Mathematics lessons for slower learners in secondary schools in the Caribbean using the LAMS platform

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This paper explains how teachers/facilitators and students/learners can work together on the Learning Activity Management System (LAMS) platform to facilitate conceptual learning in mathematics, with the primary view of assisting slower learners in the Caribbean region. It is a monumental undertaking to teach or be a facilitator to thirty to forty students (15-16years old) after three years of secondary education and *simple* tasks of applying the four rules on fractions cannot be conceptualized and simplified. There is not enough time using face to face learning to ensure that these concepts are attained in order to write a high stake examination. It is therefore essential to have such students engaged in diverse processes of constructing their own concept representations. Teachers are encouraged to prepare students to visualize concepts during their study time. It is hoped that with this new design and approach to learning that mathematical instruction would be transformed and that, as students and teachers move towards a fresh and innovative paradigm shift, students will truly be responsible for their own learning and teachers can act as facilitators and motivational specialist.

Introduction

For the past two decades, the notion of inclusion in education for all, have left individual governments throughout the world grappling with striving to make adjustments and decisions on implementation policies to accomplish this objective (Jomtien, 1990 & Dakar, 2000). The Dakar (2000) final report by UNESCO states, "Inclusive education is commonly and rightly associated with the mainstream participation of learners with impairment and categorized as having special educational needs" (p. 3). Governments of the Caribbean and their education ministries are presently finding it difficult to adequately transform classroom instruction to include all types of learners, as they struggle with new taskforce findings to transform and employ strategies suited for their curriculum and unique education requirements (Barbados Education Policy Paper and Task Force Report, 1993-2003, Jamaica Task Force Report on Education Reform, 2004 & Trinidad and Tobago ICT Report, 2005). It is because of the above environment in the author's teaching experiences in Trinidad and Tobago that this paper was conceived. To attempt to teach or facilitate slower learners or students with special needs, additional instructional support should be crafted, negotiated and utilized to support the normal curriculum. The LAMS platform presents one of these resources which can be employed for mathematics instructions.

The Impact of Inclusion and the LAMS on Slower Learners in the Caribbean

Inclusion in education produces a gamut of significant challenges and situations which were known but remained dormant in the Caribbean elitist primary and secondary school system (Fergus, 2004, Benanot & Braslavsky, 2007 & Wolff &Castro, 2000). The Dakar World Education Forum for All (2000) describes and classifies slower learners when it states that:

> It follows … that inclusive education, as defined in this study, is not solely concerned with learners with impairments, those who are sometimes referred to as disabled or handicapped, although the full inclusion of those learners is a central concern of this report. This report is concerned with ways of identifying and overcoming all barriers to learning and participation, experienced by all learners, vulnerable to exclusion or marginalization from full, successful and quality educational participation. This view of educational inclusion involves a holistic, dynamic

and complementary focus on all learners and learning centres, education systems and their personnel, communities and societies, as well as the underlying value systems, which are the cause of exclusion. Inclusive education is thus about achieving the basic human and civic rights of all, including those with physical, sensory, intellectual or situational impairments, through the creation of inclusive policies and practices at all levels of education systems, their values, knowledge systems and cultures, processes and structures (p. 5).

In" learning Disabilities - From Identification to Intervention" (Fletcher, Lyons, Fuchs & Barnes, 2007), in response to effective intervention, it was concluded that mathematical disabilities not only include skills instructions but a focus on self-regulation. LAMS produces this self regulatory experience. For example, at Waterloo Secondary School, Trinidad and Tobago, where the model and initial design of using LAMS was introduced to Fourth Form students (15 and 16 year olds) who are considered to be slower learners, it was with the view of these learners taking responsibilities for their learning. The learners were excited and elated by the possibilities the LAMS conveyed when it was explained and they saw how it can assist them to understand their work and move forward. This they exclaimed will work to their advantage. Only days before its injection, these students were so divorce from participating and engaging in the learning of mathematics. Suddenly their face lit and they were ready to work towards understanding the mathematics curriculum placed before them. This said class has thirty-two learners and although some of them have varying learning disabilities they are still expected to write a final examination at the end of five consecutive years of secondary education. Five of them are classified as slower learners by the local Ministry of Education based on a high stake final examination at age eleven. This virtual personal learning environment, LAMS, they further commented, would remove them at times to a world they can learn without the embarrassing stigma of being slower. The facility of the social-networking interactions it presents through chatting was a welcome addition. They even saw learning as being fun, some of them for the first time. Thus, they can be with other learners and their facilitator sharing and repeating certain tasks at their own pace. The web-based approach also meant that at certain times after school and from their homes, interactive communication was possible. The use of the personal learning environment of the LAMS platform did what mathematics teachers cannot do, which is to repeat over and over again what is to be done.

