

Implementation of the Principles of Constructivism and Connectivism

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Abstract

The purpose of the research was to examine how teachers, who have graduated from the University of Trinidad and Tobago, implement the tenets of constructivism and connectivism in their classes. The sample comprised 65 participants who are currently teaching different classes at various localities in Trinidad and Tobago. They were assigned by the Ministry of Education to teach at different governmental and denominational primary schools. A qualitative approach was utilized to investigate the experiences of the teachers who are of varied ethnicity, gender, age and religious denomination. Data were collected using semi-structured questionnaires, one-on-one interviews, and reflective writings. The findings revealed that teachers who applied the principles of constructivism and connectivism felt enthusiastic and derived a sense of satisfaction from teaching and learning. They discovered that students demonstrated improvement in learning. However, teachers experienced constraints and frustrations. It may be concluded that when teachers apply the principles of constructivism and connectivism, teaching and learning become more profound and motivating, resulting in enhanced student performance. The findings can be considered in the revisioning of curriculum for teacher education programmes and by extension, education in general.

Keywords: Teachers, constructivism, connectivism, implementation, experiences

1. Introduction

1.1 Context of the Study

Many teachers, who have graduated from the University of Trinidad and Tobago with a Bachelor of Education degree, are now teaching at various schools throughout the country. They were exposed to different pedagogical and practicum courses, which involved constructivism and connectivism.

1.2 Objectives of the Study

The objectives of the study were to examine how teachers, who are employed in primary schools in Trinidad and Tobago, implement the fundamentals of constructivism, and connectivism in their classes. The research also investigated the teachers' experiences in the utilization of the principles.

1.3 Significance of the Study

Many studies have focused on constructivism or connectivism, but there is a gap in the literature with regard to how teachers, at the primary level, utilize an amalgamation of constructivist and connectivist principles in their daily teaching and learning activities. The study explored the experiences of practicing teachers who are utilizing both constructivist and connectivist principles in their classes on a daily basis. Therefore, the research will inform future practice in teaching and learning at all levels of the education system.

2. Overview of the Literature

2.1 Constructivism

Some studies indicate that the use of traditional methods, which have been tried and tested, facilitate long term memory, while others lament the harmful effects on learners for several decades. Sidney (2015), commenting on traditional methods, suggests that it may be more beneficial if traditional methods are blended with more modern methods to bring about more effective learning. Schmidt, Molen, Winkel, & Wijnen, (2009) outline four components for successful constructivist practice, promoting curiosity and interest, previous knowledge, dialogue with peers/teachers and time for independent learning.

In a report done in Turkey, Ocak, Ocak & Boyraz (2016) revealed that 31 out of 35 studies on constructivism revealed improvement in student learning. Also, in an experimental study conducted in South Korea, Kim (2005) noted that "constructivist teaching is more effective than traditional teaching in terms of academic achievement . . . a constructivist environment was preferred to a traditional classroom" (p.7). However, the same study revealed negative results with regard to self-concept. According to Ames and Ames (1989) in constructivist classes, learning is more motivating, gratifying as well as challenging to students. Other studies demonstrated increase the memorability of knowledge, increased understanding and ability to solve problems.

Duffy, Lowyck & Jonassen (2012) note that the most important learning characteristics of constructivism is that learners can build on their own interpretation of the world, depending on experience and interaction, and that will generate a new understanding through the collection of knowledge from various sources Butvon Glasersfeld (1996) opines that even though knowledge

is constructed from experience, as individualized constructs, “one can never say whether or not two people have produced the same construct” (1996, p. 5).

2.2 Connectivism

Connectivism is a learning theory that explains how internet technologies have created new opportunities for people to learn and share information across the World Wide Web and among themselves (Downes, 2010). In presenting an argument on connectivism, Downes (2007) postulates that knowledge exists across an entire network of connections, and that learning occurs as knowledge connects across the entire spectrum of the network. For learning to occur, actions and experience contribute significantly in making these connections. Hendriks (2016) agrees that children hold positive attitudes towards digital learning methods.

