**TXTBKSIM Status Report**
**As of 17 February 2014**
**Submitted by Mr. Joseph H. Batac**


## Abstract

This study made use of mobile phones for testing. The results showed that the use of mobile phones require a higher level of difficulty for those who are in the rural school sample. In both samples, student level of interest in technology are the same at a high level. Thus, there is no problem with addressing the affective domain. In terms of cognitive domain, the results showed that there is the need to provide test clusters of between 5 to 10 questions per test since this will give students a better focus on the questions and their ability to respond. The exception to this result is a science test where the scores are not dispersed. There is a need to explore the possible explanation for this result. At the moment, there is a possibility that the role of pedagogy is the explanatory variable to this result.


## Introduction

If Rip Van Winkle would wake up in this second decade of the twenty first century, the one thing that will be familiar to him would be the school where he can relate to the same reality he had lived in the same second decade of the twentieth century: a room, a blackboard, chairs and tables.

In effect, schools, specifically public schools had remained unchanged in the last century. At the same time, the tides of information technology continue to reach different niches of human life, transforming the way human beings learn. This time will eventually reach public education and transform it into something that is totally unique. The challenge is overwhelming. This is but one attempt at using information technology in basic education.

## Statement of the Problem

The Basic Education Sub sector of the Philippines is at a crossroad. The current government policy of increasing the quantity of education in the last three years has been accompanied by the construction of additional classroom and the mobilization of textbooks, chairs and desks. While laudable, numerous researches have shown that the quality of education is all the more important given appropriate facilities and support. Related to quality, the latest TIMMS or Trends in Mathematics and Science Studies showed the Philippines at the near bottom, if not the bottom of participating countries in 2003 and 2008.

| Table 1 Philippine Average TIMSS Scores | | | | |
|---|---|---|---|---|
| | Scores | International Average | Rank | Participating Countries |
| **2003 Results** | | | | |
| **Grade IV** | | | | |
| ***Science*** | 332 | 489 | 23 | 25 |
| ***Mathematics*** | 358 | 495 | 23 | 25 |
| **HS II** | | | | |
| ***Science*** | 377 | 473 | 43 | 46 |
| ***Mathematics*** | 378 | 466 | 34 | 38 |
| **2008 Results** | | | | |
| ***Advanced Mathematics*** | 355 | 500 | 10 | 10 |
| *Source: TIMMS, 2003 and 2008* | | | | |

Recent publications revealed the current one size fits all, age clustered delivery of basic education is a pedagogy that tends to destroy creativity and the natural intelligence in learners. This type of delivery was designed to reflect the needs of the industrial revolution. Since the world is now in a post industrial age, the age where the digital economy is increasingly more prevalent, the way basic education is delivered is now in need of reform, if not transformation.

Learner centered, rights based basic education is the current policy of the Philippine Department of Education, where the learner is front and center of the delivery of basic education. The literature is replete with numerous studies that each learner has its own learning style given their unique endowments and the context in which they live. Learning takes place both inside and outside of the classroom.

To realize this learner centered, rights based approach to basic education, a comprehensive program is being implemented under the Basic Education Sector Reform Act or BESRA. One of the programs is the alternative delivery mechanism and the learning system.

Using its expertise in technology, Smart Communications has started several initiatives on alternative delivery mechanism and learning system. The more recent ones are the introduction of tablets in kindergarten with the accompaniment of the study on the different variables or parameters that are significant or that determine favourable learning outcomes using this new technology.

Another initiative is the Smart TXTBKS SIM that immediately caught the attention of several sectors, including being awarded as the 2013 Cannes Mobile Lion Grand Prix winner.

**Purpose**

The purpose of this proposal is to assess the current program for Smart TXTBKS SIM, defining the different variables for favourable learning outcomes, in both qualitative and quantitative metrics. The assessment will include the way forward. The conceptual framework would be guided by the econometric principle of dependent variables, or the output or outcome being a function of several independent variables or inputs.

**Review of Related Literature**

*The Rise of Online Instruction Will Upend Economics of High Education*

Education as we know it is now taking on another form. According to an article in a magazine, higher education is now moving from face-to-face instruction to the virtual world. This is called Massive Open Online Courses or MOOCS.

The said change on the educational field can be explained by two major factors. The first would be the need for Physical proximity, the more learners you have the more expenses you'll get, as you need to provide more classrooms, buildings, facilities and instructors to accommodate your learners. The second factor would be the productivity of your instructors. University professors can teach at least a few hundred students in one semester depending on the size of the classroom or instruction hall.

But in MOOCS, these two problems are easily solved as the course is given online. So, adding another building to accommodate students would not be necessary. Also, each professors can teach a few hundred to a thousand students all at the same time allowing more productivity and Income.

The only thing that you should keep in mind is the quality of the course that you are offering to the market as this would be the main criteria for having more enrolees.

