Journal of Capital Development in Behavioural Sciences Vol. 6 Issue Two (December, 2018)
Faculty of Arts & Education, Lead City University, Ibadan, Nigeria
***ISSN Online:** 2449-0679 **ISSN Print:** 2354-3981*

The Didactics of Science Subjects amidst Militancy Activities in Rural Niger Delta Region

[1]Joy-Telu **HAMILTON-EKEKE**
Email: joytelu@yahoo.com

[2]Vincent **OVIRI**
Email: voa82@yahoo.co.uk

&

[3]Regina Patricia **ABAM**
Email: abampat035@gmail.com

[1&2]Department of Science Education
Niger Delta University,
Wilberforce Island, Bayelsa State, Nigeria

[3]Basic Science and Technology Primary Education
Jasper Adaka Boro College of Education
Sagbama, Bayelsa State, Nigeria

Abstract
Didactics is used in schools to analyze learning situations and to use the analysis to determine and justify how teaching is conducted. A didactic evaluation of the teaching and learning of science subjects in the secondary schools has been a challenge to educators in the Niger Delta region as a result of militancy. This paper examines didactic models in the answering of the four didactic consideration questions of: what should be taught; why should it be taught; how should it be taught; to whom should it be taught. This is pertinent as the yardstick for the usability of didactic theory of knowledge is successful teaching; also this area has only been investigated to a limited extent, especially from difficult circumstances like militancy.

Keywords: Didactic, Niger Delta, Nigeria, science subject, militancy, science education

Introduction

Didactics is defined as the science of teaching and learning both in theory and practice. It considers what teachers should teach and the connection between teaching goals and methods. Since didactics can be seen as both a practical science and the art of teaching, it requires a systematic approach using scientific principles and a professional who can master this art (Augustsson and Boström, 2012). The didactic scholar needs to apply general principles to changing situations and also to work cooperatively, because didactics is based on the interaction between teacher and student. Didactics is used in schools to analyze learning situations and to use this analysis to determine and justify how teaching is conducted. There are usually four didactic areas that the teacher should consider: What should be taught? Why should it be taught? How should it be taught? To whom should it be taught?

Didactic theories and models are useful tools for teachers' professional development. Didactic models can also help create a reflective self-distance (Politecnico di Torino, 2011). Teachers can use theoretical language to describe their practice and thereby clarify and understand their pedagogical and educational choices and place their work in an educational context. In rural Niger Delta region that is plagued with militancy activities that leads to school disruption, a didactic evaluation of the teaching and learning of science subjects in the secondary schools has been a challenge to educators in the region (Hamilton-Ekeke, 2015; 2017). This paper therefore examines didactic model (the didactic triangle model as contained in Ullström, 2008) in the answering of the four didactic consideration questions as it affects the education of the adolescents in the rural Niger Delta region. This is pertinent as the yardstick for the usability of the didactic theory of knowledge is successful teaching.

The Niger Delta Region

The Niger Delta is the delta of the Niger River sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria (Hogan, 2013). The Niger Delta is now defined officially by the Nigerian government to extend over about 70,000 km^2 (27,000 sq miles) and makes up 7.5%

of Nigeria's land mass. Historically and cartographically, it consists of present-day Bayelsa, Delta, and Rivers States. In 2000 however, Obasanjo's regime included Abia, Akwa Ibom, Cross River, Edo, Imo and Ondo States in the region (Congressional Research Service - CRS, 2008). The delta is a petroleum-rich region (the reason for all the militancy activities in the region), and has been the centre of international controversy over pollution, corruption and human right violations.

The core people of the Niger Delta region which is Bayelsa, Delta and Rivers State agitated and are still agitating for resource control of the proceeds from the petroleum exploitation in the area. Unfortunately, the struggle for control of resources got out of control, and the present phase has become militant and hence the militancy activities in Bayelsa, Delta and Rivers States. When long-held concerns about loss of control over resources to the oil companies were voiced by the Ijaw people in the Kaiama Declaration of 1998, the Nigerian government sent troops to occupy Bayelsa and Delta States. Soldiers opened fire with rifles, machine guns, and tear gas, killing protesters and arresting them. Since then, local indigenous activity against commercial oil refineries and pipelines in the region have increased in frequency and militancy. Frequent kidnapping of foreign employees of Shell, the primary corporation operating in the region, have been the order of the day by outraged local people. Such activities have also resulted in greater governmental intervention in the area, and the mobilization of the Nigerian Army and State Security Service into the region, resulting in violence and human rights abuses and disruption of school calendar or the total closure of schools (Okonata and Douglas, 2003). In August 2009, the Nigerian government granted amnesty to the militants; many militants subsequently surrendered their weapons in exchange for a presidential pardon, rehabilitation programme, and education (Strutton, 2015).