In suggesting differences with the theory of constructivism, Downes (2007) implies that these connections are a natural occurrence and do not rely on language or logic to make meaning or for learning to take place. In addressing the application of connectivism, he suggests the implementation of a pedagogy, which includes modeling and demonstration by the teacher, and practice and reflection by the learner. However, Downes (2010) posits, “we often talk about games, simulations and other events in learning, but these technologies support only episodic learning” (p. 29).

A view of connectivism, which aligns directly with learners in the twenty first century is proffered by Siemens (2005). He believes that teachers who interact with twenty first century learners realize that their thinking has been altered by the various technological tools with which they efficiently interact, thus those who engage in pedagogical planning should take into consideration that these technological connections directly influence the learning experiences of today’s learners.

3. Research Design and Method

The research inheres in the qualitative paradigm as it is appropriate to explore the experiences of teachers with regard to the application of constructivist and connectivist principles in their classes. The study also examined how teachers implemented the pedagogical dogma and ideas of constructivism and connectivism.

3.1 Research Questions

1. How did teachers implement constructivist and connectivist principles?
2. What were teachers’ perceptions of students’ reactions to the use of constructivist and connectivist principles for teaching and learning?
3. What were teachers’ experiences in applying constructivist and connectivist activities for teaching and learning?

3.2 Sampling

The sample comprised 65 participants who are currently teaching at primary schools in Trinidad. The teachers have been assigned by the Ministry of Education (MOE) to teach at different denominational, government-assisted and government primary schools. The schools are located in various educational districts in the country. The teachers belong to different ethnicity, gender,

age and religious denomination. They have been mandated with the responsibility to educate students at varying levels, from Infant Year One to Standard Five, by the respective school principals.

3.3 Data Collection Procedures

Data were collected using questionnaires with open and closed ended questions, one-on-one interviews, and reflective writings. Questionnaires included both open-ended and closed-ended questions to allow participants to elaborate on their experiences. One-on-one interviews were conducted for two terms of the academic school year. The number of participants in a focus group depended on how many graduates were employed at a school. For instance, there were six persons at a particular school but only one at another. However, the variation in the composition of the focus groups allowed for more in-depth information and a robust analysis of data. Teachers were asked to reflect on their experiences by engaging in journal writing on an ongoing basis in their various classes. Interviews were audio recorded, having gained the consent of participants. The procedures enabled triangulation as well as established authenticity of the data.

3.4 Data Analysis

Data were analysed on an ongoing basis from inception to examine the experiences of participants. According to Miles, Huberman & Saldana (2014) data collection and analysis should be conducted concurrently. It helps the field-worker cycle back and forth between thinking about the existing data and generating strategies for collecting new, often better, data (Miles, Huberman & Saldana, 2014). Data from the questionnaires, interviews and journal writings were compared to substantiate the credibility of the information. The interviews, which were transcribed verbatim, were read reiteratively to capture the experiences of participants. In some instances, information had to be clarified in subsequent interviews.

The analysis included developing codes by linking common ideas together. The purpose of coding is to determine “repetitive patterns of action and consistencies in human affairs as documented in the data” (Saldana (2009, p. 5). A cadre of categories was formulated by combining commonalities and recurring patterns. In the process, codes of a similar nature were integrated and redundancies were reduced. Data were then re-categorized and re-classified, to discern the essence of meaning. Emergent themes were then gleaned based on additional readings. Literal remarks are reported below to demonstrate the themes that evolved.

4. Themes

The verbatim remarks of teachers have been explicated for each theme, to ensure credibility. Teaching and learning go hand in hand, therefore self-reflection, and self-evaluation are important considerations, that were outlined. The themes that emanated from the data include 1. **The constructivist and connectivist Commingle** 2. **Commentaries on students’ reactions** 3. **Teachers’ emotive expressions.**

4.1 Theme 1: The Constructivist and Connectivist Commingle

Teacher 1.1: *I incorporated both inquiry-based learning and cooperative learning . . . into the majority of my lessons . . . With the use of scenarios (scenario-based learning) . . . students were required to brainstorm and collaborate ideas, in order to formulate*

answers to questions, concoct and enact skits, and also propose solutions to problems . . . I integrated technology into my set inductions, as well as my lessons . . . I utilized videos and songs which engaged the students and grasped their attention.