Direct Link: http://www.economist.com/news/finance-and-economics/21595901-rise-online-instruction-will-upend-economics-higher-education-massive

Downloaded 12 February 2014

*Blogs on MOOCs in Developing Countries*

MOOCS had been the talk of the town since 2012 but what does 2014 have in store for it? According to a blog (http://blogs.worldbank.org/edutech/moocs-developing-countries) the MOOCS (Massive Open Online Course) is just being recognized by different educational policy makers and low income countries around the world for its potential to solve global educational issues and also, as a threat to the existing educational practices.

As per the blog, MOOCS is now being explored by different countries as a new way of teaching. However, the blog also said that further studies are needed to provide an accurate answer on how MOOCS affects the educational system around the world (May it be good or bad).

One of the problems mentioned on the blog is the preparedness of a low income country. He said that though MOOCS can be of great help to the existing educational system of the parties

concerned they are still not yet capable of handling the technology specifically when it comes to infrastructure to support the use of MOOCS.

Another issue touched by the blogger is that MOOCS is seen as “a tool for the elite”. A recent study from a MOOCS provider website (based on the blog) said that most of their enrolees are already degree holders. Though, the blogger said that the same can also be said with the cell phone on its early years but it is now considered as a “truly democratic technology”.

Then there’s the issue of “local capacity” should be also be addressed. The question of what will happen to the local ideologies, technologies, and development if people we’re to depend on MOOCS where teachings often have foreign origins. On this note, the blogger presented two options. (1) They can use MOOCS as a consumer where they will (actively or passively) use the services and teachings of other countries or (2) they can use MOOCS to improve their own local capacities.

Lastly, for MOOCS to be fully accessible in developing countries the blogger said that it should be made available on mobile devices, specifically mobile phones, as this gadget is something that is accessible to everyone. Though he left the details on how this can be done.

As it is, MOOCS still has a lot of working-out to do to be fully accepted and recognized around the world. But as the blogger said “my hope here is to share some of the reality that I am seeing and hearing—not what I think or hope this reality might or should be.”

Downloaded 12 February 2014

*A Model for Educational Technology Development from… Afghanistan:* http://blogs.worldbank.org/edutech/model-educational-technology-development-afghanistan

A blog was posted by this man MICHAEL TRUCANO regarding the help of mobile devices on challenging environments such as conflict zones and refugee settlements where education is scarce and is under constant constraints of various reasons.

On his blog, a group known as PAIWASTOON (who had previously been involved with piloting the One Laptop Per Child) conducted another educational program in Afghanistan where they wanted to find an inexpensive, non-cutting edge device that can provide audio, video, quizzes and mini games for low literate users to help with the education of the people of the said country.

After looking for the phone they then started to look for a development tool to create an app that can be used offline and of course should be compatible with the device. On this, they came across with a tool named eXe (a free authoring app to assist teachers and academics in publishing web content without any knowledge in programming. eXe was developed in New Zealand for tertiary school then later adapted in Spain, Germany and Italy).

After finding the tool and with a very small budget along with a low-skilled local staff they created an app that can be used to learn starting from the alphabets up to grade three (3) academics. They named it Ustad Mobile (mobile teacher). Their project was approved by the ministry of education and had a huge impact mostly on afghan women and afghan national army recruits.

Ustad Mobile Link: http://www.development-post.com/blog-posts/how-mobile-phones-are-helping-womens-literacy-in-afghanistan/

**Approach to the Proposal/Methodology**

This proposal builds on the current study that is being hosted by the Culiat Elementary School, CES. Initially, there are three elementary school samples with interventions, two in Makati and one in Bulacan. These are assumed as the sites of the study. In each site, a class will be randomly identified to be the sample with the TXTBKS SIM.

In all samples, variables related to those in both inside the school and those outside of it. These variables should include the learner, her/his socio-demographic background and the context of the life of the learner, the teacher, the pedagogy and the curriculum, the facilities, and the policy support of the district and the division level of the Department of Education.

These variables will be established using a combination of literature review, surveys, informant interviews and focus group discussions.

These study methodologies are currently present in the study being undertaken in Culiat Elementary School, there are at least three observations done during the week, with each observation generating data on the learner and teacher behaviour, as well as content and delivery of the curriculum for samples with and without the interventions of technology. These observations have notes and pictures which can serve as reference with the set-up of databases. Also, surveys are generating data on the socio-economic-demographic background of the learner, the learning environment outside of the school, and the periodic interaction with the management of the school with the principal, head teacher, district and division policy makers.

The use of the study methodologies hopes to capture both qualitative and quantitative metrics of the different significant variables that are estimated to determine favourable learning outcomes, and reflective of the innovative and ground breaking initiatives of Smart Communications Public Affairs in the transformation of the delivery of basic education in the Philippines.