Emergence of Armed Groups in Niger Delta

There were two major armed groups in the Bayelsa, Rivers and Delta State region of Niger Delta. The Niger Delta Volunteer Force (NDPVF) was founded by Asari, a former president of the Ijaw Youth Council, and the Niger Delta Vigilantes (NDV) led by Ateke Tom. Asari in 2003 retreated into the bush to form the group with the explicit goal of

acquiring control of regional petroleum resources (Okonata and Douglas, 2003). The NDPVF attempted to control such resources primarily through oil 'bunkering', a process in which an oil pipeline is tapped and the oil extracted onto a barge. Oil corporations and the Nigerian State pointed out that bunkering is illegal; militants justify bunkering, saying they are being exploited and have not received adequate profits from the profitable but ecologically destructive oil industry (Adelfemi, 2013). Bunkered oil can be sold for profit, usually to destinations in West Africa, but also abroad. Bunkering is a fairly common practice in the Delta, Bayelsa and Rivers but in this case the militia groups are the primary perpetrators (Adelfemi, 2013).

The continuous clashes between the militia groups and the government and even among the militia groups have resulted in the destruction of lives and properties as well as disruption of educational activities in the affected areas resulting in school dropout. The concept of out-of-school/street children according to Ihejirika (2013) is used to explain children and youths who dropped out from formal school system and retire to life on the streets and in the case of war-torn region, they are out of school and into militia groups. They are supposed to be in school but as a result of one reason or the other stay out/away from the school system. Akpama and Inaja (2006:216) stated that 'in order to survive, these victims of exclusion subsist on scavenging, begging, hawking, prostitution or theft' as their main source of income. In the rural Niger Delta area the out of school is as a result of militancy activities and coarseness of joining the guerilla militia groups. Teaching in a crisis zone has its antecedent consequences and as such requires adaptive didactic strategies especially in the teaching of science subjects.

The proceeding sections will discuss the various didactic models and strategies of teaching of science subjects at the secondary school level vis-à-vis answering the four didactic consideration questions of: what should be taught; why should it be taught; how should it be taught; to whom should it be taught.

Didactic Models

It has been proven from an epistemological and psychological perspective that the various learning strategies led to different learning results

(Hamilton-Ekeke, 2007; 2015; 2017) as it has also been demonstrated that the different learning contents can be processed through different learning paths and with varying efficiency (Szõke-Milinte, 2013). As long as the successful realization of educational objectives is at stake, disciplinary methodology and didactics cannot ignore which teaching-learning paths and methods led to the predefined objectives. Since didactics can be seen as both a practical science and the art of teaching, it requires a systematic approach using scientific principles and a professional who can master this art. The didactic scholar needs to apply general principles to changing situations and also to work cooperatively, because didactics is based on the interaction between teacher and student (Kansanen, Hansén, Sjöberg, and Kroksmark, 2011).

According to Uljens (1997), didactic theories and models are useful tools for teachers' professional development. Uljens further opined that didactic models can also help create a reflective self-distance. Teachers can use theoretical language to describe their practice and thereby clarify and understand their pedagogical and educational choices and place their work in an educational context. Didactic in physics for instance can be different from that in English. The model of the didactic in this paper is based on Ullström's (2008) version of the didactic triangle cited in Augustsson and Boström (2012). The triangle consists of three axes; teacher-student, teacher-subject, and subject-student (see Figure 1).