Teacher 1.2: *I used teaching and learning strategies such as cooperative learning, inquiry based learning, discovery learning and problem and project based learning . . . In most of my lessons I used powerpoints that catered to different types of learners and at times had videos and demonstrations. . . I also used games and integrated technology . . . they had to do an E-portfolio.*

Teacher 1.3: *In one of my lessons, I integrated Think-Pair-Share, a cooperative learning technique, that required students to think thoroughly and then write down their own definitions . . . The students then paired with one or two students to share their responses and compare the similarities and differences in their definitions . . . the students then morphed into a whole group discussion which enabled the class to create a 'consensus' definition . . . By integrating technology in my lessons I enhanced the learning process for students, I incorporated a powerpoint to teach . . . using graphics, videos and diagrams which improve clarity so students would better understand the concepts and content. This sparks the interest of students by keeping them fully engaged in the lesson.*

Teacher 1.4: *Cooperative learning was one of the strategies I used most often. Students were placed in groups of four to work on specific tasks . . . Students were engaged in discovery learning, examined a model . . . with discussions . . . Internet technologies enabled me to get lots of ideas to incorporate into my lessons . . . to make it as interesting and appealing as possible, as well as effective . . . I used videos, charts, pictures . . . models . . . cooperative learning . . . discovery learning with different modes of representations . . . It allowed students to feel trusted, independent and made lessons more interactive.*

Teacher 1.5: *I encouraged peer learning . . . I involved my students in cooperative learning and discovery learning . . . I had them do experiments in groups for themselves . . . I also incorporated problem based learning in my lesson . . . I prepared power-points and videos, which had captured the students' attention and also made them think . . . learning was definitely taking place . . . it definitely piqued students' interests.*

4.2 Theme 2: Commentaries on Students' Reactions

Teacher 2.1: *The students were very enthusiastic to participate and learn the lessons . . . Multiple students admitted to enjoying the lessons and working with their peers to do activities.*

Teacher 2.2: *Students worked willingly . . . worked in togetherness and had fun working with each other . . . students were eager and excited.*

Teacher 2.3: *Students were amazed with the animated, educational videos, and the children loved them and paid close attention . . . they were excited.*

Teacher 2.4: *My students were very enthusiastic to learn and preferred group work . . . they became more expressive . . . they were able to reflect and process the experiment among themselves and learn from each other.*

Teacher 2.5: *Students were amazed with technology, animated, videos and graphics . . . the children loved it and were attentive.*

4.3 Theme 3: Teachers' Emotive Expressions

Teacher 3.1: *Personally, I enjoyed applying constructivist and connectivist activities for teaching and learning in the classroom . . . I was thrilled to see students enjoying new experiences.*

Teacher 3.2: *I was satisfied that that most of my students did understand fully what was taught to them . . . I observed there were students teaching students . . . peer tutoring. I saw the challenging students excel . . . because of interactive lessons.*

Teacher 3.3: *Engaging in a lot of constructivist activities and strategies have made my teaching and learning experience an enjoyable one.*

Teacher 3.4: *Personally I enjoyed being able to go from traditional teaching strategies to ones that were more student-centred (constructivist) and ones that were able to keep my students interested in the entire lesson being taught rather than just the few first few minutes.*

Teacher 3.5: *I felt elated when the method (cooperative learning) contributed to meaningful learning as students showed more willingness to share their ideas with the entire class . . . and when they were permitted to consult with other colleagues . . . I was blown away by the amount of knowledge they executed.*

5. Hindrances

The participants also explained that they experienced challenges, constraints and hindrances. Some verbatim remarks that explain the problems have been outlined below.