At the same time that the data gathering is being done in the sample school and class, there is a regular activity on the review of literature and studies relevant to the innovation and transformation process, including those related to pedagogy that had been used in the Philippines and elsewhere. Significant to the review of the pedagogy is that which is used with support from the Smart Communications Public Affairs: The Dynamic Learning Program, the DLP. Although the DLP is used for learners in high school, the system is reflective of a process that is still learner centered.

In the Culiat Elementary School study, to date, the review of literature included the studies of initiatives that are somehow similar to the use of technology for alternative delivery mechanism and learning system in basic education.

For example, a relevant initiative that is currently undertaken in another country and which this proposed study can learn from, is the massive open on line courses or MOOCs that is operated in US based, well known universities with learners from different countries of the world. The recent data shows that the type of learner for MOOCs is predominantly post undergraduate level. Video documentations revealed that the diagnostic is an important component for the on time evaluation of the performance of more than 100,000 learners at any single time. The technology support is essential.

But more important is the aspect of peer to peer, group learning exchanges, and one on one coaching and mentoring as healthy collaborative endeavour that, according to the published

literature improves learning outcomes by one to two standard deviations from the usual or convention or manner in learners learning and working individually. Note that the literature where this result was based was for learners in primary school in the US, specifically those in grade 4, 5 and 6. The DLP also practices peer to peer learning up to three persons in a group and does not include subjects related to math and sciences.

In the tradition sense, when inside the classroom and learners inquire from another learner, this behaviour is discouraged and is often termed 'cheating' while in the real world, it is termed as 'collaboration.' With technology interventions, such as those established in India, recent data and published studies showed that there is value added to collaborative learning among young learners, very much in agreement with the published literature in the US studies.

These research study results do meet the reality in the current kindergarten level learners in Culiat Elementary School tablet, where behavioural observations show that learners do collaborative work to 'discover' new ways of playing with the tablet and learning the alphabets, letters, shapes and colors.

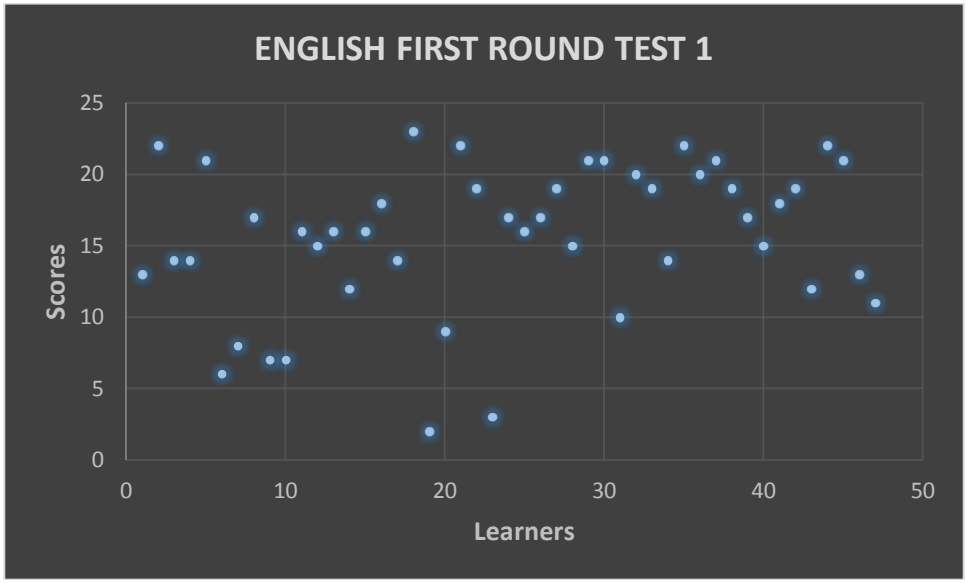
Thus, field based, classroom observations are important investments of the study to gather the empirical data on behavioural changes related to the learner, the teacher, and the other relevant stakeholders in the process of learning. This is just one aspect of the works of the study albeit an important variable related to teacher pedagogy and learner responsiveness that hopes to result to favourable learning outcomes.

At this stage of the engagement, the value added of two simultaneous study: the Kindergarten Tablet Study in Culiat Elementary School, and, the TXTBKS SIM in Three Schools, is the establishment of a possible pedagogy options that is based on literature review, validated by school based observations and with consultations from subject matter experts that will be tapped with experience in technology based interventions with lessons learned from both favourable and not so favourable learning outcomes.