The countries of the Caribbean and Latin America are signatories to the Dakar Framework for Action (2000), which stresses formulating a plan of action so that each country can achieve the ideal of quality education for all by the year 2015. Most countries are committed to meeting the obligation and have created similar slogans. The following is a list of some of them:

> That every child has the ability to learn and that we must build on this positive assumption… That every child has an inalienable right to an education that facilitates the achievement of personal goals and the fulfillment of obligation to society … ICT in education would enhance human capacity, dynamize the teaching/learning environment, and in addition to providing equity and access would create an environment that encourages creativity, critical thinking, and decision-making … (Ministry of Education, Trinidad and Tobago, 2004).

> To ensure the equity in the delivery of education, taking the special needs of each student into consideration… To continue the enhancement of the teaching and learning process through the integration of information and communication technologies… (Ministry of Education, Barbados, 2005).

> Every child can learn … every child must …All children, young people and adults have the human right to benefit from an education that will meet their basic learning needs in the best and fullest sense of the term and education (Jamaica Task Force, 2004).

> The National Strategy for Special Needs Education will focus on putting children with special needs into the mainstream of education (Guyana, 2001-2010)

Despite all of the above theory and good intentions to deal with the inclusion affair, there has been no practical national policy on how teachers should deal with the whole issue of inclusion. What prompted the author to begin searching for alternative resources for this particular Form Four class was because of

the needy, desperate and sad look of the students' faces as they were   unable to follow the lessons being taught on the whiteboard. Schools, departments and teachers in their individual institution try to hammer out local ways and means of strategically designing lessons and events to assist their slower learners. Throughout Caribbean schools the author has asked teachers about how their countries deal with inclusion. The answers were all similar as none boasted of any practical policies concerning having workshops and retraining to attack this new initiative of inclusion. They did say though that inclusion was common knowledge and a positive move. These are some of the answers that some Caribbean teachers gave when ask about how they deal with teaching/facilitating slower learners:

> Whenever we observe that there are slower learners we try to have two teachers in the class to assist, but this is not always possible... There is no national policy or proposal that I know about to assist with teaching slower learners (Barbados teacher).

> I am not a trained teacher to deal with slower learners. Let the ministry get someone to deal with their dirty job... I have to be trained and the ministry of education does not have any plans soon, if any, to assist with this issue (Trinidad and Tobago)

> We don't have slower learners. What we have is lazy and irresponsible students, teachers and parents... I do agree that I should be retrained to deal with all types of learners (Jamaica).

The above is just a sample of answers which were noted and demonstrates the trend among educators concerning the inclusion process.

Challenges and Constraints

Research has shown that there are many students/learners with learning disabilities in one form or the other and could constitute about one in every five students (Fletcher et al., 2007). This could mean that in a class of thirty students there can be at least six students with learning disabilities, which may be rendered as slower learners. Fletcher et al. also postulates that there are difficulties in defining who among us has learning disabilities and that this can be further broken down into individual subjects, such as mathematics. The bigger problem he states though is in implementing best practices:

> Many interventions demonstrate efficacy when they are studied in controlled environments. However, when the interventions are translated into everyday practice in complex school and classroom settings, fidelity suffers, and contextual variables such as teacher preparation and commitment to the intervention, composition and adequacy of resources dilute the efficacy that is apparent in a more controlled research setting. (p 261)

This is a major challenge and interventions will only be as valuable and successful as the fidelity with which they are implemented. Policy makers, administrators and finally teachers need the tools to help build classroom contexts which will buttress and maintain positive instructional practices (Vaugh & Fuchs, 2003). The LAMS could be one such tool which with its monitoring capabilities assists slower learners in mathematics and other subject areas. Bentum & Aaron (2003) study of several hundred of students using resource rooms saw no great improvement with learners. Thus, it is important that teachers/facilitators know how to motivate and show efficacy for technology to be a factor. The technology as intervention by itself will not suffice.

Government education ministries must provide the necessary training and resources to assist teachers and students in developing skills to ensure they are adequately equipped to participate fully in technology integration. This will be necessary in order to have teachers equipped with basic computer technology skills. In 1995, the Congressional Office of Technology Assessment, in the United States of America, produced a landmark report - "Teachers and Technology: Making the Connection" - which revealed that most teachers did not feel prepared to use technology effectively (Poplin, 2003). In 1998 a two year project with 160 K-12 teachers was embarked upon under the banner of: "Applying Technology to Restructuring and Learning" with the aim of helping teachers create learner-centered learning environments supported by technology (Doering, Hughes & Huffman, 2003). Lloyd & Gressard (1986) illustrated that teacher's positive attitudes toward computers are positively correlated

with the extent to which they are willing to use technology in the classroom. They contend that with familiarity, anxieties and fears tend to decrease, and confidence increases. Thus, this is the reason why it is critical to have teachers competent in using educational technology tools because they are the major player in the instructional process.

