Inflencing Action Plan

"The Use of Manipulative in teaching Mathematics"

Course: EDCI613-50

Introduction

Ellis a Jamaican educator and author in her book "Inside Jamaican Schools' clearly gives an understanding of what school is and the purpose it is expected to serve. "School is the major social institution that prepares youth for the adult world and particularly for the job market. Because of this common school experience that all the youths in most societies undergo, school is seen as having the potential for integrating and unifying elements of the society through exposure to a common curriculum and to common ideas and ideals (P8).

It would seem however to a very large extent that schools have fallen short in its ability to fully deliver on the purpose for which it is intended. They have lost sight of the fact that students have different learning styles and as such should be taught accordingly. They have also failed to recognize that young children more than all learn better when they are able to touch, manipulate, build or do things.

According to Van De Wallen (2004) to construct or build something in the physical world requires tools, materials and effort. How we construct ideas can be views in an analogous manner. The tool we use to build understanding are our existing ideas, the knowledge that we already possess, the materials we act upon to build understanding may be things we see, hear or touch – elements of our physical surrounding.

As teachers we want our students to remember us as the kind of person who impacted them positively. This can only be achieved through our actions, our thoughts and most importantly the lesson we have taught. The way we teach must help students gain better understanding of the world in which they live and to become worthwhile citizens. We must apply all the necessary strategies such as the use of manipulative to help develop students' understanding of concepts that seem to appear disjointed, isolated and abstract.

I choose this area for writing influencing action plan as I realize from observation that many of my colleagues at school were struggling with how to deliver mathematical concepts meaningfully that students could understand. This reflected in the poor performance of our

students at benchmark examinations such as the GAIN, (numeracy component of GFLT). Another striking feature was the failure of upper primary (Grade 4-6) teachers to incorporate in their lessons the use of manipulatives to reinforce lessons and to connect between them and the real world. Lastly, there are those colleagues who will attempt teaching the subject but would prefer to be on the safe side, so in order to not take the risk of the use of manipulatives with which they are not comfortable with they stick to "play it safe" by using the old chalk and talk approach.

Situation Analysis and Perspectives Taken

Description of the Situation from My Perspective:	A description of the situation from other perspectives:

It is my belief that most students and adult inclusive of myself have a morbid fear for the subject mathematics. When asked what is your favorite subject one will be flooded with responses for all other subjects except Math. They would also response with a multiplicity of reasons for their fear or dislike of the subject: • The teacher can't teach. • The teacher doesn't understand it/can't explain it. • It's boring. I have recognized that the school in which I teach has a number of teachers who are specifically trained in other disciplines e.g. Home Economics, Business etc. where it is compulsory to teach all subjects. Not having training in Math allows for a poor delivery of the content in a meaningful way to students. I also call to mind my own experience in high school where my Math teacher told the class who could not cope then we should back out. This I did but vowed to myself that I would never do the same to anyone. We see also, these teacher who have received training but lack the confidence to approach the teaching of mathematics beyond the early-primary grades. Teachers at all levels should be cognizant of the importance of the use of manipulatives particularly in the teaching and learning process of mathematics to young children to improve their understanding of the concept	• It is a generally accepted fact that there exists a crisis in mathematics within our nation. According to a 2013 news paper report the Minister of Education at a press meeting stated that there is a crisis as we still have much ground to cover to attain the target for mathematics set by the National Education Strategic plan. The minister stated that for the year 2012 and 2013 mathematics can improve in single digits (Observer April 2013). A Jamaica Observe report stated that only 49% of the total population of 60,000 students achieved mastery in 2011 GSAT. (Observer Thursday July 7,2012) • Teachers are of the view that they learnt mathematics through traditional method and as such they see nothing wrong with it. • Parents have expressed their inability to help their children with home work as they do not understand the concepts. • Teachers view the use of manipulatives in teaching mathematics as time consuming while others feel it is cumbersome and yet there are those who are not very versed in the use as aid to reinforcing concepts. • Most students view mathematics as a waste of time or as boring and as such show reluctance in learning it. • Parents have expressed grave concern in the low numeracy rate a problem not just in my school but across the educations spectrum. It is the a general consensus however that this problem lies in the way that mathematics is being taught in our schools.
Investigation/Research	
Current Information about the Issue. How do I know it is a problem?	**How do I know it's a problem?**
In accessing the school's performance in the General Achievement in Numeracy (Grade 4 Literacy/Numeracy Test) for the last 4 years 2010 – 2013 the percent mastery for each years is as follows: 2010 – 40%; 2011 – 22%; 2012 – 41% and 2013 – 55%. Only in 2013 there was significant growth. In comparing literacy	From frequent visits to classroom and observations it is evident that the non-use of manipulatives in classes is a problem. The proof of this: • From observation only four of the thirteen classes display manipulatives (grades 1-2)