**Findings and Discussions**

- The total sample of learners has reached 170 Grade Three students from the following school:
    - Culiat Elementary School
        - Section 1 English Class has 50 learners
        - Section 2 Science Class has 50 learners
    - Tiaong Elementary School
        - Section 1 English Class has 35 learners
        - Section 2 English Class has 35 learners

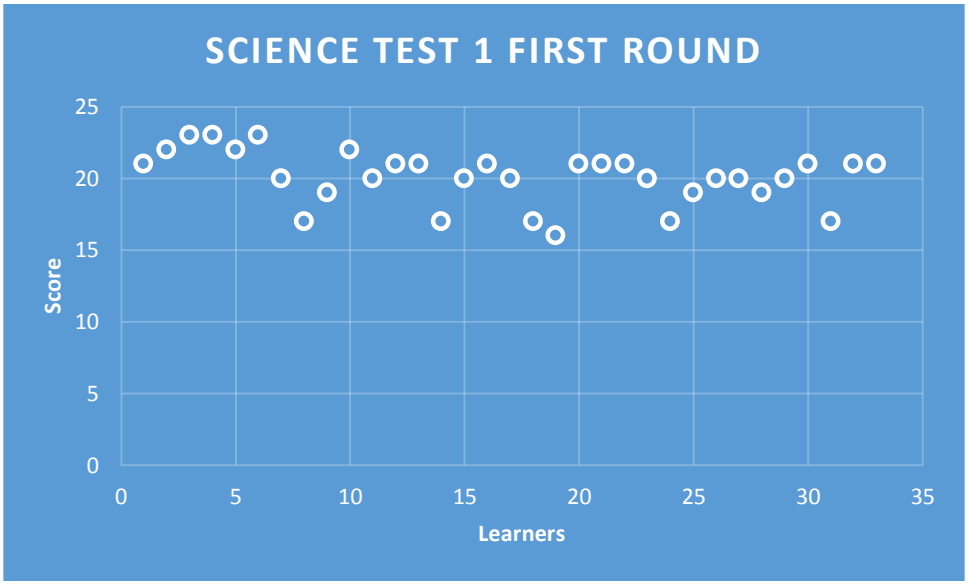
- **First Round First Test Culiat Elementary School**
    - English Class Culiat Elementary School




This result has an average score of 15.6 and a standard deviation of +/-5.2. This means that the score of the learner in the test is between a low of 10 and a high of 20, or that the scores are scattered resulting to inconclusiveness given that this type of data is considered as noisy. The factors that can be ascribed to the noisiness of the data are several but during the test, it was obvious that the learners were having a hard time using the mobile phones or that the level of familiarity and technique in operating the mobile is still a challenge to the learners. This would indicate that there is the psychomotor aspect which maybe present with most of the learners.

Also, note that there was a problem with the encoding of the 25 test question. The test questions were clustered into two major areas of assessment. When these questions were encoded in the SIM, the resulting arrangement was not in the proper sequence, thereby resulting to a confusion in the instructions. To address this, another research set up or arrangement has been proposed. This new proposed arrangement is still to be tested in Culiat ES.

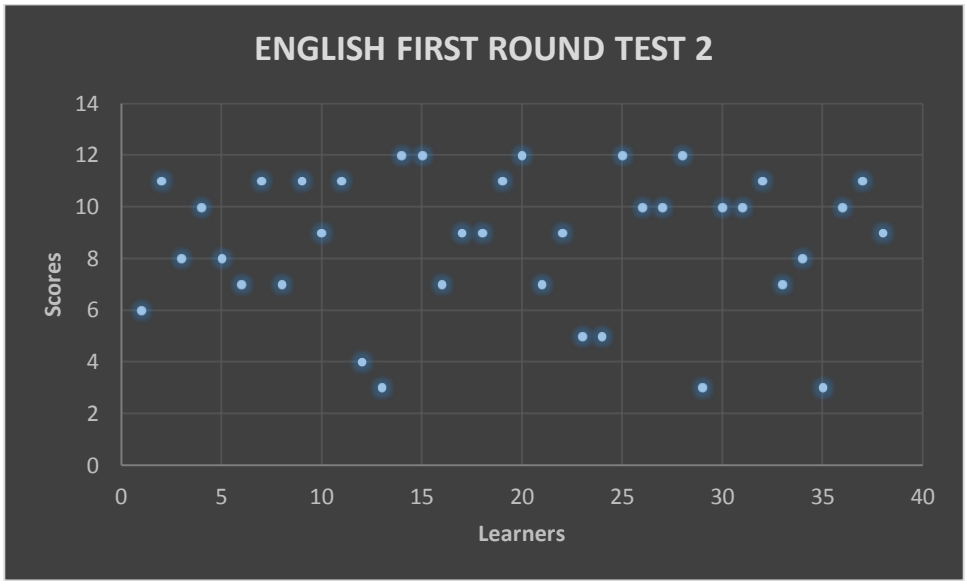
- Science Class showed a totally different result as follows:




This result has an average score of 20 and a standard of only 2. This would indicate that the scores are not dispersed since the low score is 18 and the high score is 22. Or, the majority of the class of the class were able to answer the question to the test even though the encoding of the test questions were not in order or in sequence by the area of assessment. Thus, this would indicate that there is no psychomotor issue with the use of the mobile phones since most of the leaners were able to answer the test with scores that are very high given an average of 20 out of 25 perfect score.