Also, in the United States, a great deal of funds has been spent to place computers in their schools over the past two decades. It was estimated that the total cost of technology in U.S. schools as of the late 1990s was approximately $3 billion (Coley, Cradler, & Engel, 1997). As plans are continually made for the increased use of technology, it is imperative for policy makers, educators, and researchers to appreciate and realize how teachers and children relate to this technology. The U.S. Department of Education has emphatically recommended that districts allocate 30% of their technology budgets to staff development activities. With such a substantial projected increase in funds allocated to technology staff development, it is only fair and necessary that studies be done to determine what types of teacher education and re-education may lead to effective use of technology in the classroom.

It is important that Caribbean countries do not fall into the same dilemma as their American counterparts but create the culture and environment for teachers to feel comfortable and competent to use technology in their teaching and learning. It is only when they can experience the ultimate value of ICT in education that they can be motivated to use and have their students engage in it for their own good. It was during the 1980's when the author was an undergraduate student that he experienced a physical personal learning environment-type experience. The author, along with many other students, attended remedial classes on the university campus when they of themselves taught they lack certain academic skills in grammar and basic mathematics. The available technology was printed material (booklets) and a tape recorder with cassette tapes. This perception has become the mission of the Open School movement, which is to make learners responsible for their own learning (Jomtien, 1990). The LAMS provides such a platform and can be accessed anywhere there is internet access.

A major constraint can be the availability of internet access and computers in some instances. Most of the students and parents needing help with this scheme may not be in a position to purchase computers and they will have to depend on the school for access to the LAMS. Even so, principals and other administrators must see the worth of the LAMS and what it can do and mean for these slower learners. They will have to make the adjustments to timetabling to facilitate this new insertion.

Despite the constraints and challenges in Caribbean schools of insufficient computers, timetabling, teacher training and retraining via workshops and administrators coming on board, technological intervention is a worthy endeavour.

The Design

The example which follows is based on what happened in September, 2009, at a secondary school in central Trinidad, West Indies. Most secondary schools in the Caribbean are similar in terms of classroom instruction, as they all prepare for the same form and type of final assessment – the Caribbean Examination Council's (CXC) and/or the Cambridge General Certificate of Examination (GCE). They are both high stake examinations. Thus, the LAMS can be used anywhere with the teacher's innovation to improve the skills of their slower learners.

The first task I engaged in to introduce the LAMS software to the learners of my Form Four class at Waterloo Secondary School, in September 2009, was to speak to them about where they were in their mathematics experience. This was based on a needs analysis. The session was honest and there was much interaction between the facilitator and the students. Then the way forward was proposed with the LAMS platform and its version of a personal learning environment. The students were told that they will be shown how to use the interface and that lessons and homework will be placed there for them to use. The monitoring aspect is an important aspect as sometimes this can be used to verify if they were doing what is expected of them.

The use of MOODLE and other web 2.0 software which can be used with LAMS will be introduced as the sessions continued. Throughout the school's term there will continue to be formative assessment to

observe if learning of the concepts are taking place. The use of videos, graphics, interactive web-based educational software, chatting and synchronous interactions will be used after school to add to the face to face sessions. It is hoped that at the end of the school year that seventy-five percent of the basic mathematical skills are competently conceptualized.

Conclusion

Mathematics education is essential in today's world of academia. In the Caribbean, students are expected to be successful in passing mathematics after 5 years of secondary schooling. Inclusive education places on teachers the added tasks of preparing for yet another type of learner. There is a great and diverse amount of technology to choose from to assist teachers/facilitators. The technology in and by itself cannot bring about these changes. Students must be convinced that they are lacking certain necessary skills and that they are responsible to acquire them. LAMS provides a tool which can be introduced to remedy and assist learners and teachers overcome these challenges. Personal learning environments are the way forward and LAMS with its authoring and monitoring features are a welcome addition to both teachers and students.

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Please cite as: Warner, S. (2009). Mathematics lessons for slower learners in secondary schools in the Caribbean using the LAMS platform. In L. Cameron & J. Dalziel (Eds), *Proceedings of the 4th International LAMS Conference 2009: Opening Up Learning Design.* (pp. 116-121). 3-4th December. 2009, Sydney: LAMS Foundation. Retrieved from: http://lamsfoundation.org/lams2009sydney/papers.htm