average to that of the numeracy for the same period students seem to have done exceptionally well. GSAT 2013 50% gained below 50% 2012 34% gained below 50% 2011 47% gained below 50% 2010 42% gained below 50% The results as shown in the benchmark examinations are that evidently a problem exists in the way we teacher mathematics at this school. Others include: • The absence of easily found materials that can be used as manipulative is one major factor. • Teacher competence in the use of manipulatives serves also as a factor to the problem. • The lack of frequent in-house training to build teachers confidence as well as to address of Math. • The stigma attached to mathematics.	• Only a minority of students have access to the math resource room, mainly at club meeting or preparation for competition. • Students in other classes do not have access or even use manipulatives. • Students' failure to make connection between mathematical concepts and the real world.
Ideal Outcome	
• Consistent supervision and monitoring of teaching and learning in the class room. • Hold frequent training workshops that demonstrate and promote the use to manipilatives in class. • Provide adequate manipulatives for use in classes. • Revamp mathematics club so that students will have a sense of purpose and increase interest. Let it be an avenue for students' learning. • School wide campaign to encourage teachers to use manipulatives to support the teaching and learning process.	
Existing strategies and programs currently being used to address this issue:	
• Existing math club but only a minute portion of the population is catered to. Due to space and time constraint. • A small number of students who have interest in mathematics are (trained) coached for competitions such as the UWI Math Olympiad. • Common Planning Time sessions are held but only if teacher are having differently with a particular strand then it is discussed. • Teachers' attendance at MOE Regional Math Workshops. • In-House presentation where teacher who attend MOE workshop train other colleagues.	
Benefits to Constituents	
• Students love appreciation and understanding of the subject will increase.	
Action/Steps: What strategies would you use to remediate the issue?	
Structure a series of meetings that would involve all stake holders – PTA, Board, Staff,	

community organizations, service, clubs etc. to sensitize them to the problem, drum up support, and solicit possible solution.

- Seek support/sponsorship cash or kind from business entities and service clubs.
- Explain issue to the Ministry's Professional Development Unit and seek their help in staging professional workshop to address the situation.
- Identify Curriculum Implementation team to review the math components of curriculum for all grades. List possible type of manipulative that could be developed.
- Sponsorship from business entities and service clubs to help in the provision of manipulatives.
- Local/community to sponsor indigenous manipulatives.
- Refurbish math resource room and make available to students and teachers.
- Introduce virtual manipulatives to students and teacher by equipping resource room with at least one computer.
- Have frequent review meeting to get feedback.
- Curriculum implementation team carry-out at least one "walk through" per month

Identify obstacles, unintended consequences or related problematic issues that must be addressed:

- The unavailability of time for same constituent to meet.
- Funding/sponsorship for provision of resource and materials e.g. manipulatives
- Unwillingness of some teachers to come on board
- Negative influence/impact of some teachers on others.
- Unwillingness of some teachers to participate in frequent meeting, workshops and training sessions.

Steps that will be taken to initiate change:

- Meet with principal to outline plan of action and seek approval.
- Meet senior teachers and grade coordinator to sell the plan and gain support.
- Prepare materials including procedure for implementation, research materials etc for distribution to senior teachers and grade coordinators.
- Strengthen role functions and scope of Math club to serve wider cross section of school community.
- Curriculum implementation team to be mandated to give oversight and support to staff and carry out assessment and give feedback.
- Contact Ministry of Education Professional Development Unit for scheduling of training and workshops.
- Establish math corners for teachers and students.
- Mounting of displays.

How will implementation be encouraged measured and the effects of change assessed:

- Use of school bulletin; notice board and school intercom.
- Forum for brain storming, discussions and feedback.
- Workshops demonstrating the use of manipulatives in teaching math.
- Encourage question and answer sessions.
- Lesson observation and walk-through to ensure and encourage the use of manipulatives especially in mathematics classes.

- Use PLC to promote manipulatives use in classrooms
- Students' assessment and comparative date.
- Provide incentives

Lesson plans, vetting test items and organizing training workshops for teachers as well as conducting teacher appraisals on a timely basis. Having these to carry out these tasks allow me to have firsthand knowledge of the quality of teaching that is done within the classroom.
Interesting to note that the use of manipulatives in the classroom was actually non-existing. The schools' mathematic resource room with all materials and manipulatives remain closed. The school's math club is nothing but a bunch of students gathered in a holding area on a weekly basis with no sense of purpose. Students' performance in the Grade Four Literacy and Numeracy Test for the past three years has improved only marginally.
In carrying out these administrative function revealed that the majority of teacher didn't use manuipulatives when teaching mathematics.
My personal take is that student's failure to learn and understand these concepts was the result of the teachers' failure to incorporate the use of manipulatives in their teaching.