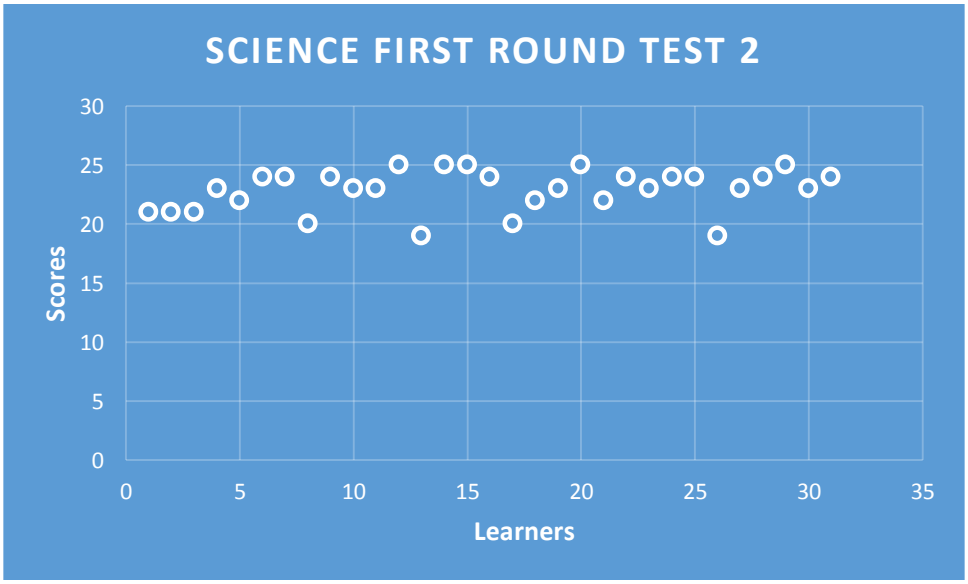
Given that the results of Science test showed scores that are closer together compared to English test would be indicative or can be explained by factors other than psychomotor. This led the research to have the interim conclusion that the determinant for the high score that are clustered together is the pedagogy or that method of teaching being more effective with the Science class, thereby showing higher level of learning outcomes for most of majority of the learners.

- First Round Test 2 English Class




This result is consistent with Test 1 where the scores are scattered.