Teacher 1: *The issues faced when incorporating constructivism in the classroom included classroom management, as the students took time to settle, subsequent to forming groups, which allowed the noise levels to increase for some time . . . Sometimes they got excited and the classroom became very noisy.*

Teacher 2: *Songs and videos were previously downloaded onto my laptop because of the limitation of internet access at the school. Unfortunately, I was unable to incorporate online games because of the lack of internet access.*

Teacher 3: *Some of the activities were time consuming in terms of implementing them in the classroom and also in planning how to utilize these approaches . . . they definitely required assertive classroom management . . . some students were a bit disruptive.*

Teacher 4: *A few students complained that their peers were not cooperating with them and wanted to complete the activity on their own . . . there were students who did not want to work with each other.*

Teacher 5: *They were egocentric . . . got distracted quickly by the technology and wanted to see more and sing along, so it was a bit difficult to draw back their attention to work.*

6. Reflective Writings

Reflective writings are always necessary to discern commonalities and connections with information as well as to unearth experiences. Some reflections that teachers wrote are shown below.

Teacher I: *Personally, I am enthusiastic about the student centred strategies and using the technology . . . I felt comfortable and I kept my students interested in the entire lesson.*

Teacher II: *As a teacher I will be always be implementing problem based learning in my classroom. I used the constructivist approach for my teaching strategies. It is also important to apply connectivism in teaching and learning, as student learning is enhanced.*

Teacher III: *As a constructivist teacher, I encourage students to constantly assess how the activity is helping them gain understanding, especially when I integrate the technology.*

Teacher IV: *I felt satisfied that most of my students understood what I taught them . . . I got them thinking deeply and they were very interested.*

Teacher V: *I enjoyed using these two theories in the classroom and I will definitely use them in in my lessons in the future.*

7. Findings and Discussion

All participants indicated that they utilized a combination of constructivist and connectivist principles in their classes to optimize learning so that students may construct their personal meanings and interpretations. Some strategies teachers used in their classes included cooperative learning with peers in heterogeneous groups; discussions with real-life examples and reflections; inquiry-based learning with exploratory questioning; discovery learning with experiments and different modes of representations; problem-based learning with investigative solutions to complex ill-structured questions; and project-based learning that required collaboration and independent research. The findings revealed that teachers integrated the principles of constructivism and connectivism for teaching and learning.

Teachers indicated that the constructivist strategies blended with active engagement and the use of technology, using videos, powerpoints, graphics as well as games and simulations provided meaningful learning for students. They provided appropriate resources and authentic tasks for students, for example, experiments and hands-on learning. They found that students were responsive to the student-centred approach, as advocated by constructivist theorists, such as John Dewey and Vygotsky. They established that learner-activities, interactions and a conducive environment are important considerations in the constructivist/ connectivist realm.

The implication is that teachers must have an awareness of the significance of student-centred learning and student involvement and develop a consciousness of constructivist and connectivist principles on how students learn and construct knowledge. Memory is facilitated based on previous knowledge and accommodation or adaptation of new situations through various activities. They must be cognizant not only of the methods of teaching and learning to meet individual needs, but also the learning environments. Jonassen (1999) argues that learning environments should offer constructive, active, intentional, collaborative, complex, conversational, contextualised and reflective learning.

Even though it was inferred, none of the participants mentioned the cultural context, which is one of the key elements that must be taken into account in the constructivist paradigm. It means that teachers have to rethink and reflect on their personal conceptualizations of constructivism.

In addition, Jonassen (1991a) who outlines three stages of learning: introductory, advanced and expert, argues that introductory knowledge acquisition or concept learning is more aligned to the behaviourist paradigm. Sidney (2015) agrees with this perspective. However, in this study, teachers did not indicate whether they encountered challenges with regard to the teaching of concepts in the constructivist or connectivist mode, neither did they state whether some students had difficulty in transferring and applying knowledge to solve problems.

8. Conclusion

Conclusions drawn from the findings are that teachers are comfortable with the implementation of the pedagogical principles of constructivism and connectivism. Their experiences revealed that they felt enthusiastic and derived satisfaction from teaching. Learning was optimized as they saw improvements in student learning. But, practice was constrained because of issues like limited resources and access to the internet. In some instances, teachers complained about the physical environment that is not very conducive to learning, for example, overcrowded classrooms and open-spaced environments where there were multiple disruptions, since all classes were visible and voices were audible. It means that teachers and learners have to adapt to the particular school environment.

Future research may be conducted to validate whether constructivism supports more complex learning, whether tiered learning and differentiated instruction should be amalgamated to maximize students' potential.

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