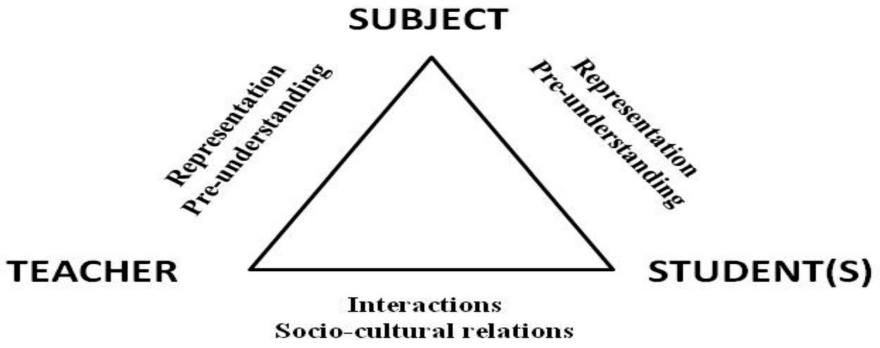

Figure 1: The didactic triangle from Ullström (2008)

The teacher-student axis concerns the interaction between teacher and student/student group, the teacher‘s awareness and intentions of his or her science subjects and the results of the teaching which is a demonstration of understanding. This axis is connected to the teacher‘s knowledge of classroom interaction, group processes, and socio-cultural relations and the ability to handle this knowledge. An important and decisive factor for success in teaching is a good relationship between teacher and students (Hattie, 2009). The axis concerns teacher’s insight into what takes place in the didactic science classroom and into his or her own teaching style (Boström, 2011; Stensmo, 2000). Therefore, this axis represents the micro-aspects of teaching and the link between the teacher‘s values and intentions, on one hand, and the teacher‘s ability to achieve a constructive learning environment on the other (Steinberg, 2012). This feat is a challenge amidst militancy activities.

The teacher-subject matter axis includes the didactic questions that guide teachers in their choice of materials, teaching strategies, and personal performance. Even the rhetorical tradition is strongly connected to the didactic. The axis draws attention to both the teacher‘s behaviour and his or her relationship to the subject matter, to what should be communicated, and, of course, why. Communication in this sense is about rhetoric, including the teacher‘s experience, oratory, understanding of the receiver, and ability to achieve a given communicative goal. Form and content are two aspects that mutually presuppose and condition each other (Hellspong, 2009). This axis is more about teachership, i.e., having an area of knowledge (the subject) and an ability to illustrate this knowledge. The axis also assumes, in a didactic sense, a teacher who is self-aware.

The subject-student axis includes the teachers’ choice of strategies for stimulating the student/student group in an optimal way. The methodological axis is about the dialectic between understanding and performance. Knowledge is always situated and connected to an act or state of readiness. These acts or states include individual work, group work, subject and/or thematic integrated approaches, practical/abstract subject content, and work methods. Implicitly, this axis touches on the teacher‘s competence to expand his or her methodological repertoire

to match the individual student and the student group, as well as other specific factors (Grinder, 2008). The axis deals with the exposition of the subject matter to the student in an accessible way that it is both individualized and has a progression (Hamilton-Ekeke, 2015; Boström, 2004). An understanding of people's unique styles and didactic matching is needed for success (Dunn and Griggs, 2007; Hamilton-Ekeke, 2007). An important factor in this axis is that the teacher assumes the students have preconceptions that enable them to understand the subject. Students in the rural Niger Delta region have crude preconceptions of bits of science especially in the crude way of refining petroleum for the production of fuel and kerosene by-products. This knowledge if properly harnessed by the science teacher in the classroom during the teaching of related concepts would serve as prior knowledge. The place of prior knowledge in the understanding of concept to be learnt cannot be over emphasized.

Summarily, in using the didactic triangle to answer the four didactic areas that the teacher should consider which are: what should be taught? Why should it be taught? How should it be taught? To whom should it be taught? The teacher–student axis deals with the 'whom should it be taught question' while teacher-subject axis addresses the 'what should be taught' and 'why should it be taught questions'; also the subject-student axis looked at the 'how should it be taught question' as a teacher's choice of strategies (teaching methods) stimulates optimal learning.

