

THE USE OF LEARNER ENGAGEMENT IN SCIENCE CURRICULUM DELIVERY

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Accepted 13 December 2017

Learner's individual engagement in science learning process to acquire the relevant skills and attitude is generally very low. To reawaken this consciousness, this paper examines the strategies to encourage science learner's engagement in individual learning process. To achieve this, this paper takes a cursory look at the concepts and application of science, learner's engagement in science learning styles from various conceptual perspectives. The paper thus presents an overview of the relationship between learner's engagement in learning sciences and academic performance. Based on these and their implications on skill acquisition process, the paper proposed strategies on promoting learner's engagement in learning sciences and the teacher's roles in the achievement of the learner's improvement to engagement in learning.

Keywords: Science, skill acquisition, learner's engagement and engagement strategies.

INTRODUCTION

Science and technology, is receiving much emphasis in education because of its significance and relevance to life and society (Nwagbo and Chukelu, 2011). Their importance in this modern world can be felt in the area of transportation, communication, security, banking, healthcare and entertainment.

Science can be defined as the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence (British Science Council, 2009). Science comprises basic subjects such as Physics, Chemistry, Mathematics, Agriculture and Biology.

The major goals of science teaching is to equip the learner with the basic knowledge, skills and attitude that will enable one to lead an independent and useful life, both to himself/herself and the larger community in which she/he lives. Hence, the Federal Ministry of Education (FME, 2009), spells out the major objectives of the biology curriculum which is one of the science subject offered by majority of the students as:

1. Understanding of the structure and function of living organisms as well as appreciation of nature;
2. Acquisition of adequate laboratory and field skills in order to carry out and evaluate experiments and projects in Biology
3. Acquisition of necessary scientific skills, for example, observing, classifying and interpreting biological data;
4. Acquisition of knowledge in Biology needed for future advanced studies in biological science; acquisition of scientific attitude for problem solving;
5. Ability to apply biological principles in everyday life in matters that affect personal, social, environmental, community health and economic problems.

Achieving these objectives therefore means that every citizen must be taught the subject to understand and master all the concepts. Therefore, the study of biology is essential for the nation's scientific and technological development (Nwagbo and Chukelu, 2011).

These objectives are to be achieved through effective teaching and learning process with particular emphasis in learning by doing that reflect real life situation and application.

Learner's Engagement in Sciences

The concept of engagement was introduced mainly to deal with the dropout rates of socially and economically challenged students that were known to be at risk (Parson & Taylor, 2011). In the past, learner engagement was linked to achievement, behavior and a sense of belonging in particular in school contexts, subsequently, the main focus of the concept of student's engagement has changed and the current tends of engagement constitute multiple constructs. Based on this, Parsons and Taylor (2011) identify three main categories based on different purposes and definitions of learner engagement. These three categories represent the shift in the purposes of learner engagement in the last three decades.

- During the first decade, learner engagement was associated with disengaged and disadvantaged students; the students needed help in participation and achievement. Thus, learner engagement in this decade was to reduce the dropout rates.
- The second decade focused on learner engagement in terms of classroom management in order to avoid and reduce classroom disciplinary issues.
- The third decade focuses on learner engagement "to engage students in learning about learning (to help them to become skilled lifelong learners as opposed to well behaved, attentive students)" (Parson & Taylor, 2011, p.9).

Learner engagement is a complex term, which is defined by different scholars in different way and it links important contexts – home, school, peers, and community – to learner's and to outcomes of interest (Reschly & Christenson, 2012). According to Gallup, (2013) learner engagement is a term used to describe an individual's interest and enthusiasm for school, which impacts on their academic performance and behavior. It is associated with positive learner behaviors and attitudes, such as regular attendance, paying attention in the class, and participation in class (that is active involvement in class activities), as well as the psychological experience of identification with school and feeling that one is cared for, respected, and part of the school environment" (Anderson, Christenson, Sinclair, & Lehr, 2004, p. 97). Similarly, Chen, Gonyea and Kuh (2008) stated that learner engagement is the level to which the learners are involved with learning activities and engagement is related to learners' satisfaction and achievement of good grades. In other word, learner engagement can be described as the degree of attention, interest and curiosity learner show during the process of learning which could have a positive effect on their academic performance as well as their attitudes.