- Science First Round Test 2

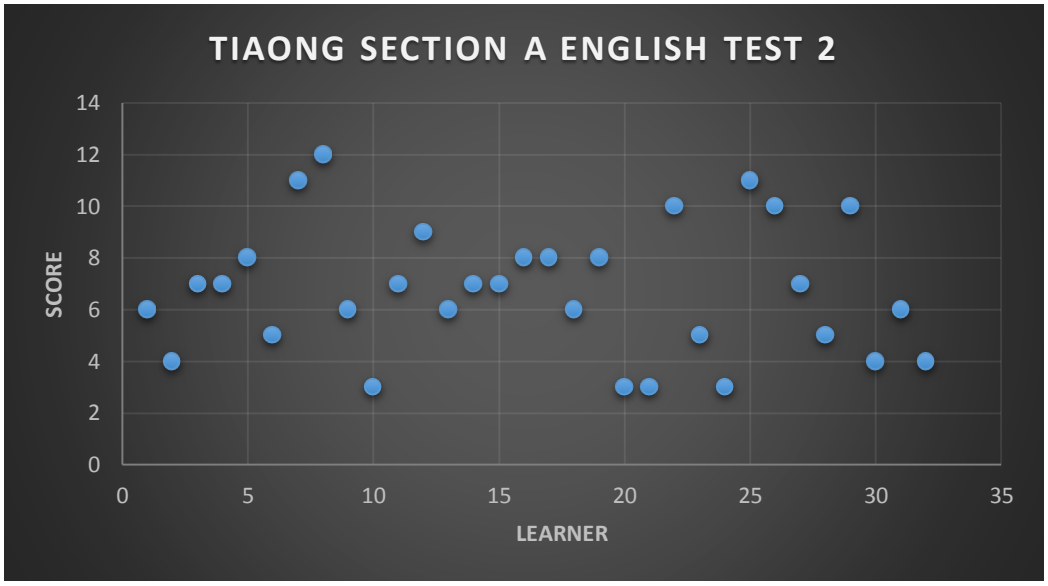


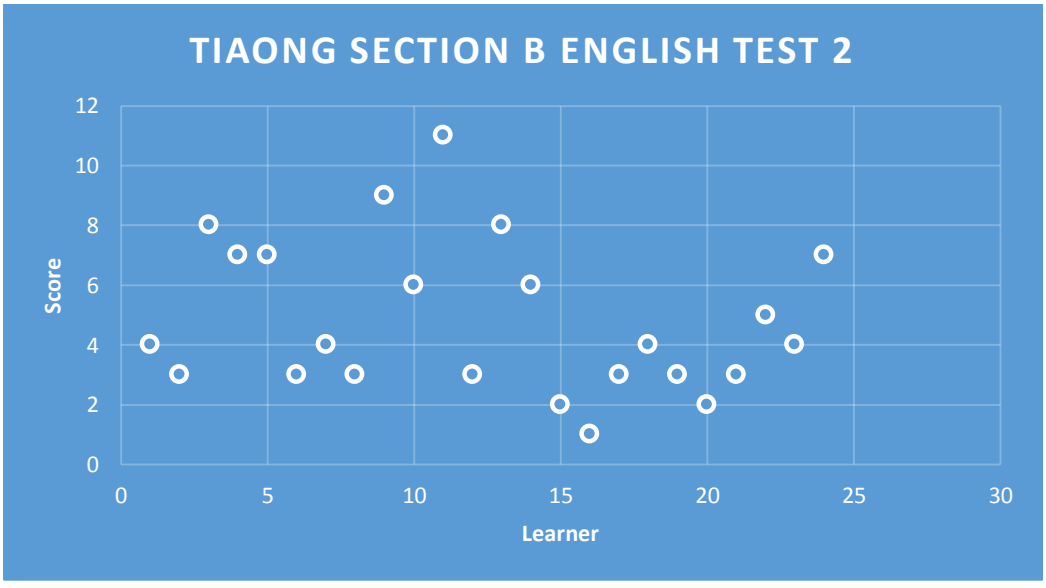

This result showed the same result as Test 1 where the scores are closer to each other and have remained elevated.

**Interim conclusions for Culiat ES**

The use of mobile phones by learners in the conduct of tests showed that two major factors are to be considered. The first is the effectiveness of the pedagogy of the teacher as indicated that the learners in the science class have better learning outcomes. The other is the psychomotor aspect or the familiarity of the learner in the use of the mobile phone. Both factors are determinants of the ability of the learner to use the mobile phone gadget in the conduct of test activities.