The place of Ullström didactic triangle in the teaching and learning of science subjects in adolescent age group (secondary school students) which is the most targeted age bracket for ready recruitment into militia; will help steer their vigor in the right direction. The student-subject relationship is also addressed by Schussler (2009) and Mader (2009). Schussler (2009) explained how teachers can engage uninterested students through challenges, support, instruction, and relevance. Mader (2009) believes that a teacher should abandon stimulating students by means of external rewards such as points or symbols of various kinds and should instead get to know students and what motivates them. Militancy activities in the Niger Delta region are borne out of the desire

to control their natural resources which is basically the crude oil which is a natural endowment in the region. The youths wanted to be able to refine the crude oil into petroleum and its' by-products. Science teachers in this region who have this understanding as what can motivate the youths of this region to be interested and learn science can use this (refining) concepts in the teaching of science in order to motivate and engage them in the learning of science subjects; the key to successful teaching and learning lies in assigning schoolwork that is interesting to students (Boström, 2004).

The Teaching and Learning of Science

It is difficult to define the term science precisely, philosophers have been arguing about it for decades. For classical scientists, the aim of science discovery was to gain true and certain knowledge and understanding of the world. Such knowledge is only possible where the objects themselves are precisely defined, unchangeable (Sochor, 2011). Moreover, the modern term 'science' is now applicable to a broad set of human endeavor. The devastation of the environment, the climate changes, and the rapid development of the industry requires that people should be more aware of the phenomena occurring in nature. On the other hand, natural sciences (physics, chemistry and biology) are considered by students as difficult subjects to understand and thus not many people choose this way of education. Therefore, a special attention should be paid to the theories, methods, teaching tools and teaching aids in science education (Hendl, 2002).

In order to further address the didactic question of how science is to be taught, Novotný and Svobodová (2014) opined that it will be pertinent to look at how science works. How science works focuses on the scientific ideas with their wider contexts. This is intended to assist students in better understanding of the importance of science point of view. Recently, there are many debates about appropriate educational approaches for scientific thinking for improving teaching in school science. It can be reasonably assumed that scientific thinking can provide skills for cognitive development of young persons. Students should be able to demonstrate understanding of scientific approach; they should formulate

scientific arguments with respect to their consistent structure (hypothesis, expectation, and observation) and principles for known theories. Student can use not only standard scientific methodology, but they can use historical thought experiments, paradoxes and can identify argument fallacies. They can clarify some themes which characterizes scientific reasoning and the structure of theories. Student sees relations between the precise and the elementary description of selected science phenomena and they are able to formulate elementary treatments of those phenomena and to explain their adequacy. Vopìnka (2012) stated that the whole science module content is designed for shift to more active learning instructional strategies. Active learning strategies are used to engage participants in thinking critically or creatively, speaking with the entire class, for expressing ideas through writing, giving and receiving feedback. The teaching of science subjects in the Niger delta region should centre on the concepts that enhance its biodiversities and rich mineral endowment as well as its environmental degradation and how it can be restored and effort to explain the science behind it, how it works, and how it is related to other disciplines and society. There is a compromise between the depth and range of material teachers wish to cover, and what students are able to successfully accept in the teaching time available due to militancy activities in the region that disrupt school calendar.

Still on how science should be taught, teachers using several examples should demonstrate steps of the science picture of the world from a crude phenomenological description, via the qualitative analysis to the first steps of exact quantitative explanation. These conclusions can be confronted for selected specific problems in physics for example with popular elementary treatments. Students try to find the optimum level of simplification in real problem case.

Teachers should expose the misconceptions in common science interpretation. Teaching science subjects should provide information about the science demarcation, differences between good science (for example the science of refining crude oil) and pseudoscience (the bunkering way of refining crude oil). The meaning of this lays in combination of interpretation and discussion on selected science

methodology or science relation topics, whereas bigger relevance is put on discussion. Sokol (2010) consented that students could evaluate the following questions (what is 'scientific discipline'? can science explain everything? has the ideal of science been changing? should the scientist interpret, evaluate or change his surroundings?) and many others in order to promote didactic teaching and learning of science subjects.