It is evident that, learners vary in their level of engagement as they progress through school. Moreso, learners can change within specific aspects of engagement (Archambault et al., 2009).

Engagement and Academic Achievement

The frequent learner disengagement presents a serious problem for education systems, teachers and families both internationally and locally (Bland & Carrington, 2009; Hawthorne, 2008). It was reported by Austin and Benard (2007) that more than 40-60% of low-income, minority, and urban learners are chronically disengaged in school. Prior to dropping out, learners report a process of disengagement from school activities and school demands (Archambault, Janosz, Morizot, & Pagani, 2009). Disengagement occurs for a variety of academic, cognitive and social reasons and has been found to significantly decrease as learners' progress through secondary school and peaks during the middle years of schooling (Jones, 2010). He further states thus:

"It is now well recognized that the middle years of schooling are a time that students disengage from learning, classroom activities, teachers and their schools. Many of our schools and thus the classrooms reflect a factory model of learning and teaching. Students are taught material which for many of them is irrelevant". (Jones, 2010, p.1).

This indicates that, the level of disengagement leads to poor school attendance and a drop in academic performance (Bland & Carrington, 2009). Learners' engagement is therefore necessary for learners to gain knowledge and skills to succeed in post-secondary programs and future careers (Wang & Eccles, 2012a, 2012b).

By understanding the various loopholes schools can actively work together to increase the level of engagement of their learners, and thus, their school success.

Types of Learner Engagement

We have various types of learner engagement, they include: behavioral, emotional, social, academic, psychological,

intellectual, cognitive and institutional. Some types of learner engagement are repetitively addressed in the literature and new categories are added every year including unfolding diverse elements that are associated with this multi-dimensional construct.

Archambault, Janosz, Morizot, & Pagani (2009) identified three distinct types of learner engagement:

- Behavioral engagement includes a learner's compliance to rules and involvement in the classroom and with extracurricular activities.
- Affective engagement includes the experience, feelings, attitudes, and perceptions a student has towards school. Specifically the student's sense of belonging, interest, willingness to learn, and general sense of liking school.
- Cognitive engagement refers to the cognitive functions involved in a learner's learning process.

Since behaviors, emotions, and cognitions are all part of development, it is important to consider all the three categories (behavior engagement, affective engagement, cognitive engagement) when implementing an intervention program (Archambault et al., 2009).

Majority of the research on learners' engagement focuses on the three types of engagement; however while few of the studies focus only on one types of engagement or a combination of two (Fedricks, Blumenfeld, & Paris, 2004; Harris, 2008), but as Fedricks, Blumenfeld and Paris (2004) affirm, all the three types, behavioral, emotional and cognitive are non hierarchical, as they are all equally important.

Furthermore, Wilms, Friesen and Milton (2009) identify three dimensions of engagement as social, academic and as the authors mention, a "newer concept" of intellectual engagement. The authors link social engagement with participation and a sense of belonging. Academic engagement is described as the involvement with formal requirements that are needed for schooling and intellectual engagement is defined as a combination of emotional and cognitive aspects of engagement. Willms, Friesen and Milton point out that intellectual engagement is linked with analytical, higher order thinking skills that help individuals to understand and resolve problems as well as create new knowledge.

Learner Engagement Strategies

The following are some engagement strategies for use with whole groups, small groups, and individual learners. The use of engagement strategies is a powerful teaching tool critical in promoting children's achievement because it;

- Focuses children on learning
 - Supports learning specific skills and concepts; and
 - Provides children positive associations with learning.
- These engagement strategies can be used for different purpose and in different settings. Teacher should;
- Activate prior knowledge
 - Foster active investigation
 - Promote group interaction
 - Encourage collaboration
 - Allow for choice
 - Include games and humor
 - Support mastery
 - Nurture independent thinking

The engagement strategies chosen depend on purpose, teaching style, and the children in classroom. Regardless of the strategies selected, effective techniques is a key to making them work.