- **Tiaong Elementary School**

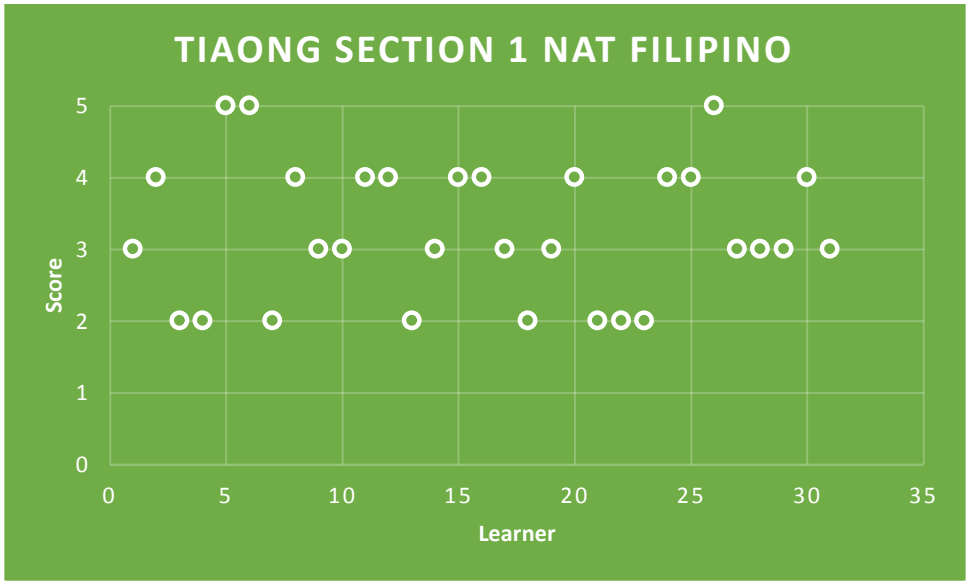


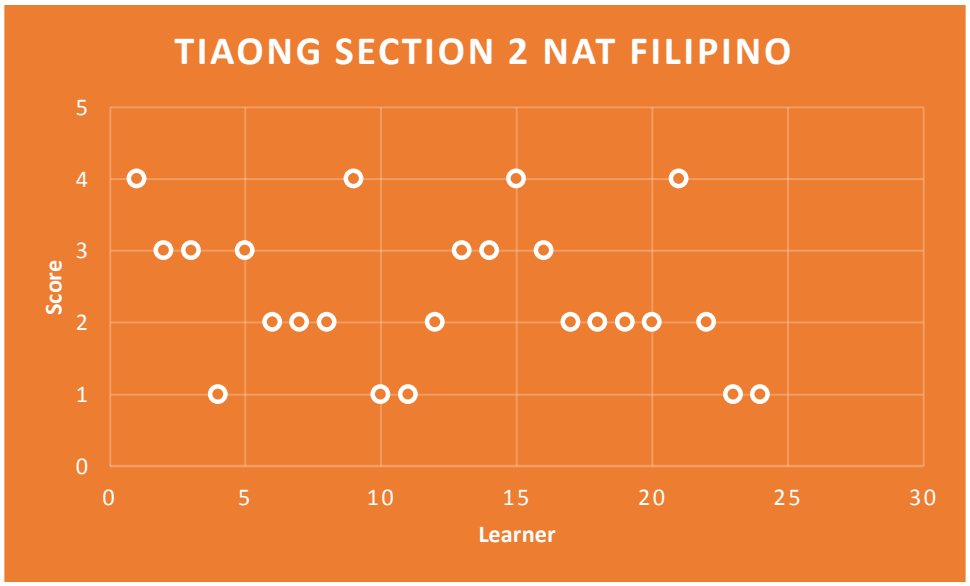




Both sections showed inconclusive test scores indicating possible aspects related to psychomotor and the fact that the encoding of the test question does not result to a program in the inbox of the phone that were in sequence. To be able to overcome these aspects, another set of research was done. This is the second round in Tiaong Elementary School.

For the second round, the test were done using the NAT reviewer. Also, there were only five test questions that were encoded on the phones for each trial. Also, to ensure that the aspect of mother tongue is rendered with minimal influence if not taken out altogether as a factor, the subject matter that was use is Filipino.

A trial showed the following results:



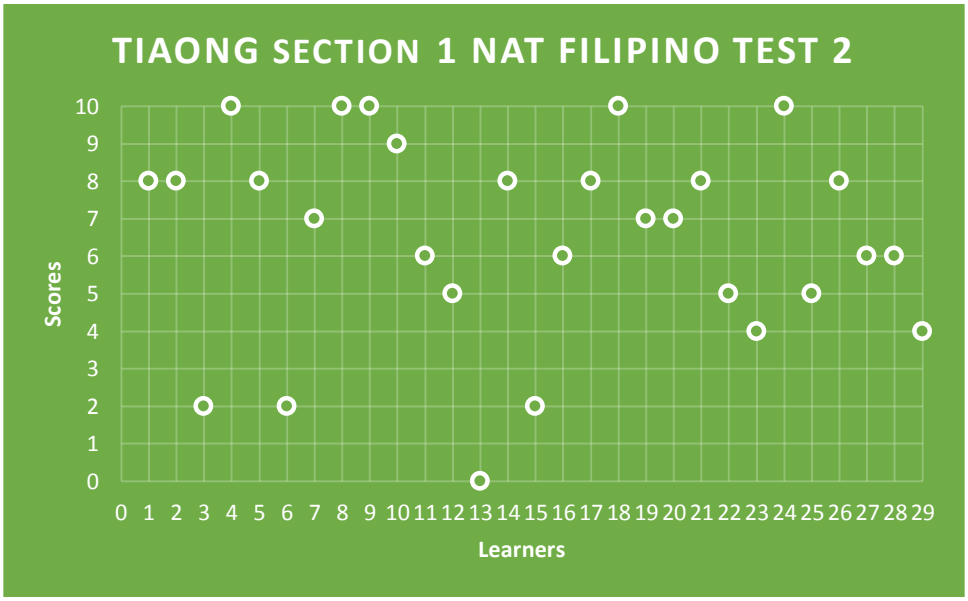




This trial should that there is an improvement in the clustering of the scores given that the encoding of the test was in sequence. For this round, the test questions were only limited to five to ensure that the sequence is in order.