Didactic Evaluation of the Teaching and Learning of Science Subjects in the Secondary Schools

The teaching and learning of science subjects amidst militancy activities is a huge challenge for science teachers in the rural areas of the Niger Delta region (Hamilton-Ekeke, 2017). From interaction with teachers in the rural secondary schools during teaching practice supervision availed the researchers the opportunity to observe firsthand the devastating conditions and incessant disruption of school timetable as a result of invasion of the village by guerilla militia as well as the Federal military trope of Soldiers and Navy. Most of the school boys are enrolled into the guerilla militia and have to drop from school to fight for the emancipation of their fatherland. Science teachers struggle with the coverage of the science syllabus for secondary school science. Teachers themselves are also vulnerable to the recruitment exercise which is usually compulsory and without due consents.

Science students and teachers are also usually coarsen to be involved in the bunkering business because of their science based knowledge which they thought will be useful in the local refining of crude oil. The epileptic nature of the school science laboratories in the rural schools should have been 'blessing in disguise' but then, the laboratories are not spared during such military invasion as they are usually used as local bomb manufacturing factories.

Summary

The paper x-rayed the practical science and the art of teaching and learning in terms of what is to be taught, how is it to be taught, why should it be taught and to whom should it be taught. Using the Ullström (2008) didactic triangular of teacher, student and subject to try and answer

the didactic model questions has thrown more light on how secondary school science teaching can be made interesting to meet the aspiration of the Niger Delta timing youths whose interest is to refine their God's given endowment (crude oil) which is the bane of all the militancy activities in the region.

Conclusion

The most devastating challenge of education in difficult circumstances is the frequent disruption of school calendar as a result of the incessant military activities in rural areas of Bayelsa and Delta States, where schools have to be closed down indefinitely during invasions. Also, the issues of lack of substantive coverage of the national science curriculum for the terminal examination which is the same for all schools in West Africa (West African Examination Council–WAEC) and the nation Nigeria (National Examination Council – NECO) irrespective of where the school is located. The Niger Delta rural region is strongly disadvantaged due to the militancy unrest occurring frequently in the region. So, the frequent disruption of school activities ties to the non coverage of the syllabus. People are in constant fear of their lives and the last thing on their mind is education. Ironically, education is the avenue as well as pivotal force in understanding of resource control which is the bane of the militancy activities in the Niger Delta region. Educational activity is the worse hit of the guerilla warfare. The narrative of militancy which results in the educating of children in difficult circumstances in the Niger Delta region needs to change.

Recommendations

- Some of the Government and private initiatives to develop the Niger Delta region which have been introduced such as NDDC should be strengthened to focus on education in the region not just infrastructural development of the region. Such initiatives include the Niger Delta Development Commission (NDDC) and the Development Initiative (DEVIN).
- A community development non-governmental organization (NGO) should introduce ways of developing the region and be more responsive to the people.

References

Adelfemi, I.V. (2013). Armed society in the Niger Delta, *Armed Forces & Society.* 39 (2): 331–358. doi:10.1177/0095327x12446925.

Akpama, S.I. & Inaja, A. (2006). Combating the problem of street children in Nigeria: The non-formal education option in adult education in Nigeria, *Journal of the National Council for Adult Education* (NNCAE), 11(2): 216-227.

Augustsson, G & Boström, L. (2012). A theoretical Framework about Leadership perspectives and Leadership styles in the Didactic Room, *International Journal of Human Resource Studies* (2)4: 166-186

Boström, L. (2011b). How do teacher-students for compulsory school learn compared to music teacher-students in Sweden? A comparative study of two different student-teacher groups in Sweden. *The Quality of Higher Education*, *8*, 158-179.

Boström, L. (2004). *Lärande & metod: Lärstilsanpassad undervisning jämfört med traditionell undervisning i svensk grammatik* [Learning and method: Learning-style adjusted teaching compared to traditional teaching of Swedish grammar] (Doctoral dissertation, Jönköping University). Jönköping: Jönköping University Press.

Congressional Research Service (2008). Report for Congress, Nigeria: Current Issues.

Dunn, R., & Griggs, S. (2007). *Synthesis of the Dunn and Dunn learning-style model research: Who, what, when, where, and so what?* Jamaica, N.Y.: St. John's University Press.

Grinder, M. (2008). *Managing groups*. Battle Ground, WA: Michael Grinder & Associates.