Specific examples to illustrate the situation and the various perspective:

- Teachers' inability to adequately use manpulative in the teaching/learning process.
- Students' poor understanding and failure to make connection subject to the real world.
- Peoples' general fear of mathematics.
- Teachers believe that manipulatives are cumbersome, take up space and time consuming.
- Teachers performance for traditional chalk and talk method.

Research regarding the issue of program what strategies does research identify that have successfully solve or address the problem:

- In a survey done by Micaael Achile Umunah of the University Nigeria (2011) According to Umunah (2011) of the University of Nigeria a good math teacher will so digest or absorb all the available methods comprising the good points of all the methods. He will not permit all the methods to become his master but remain a true master of them all. One of the consequences of over dependence on foreign approach to teaching math he says is the seeming lack of basic math principles which result to not learning and low achievement in math. Attempts to address this problem have necessitated the fact that teachers should evolve strategies that will ensure active participation of learners.
- There have been several studies on instructional material and academic achievement. Umunah (2011) further stated the work of other researchers, their findings show the schools with adequate instructional performed better than those with inadequate instructional materials. (Moronfola 1982, popoola 1990 and Momah 2010)
  Many studies show that use of concept materials can produce meaningful use notational systems and increase student concept development.
- In a comprehensive review of activity-based learning in Mathematics in Kindergarten through Grade 8. Suyden and Thiggins concluded that using manipulative materials produce greater achievement gain than not using them.
- According to an online article Math by Month manipulatives supports students learning. There is no substitute for firsthand experience. Along the same line manipulatives give students ways to construct physical models of abstract mathematical ideas. Ideas exist in children's mind, and manipulatives help them construct an understanding of ideas that they can then connect to mathematical/vocabulary and symbol. What math manipulatives

do:

- Build students confidence
- Useful tool to problem solving
- Make learning math interesting and enjoyable
- Makes abstract concrete (Math by the Month)

Manipulatives are the way to our future and the way to new knowledge. Mathematics is changing all the time there children in today's classroom deserve to have that extra tool to help them grasp the concept; in order to form mastery in math.

- Roy and Roy (2006) manipulatives are everywhere we turn. The research has provided several examples that various researchers have implemented to enhance learning through the use of manipulatives.

  Flagella and Hayes (1988) believes that "our role, as adults is to help each child recognize mathematical situations in their activities and encourage the children to apply their knowledge and experience to any problem that occur (p.9). These activities involve to help students solve the given situation or problem. The researcher provides evidence that the use of manipulatives is significant to students achievement Van Cleven (1991) he states claims should be a fun experience and encouraging desire to investigate topics involving math with unique strategies and with less frustration "Mathematical tools can build a foundation for children to understand concepts which can then initialize an abstract understanding"

  (Hubert 1997) Manipulative can become those mathematical tools to build a firm foundation (Picciotto 1993) that foundation for mathematics helps facilitate the leap to abstraction that are embedded and embodied in the notation of addition and subtraction. Manipulatives allow the students to become more comfortable with the lesson in the classroom. Manipulatives also give teachers a chance to show students different approaches that they can take to solve a particular problem. Burch (2006) clams that a math teacher should provide students with an excess of fascinating materials that may include things in real life that involve mathematics.

  Hedda 2005 in the TUJC argue that using manipulative material in teaching mathematics will help students learn:

  To relate to real world situation to mathematics symbols.

  To work together in solving problems

  To discuss mathematical ideas and concepts

  To verbalize their mathematical thinking

  That there are many different ways to solve problems

  That they can solve mathematical problems without just following teachers' directions.

  (The Turkish Online Journal of Educational Technology 2006. Vol. 5 Issue 1 article 12)

- There have been many studies done to show the benefits of incorporating math manipulatives into math lessons; "the use of manipulatives to promote student learning is considered a best practice pedagogical technique" (Moch, 2001, p.82). However, incorporating them properly into a shared learning environment and appropriately guiding students in their use is easier said than done. As stated by Ball (1992), "Teaching with manipulatves is not just a matter of pedagogical strategy and technique. Few well educated adults-not just teachers-can devise or use legitimate representations for many elementary mathematical concepts and procedures" (p.47).

Conclusion

In conclusion, one can agree that the use of manipulative in the teaching of mathematics to our student is of great significance. We must agree that it eliminates many misconceptions about mathematics; provides a connection between the subject and the real world and transforms that which was once seen as abstract into real situations that which will fit them for life.

Many studies have provided us with strong evidence that manipulative set the foundation for students' strong mathematical skill as well as their appreciation for the subject.

As educators it is imperative that we maximize on the use of manipulative in teaching of mathematics if we want the students we teach to rank alongside others as successful achievers.

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