracting instruction
5. Provide real world, case based learning environment, rather than predetermined instructional sequences.
6. Foster reflective practice
7. Enable context and content dependent knowledge construction
8. Support collaborative construction of knowledge through social negotiation.

Duffy and Murphy have not deviated from one another. With their guide lines in mind, activities can be designed to reflect instructional materials that are process oriented, problem based, contextual, interdisciplinary, and metacognitive in nature.

When critically analyzed, classroom activities are categorized based on curriculum, instructional and assessment practices. The concern here is on instructional practices which include, problem based learning, student directed learning, experienced learning and monitoring. A sample activity or scenario is hereby presented reflecting problem-based learning.

The Ministry for Environment Management in your state is interested in finding solutions to the problems resulting to degradation of the environment. Due to the fact that there is inadequate data in the office concerning the causes, effects and possible salutations for the factors responsible for environmental degradation the opinion/decision of members of the community is needed. Your company has been asked to investigate the issue and come up with recommendations.

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- Step 1-** Let students identify a hypothesis for problems solution (Brainstorming can be used for compiling a list of issues relative to the problem).
- Step 2-** Create problem solving groups or teams at least four and identify their roles
- Step 3-** Describe each team’s responsibility which is gathering information to support or reject hypothesis
- Step 4-** Initiate the research part of the investigation. Provide teams with background information
- Step 5-** Brainstorm with students other methods of obtaining information e.g. interviewing, community members conducting surveys, and personally soliciting opinions.
- Step 6-** Engage students in critical thinking and reasoning. Have team members work together to identify the facts that surround the problem and develop criteria to evaluate the appropriateness of information.
- Step 7-** Let team members collaborate with each other to identify possible solutions.
- Step 8-** Let students make a decision based on the consensus of the different groups.

Reflective Practices -Have students discuss the importance of various perspectives on environment degradation obtained through their research.

- Evaluation**
- Involve students in debriefing about the team activity.
 - What was most difficult for you in the team activity?
 - What was one of the most positive things to come from your team interactions?

The activity spelt out involves students in the actual experiences of solving a problem that has real world significance beyond the school. Using ill –structured problems – problems that have no one right solution – is an instructional strategy used to promote critical thinking and problem solving within the context of real world application. In this way students are able to expand and refine their knowledge through self – directed searches for information, active discourse with others, analysis of conflicting ideas and appeals, and decision making.

A performance checklist can be designed and used for student assessment. This also serves as a guide to the expectations of the teacher. Below is sample based on the activity earlier described.

Performance Checklist

Part 1: To what extent were the following guidelines for team interactions followed:

Item	Always	Sometimes	Rarely	Never
The specifics of the problem were clearly identified by the team				
Sufficient information was gathered for review				
Several perspectives to the problem were considered by the team				
The pros and cons of each				

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recommendation were presented				
The solution was unanimously selected				

Part 2: Identify the Extent to which the Following Practices were Evident in Your Team Interactions

Practice	Always	Sometimes	Rarely	Never
Demonstration of good listening skills				
Free submission of ideas for group consideration				
Demonstration of respect for the opinions of others.				
Active consideration given to all suggestions				
Negotiation with others to reach team agreement				

Conclusion

In this paper, effort is made to show that the only education that children need today is one that is capable of developing in them skills needed for survival, real-life work and adaptation to this present era of globalized and complex media saturated society. Contextual teaching and learning is herein considered as an instruction strategy that may help students have contact with working science and technology.

Recommendations

Based on the foregoing the writer made the following recommendations.

1. Science and Technology teachers must be familiar with aspect of the curriculum that demands application of knowledge to real world problems and tailor teaching and learning activities to reflect same
2. Curriculum planners should strive to develop interdisciplinary curricular to allow for learning in diverse life contexts.
3. Authentic assessment practices such as journal writing, which engages students in thinking about certain ideas and experiences as well as envisioning new ways of responding to them, portfolios, observation checklist etc. should be emphasized.

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