Moreover, Jones (2008) proposes an Engagement-Based Learning and Teaching Approach (EBLT) which is based on the three domains, behavioral, emotional and cognitive engagement. According to him, the behavioral domain encompasses habits and skills; emotional domain includes feelings and motivation while the cognitive domain comprises values and beliefs. Highlighting the values of each component, the author identifies several preconditions and practices that are important in strengthening learner engagement in learning sciences.

The preconditions are as follows:

- Learning relationships,

- Classroom environment,
- Rewards,
- Guiding principles,
- Habits and
- Skills

The relevance of these preconditions can be stressed from the point of view that these conditions are comparatively dependent on one another to the overall achievement of an effective learning process. Hence, these preconditions also encourage positive learning process.

The practices include:

- relevant and personalized learning
- learning strategies,
- literacy and
- learning relationship

Lent, (2014) has also suggested practices that will serve as a guide for a positive learner engagement. They are:

- Teachers create opportunities for active rather than passive learning.
- Teachers encourage autonomy and further independence through choice.
- Teachers create relevance in assignments and topics.
- Teachers value and use collaborative learning methods.
- Teachers use technology as a tool to increase learning opportunities and depth of study.
- Teachers employ multiple learning methods and texts.
- Teachers develop lessons and assignments that incorporate both challenge and success.
- Teachers differentiate and scaffold learning.
- Teachers develop a culture of inquiry within the classroom.
- Teachers create authentic assessments and offer timely and frequent feedback.

Understanding learner engagement is essential for schools that want to promote positive youth development (Li & Lerner, 2011). One way schools can proactively work to increase learner engagement is to increase teacher support and engagement in their respective classrooms. Teachers who are engaged are those who show enthusiasm, are concerned with learners' success, and provide academic support for students (Bryson & Hand, 2007). Teachers can show their concern for learners by establishing positive relationships with them. In a nutshell innovative and learner focused pedagogies are therefore of central importance in ensuring that today's learners maintain a positive school experience, gain the maximum benefit from their education and improved their engagement.

Benefits derived from Learner Engagement in School

Many research studies (Skinner et al., 2008, Sinclair, Christenson, Lehr, & Anderson, 2003, O'Farrell and Morrison, 2003) have been conducted on learner engagement and were able to come out with some of the benefit of engagement. These include:

- Learners who are engaged in school achieve greater academic success. (Skinner et al., 2008)
- Learners' engagement not only predicts grades, achievement test scores, and learning; but also predicts attendance, retention, school completion, and academic resilience (Sinclair, Christenson, Lehr, & Anderson, 2003).
- Learners who are engaged in school are less likely to fall victim to potential adolescent troubles. These affirm with the study of O'Farrell and Morrison (2003). They suggested that learner engagement prevents behaviors that are not a part of the school environment, such as substance abuse, risky sexual behaviors, and delinquency.
- Provides learners' sense of belonging at school, which can come as a result of facilitating learner engagement in school activities, gatherings, and access to adults and other learners, influences learners' psychological and academic results in a positive way (Kortering & Braziel, 2008).

CONCLUSIONS

Various research studies have linked positive learner engagement to an increase in school success, a decrease in adolescent deviant behaviors and dropout risk. The three (3) types of learner engagement that is behavior engagement, affective engagement, and cognitive engagement have been discussed briefly. There are also many strategies that can be used to foster learners' engagement and also increase teacher engagement and support. Benefits of learner engagement were also discussed in the paper. However, it is necessary to state here that by understanding the various loopholes that act as barrier to learner engagement schools can actively work together to increase the level of engagement of their learners, and thus, their school success.

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