Hamilton-Ekeke, J-T (2015). Improving self-regulated learning style amongst students, *International Journal of Secondary Education*, 3(6): 6-10

Hamilton-Ekeke, J-T (2017). Cooperative and self-regulated learning styles on students; achievement in biology, *International Biological and Biomedical Journal*, 3(1): 20-25

Hamilton-Ekeke, J-T (2007). Effectiveness of expository and field trip methods of teaching on students' achievements in ecology, *International Journal of Science Education*, 29(15): 1869-1890

Hattie, J.A.C. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London: Routledge.

Hellspong, L. (2009). Förhandling som samtalsdidaktisk modell [Negotiation as a conversational didactic model]. In B. Schüllerqvist, M. Ullström, & S.-O. Ullström (Eds.), *Ämnesdidaktiska brobyggen: didaktiska perspektiv inom lärande och forskning* (pp. 132–138). Karlstad: Karlstad University Press. Retrieved from http://urn.kb.se/resolve?urn= urn:nbn:se:kau:diva-4427 accessed on 1st October, 2017

Hendl, J. (2002). Meta Analýza V Medicínì. Èasopis Lékaøù Èeských 141(8), 235 – 239.

Hogan, C.M. (2013). Niger River, In M. McGinley (ed) *Encyclopedia of Earth*, Washington, DC: National Council for Science and Environment

Ihejirika, J.C. (2013). Predisposing Factors to Life on the Streets: the Case of Out-Of School/Street Children in Nigeria. Implications for Non-Formal Education, *Journal of Education and Practice* 4(4): 125-131

Kansanen, P., Hansén, S.-E., Sjöberg, J., & Kroksmark, T. (2011). Vad är allmändidaktik? [What is didactics?] In S.-E. Hansén & L. Forsman (Eds.), *Allmändidaktik: vetenskap för lärare* Lund: Studentlitteratur pp. 29–48.

Mader, C. E. (2009). I will never teach the old way again : Classroom management and external incentives. *Theory into Practice*, *48*(2), 147–155. doi: 10.1080/00405840902776483

Novotný, J. & Svobodová , J. (2014). Teaching and Learning Science – Theoretical Considerations: how science work, In Pawe3 Cieœla, P. & Michniewska, A. (Ed) *Teaching and Learning Science at all Levels of Education* ISBN 978-83-7271-880-8

Okonata, I. & Douglas, O. (2003). Where Vultures Feast. Verso, ISBN 1-85984-473-1.

Politecnico di Torino (2011). Didactic model draft: a project of the European Commission and coordinated by FOR.COM. available at: https://didattica.polito.it/pls/portal30/sviluppo.offerta_formativa.corsi?p_sdu_cds=81:3&p_lang=en accessed on the 3rd of October, 2017

Schussler, D. (2009). Beyond content: How teachers manage classrooms to facilitate intellectual engagement for disengaged students. Theory into Practice, 48(2), 114–121.
Sochor, A. (2011) Logika Pro Všechny Ochotné Myslet, Karolinum .
Sokol, J. (2010) Etika A •ivot. Vyšehrad, Praha.
Steinberg, J. (2012). *Ledarskap i klassrummet* [Leadership in the classroom]. Lund: Gleerups.
Stensmo, C. (2000). *Ledarstilar i klassrummet* [Leadership styles in the classroom]. Lund: Studentlitteratur.
Strutton, L. (2015). The New Mobilization from Below: Women's Oil Protests in the Niger Delta, Nigeria, A Ph.D. thesis submitted to *New* York University.
Szõke-Milinte, E. (2013). Didactic teaching strategies for successful learning, *PedActa*, 3(2): 49-58
Vopìnka, P. (2012) Velká Iluse Matematiky Xx. Století A Nové Základy, Plzeò: Zu,Koniáš.
Uljens, M. (1997). *Didaktik: Teori, reflektion och praktik* [Didactics: Theory, reflection and practice]. Lund: Studentlitteratur.
Ullström, S.O. (2008). Ämnesdidaktik som bro och vetenskap [Subject didactics as a bridge and science]. In B. Schüllerqvist, M. Ullström, & S.O. Ullström (Eds.), *Ämnesdidaktiska brobyggen: Didaktiska perspektiv inom lärande och forskning* (pp. 10–23). Karlstad: Karlstad University Press. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-4427urn:nbn:se:kau:diva-4427 accessed on the 2nd of September, 2017