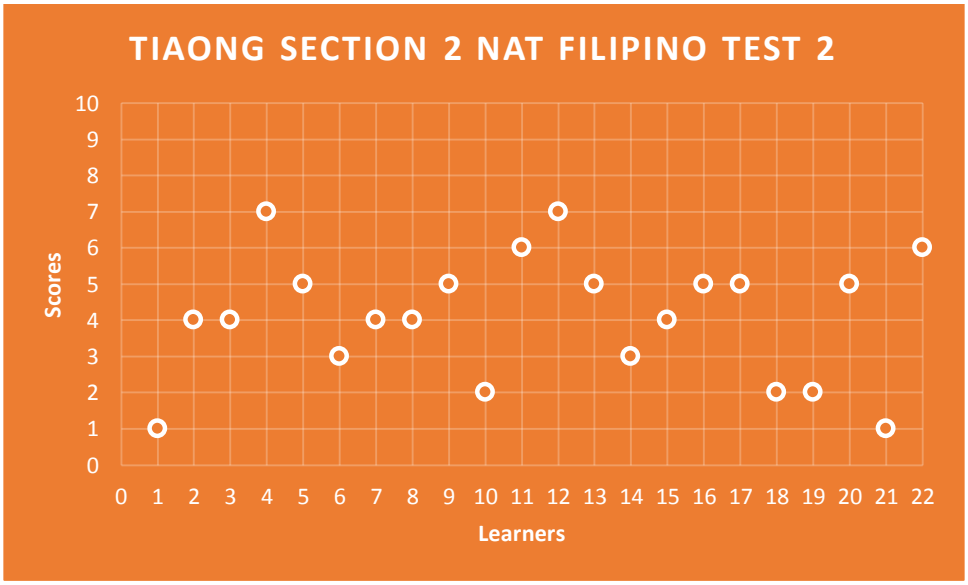
**Interim Conclusion:**

- Given that the issue of sequencing of the questions had been eliminated given the limit of five questions, at the same time that the mother tongue, Filipino subject was used, there is a better chance that the learner is able to improve the psychomotor or the use of the mobile phone. With the improvement in the psychomotor ability of the learning, there next use of mobile phone for testing is successful provided that the pedagogy is of good quality.

**Tiaong Elementary School:**




In this test, the result showed a more scattered score plots for the learners.



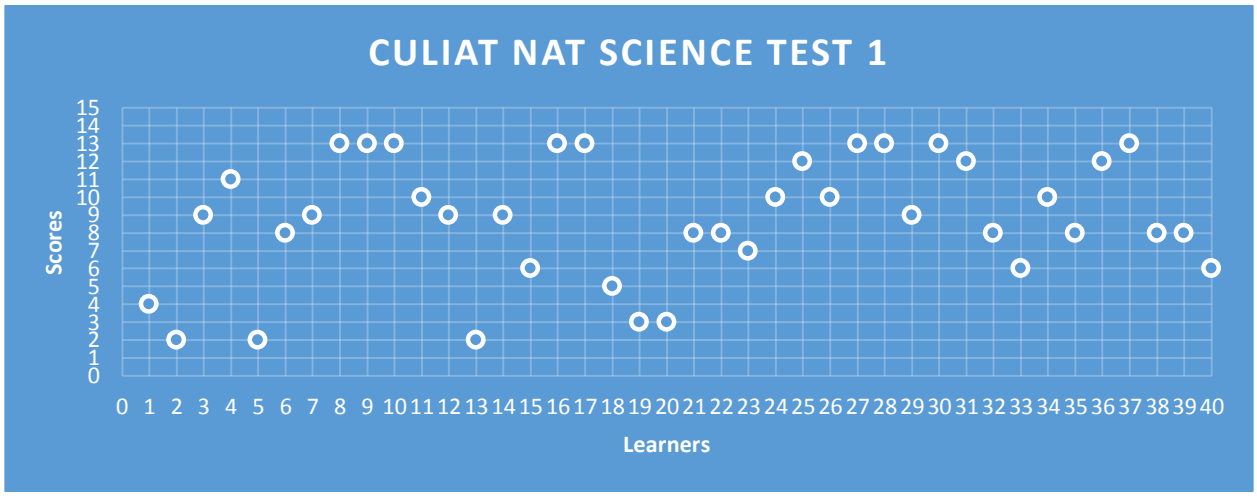
Just the same with the last examination, the test results shows scattered data much the same as the previous exam.

In this trial, the number of items were increased to 10 items and the number format remained intact. Though the result with the 1st section is more scattered, the number of students who got better scores are higher than that of the 2nd section where scores are clustered but lower grades.

**Interim Conclusion:**

Aside from adding additional items on the examination, there are no other changes done with the test. The numbers are still in sequence, mother tongue was used and questions were properly encoded. On this, we can only conclude that the main factor that affected the students' scores is related to the pedagogy of the teacher.

**Culiat Elementary School:**




This chart shows yet another scattered data on the scores of the test subjects.

**Interim Conclusion:**

This time, the number of items were increase up to 15 using the same subject (Science) and we used the English language for the questions. However, the sequencing of the numbers had been compromised. This may have been caused by the software that we are using on the encoding of the questions. After checking this with the students, they said that the sequencing was not anymore a problem for them as each question was properly labelled making it easy to find. On that note, it shows that the psychomotor is not anymore an issue with the students. But, the chart still shows scattered scores of the learners much like on the previous examinations that were held. This only proves that the pedagogy of the teacher really is a major factor in this research.

## Overall Conclusion

The use of mobile phone in basic education was proven to be successful considering three major factors or determinants. These are the pedagogy, the psychomotor and the aspect of encoding or the proper sequencing of the lessons.

## RECOMMENDATION

Given the mixed results of the outcomes, there is a need for further and much more detailed study on the variable of pedagogy. This recommendation is based on the science test outcomes whose results showed a more clustered data set compared to the rest of the sample tests.

On the use of the mobile phone as a tool for administering the test, the recommendation is looked at the possibilities of having models that have applications other than the text messages. This application will provide more use of the investment in the mobile devices and therefore a higher rate of return or longer productive uses.