Assignment V

Samar J. Singh, Developing world - E4A

Contents

Citation

Title of article: A comparative analysis of a game-based mobile learning model in low-socioeconomic communities of India

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Name of Journal: International Journal of Educational Development

Task Definition: How what I read can be applied to the design or implementaton of educational environments or tools.

1 Abstract of article chosen

This study explores the effectiveness of a game-based mobile learning model for children living in underdeveloped regions with significant contextual variations. Data for this study came from a total of 210 children between the ages of 6–14 years old from six marginalized communities in India. The findings reveal that children with little or no previous exposure to technology were able to not only figure out the given mobile learning technology, but also solve a series of incrementally challenging problems by playing math games without specific intervention or instruction by adults. The study also found that various factors, including gender and group size, do affect children's ability to adopt and learn while presenting a unique set of learning interaction patterns. This paper concludes with specific recommendations for future ICT4D (Information and Communication Technology for Development) projects for educational development particularly targeting developing regions.

2 Introductory statement

This carefully designed study is a pleasure to read. The choice of this paper for my assignment was influenced by the context of my work i.e reform of the Indian education system. While I now prioritize my efforts for the urban poor, there is no denying that much change is also required in rural areas. It is merely that diversity of language and dialect, context and cultures makes that a more daunting challenge.

2.1 The basis for my reflections on this study

I have spent several years between 2004 and 2008 working with a colleague through the auspices of an NGO, in rural areas and small towns in India, and to a lesser extent in Malaysia and Sri Lanka in education related projects with children in difficult circumstances, as well as in Hue Province in Vietnam for a month long audit of a completed project. My colleague, Shonu Chandra, is a distinguished documentary maker who spent many years working with children in difficult circumstances primarily in rural but also in urban India with Plan International and Plan India.

In the recent past, we have developed technologies, processes, methods and structures to leverage the value of a classroom which we call the AGEM system. I will try to examine these findings in the context of what we have done.

I hope that I can bring experience of Indian education and society and the learnings through interaction with my colleague to add value to the interpretations offered in this paper.

3 Surprising or interesting things that I read.

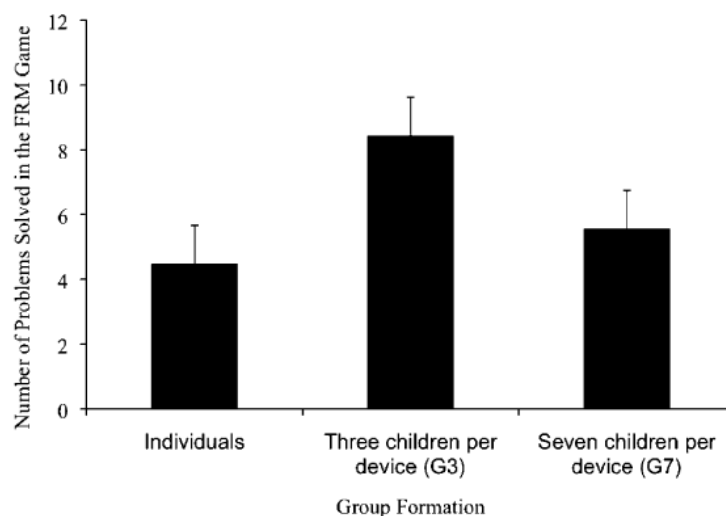## 3.1 Effective adoption and learning - Group size

Fig. 7. Game performance main effect in the FRM based on the group formation showing an advantage of smaller groups compared to playing individually or in larger groups.

Figure 1: Difference between group size in Game performance. Source: A comparative analysis of a game-based mobile learning model in low-socioeconomic communities of India

This is an exciting confirmation of work done 12 years ago when setting up a school, Vidyashilp Academy, in Bangalore, in 1998. My personal focus was to allow children to collaborate more than compete. A doctoral dissertation from MIT Media Labs, yielded a design for desks that could be configured to form many different desk formations. We tried several but eventually found the combination shown below to be most appropriate for collaborative work. You can also see some children using the clickers we developed at the time for interactive work. One of the valuable things was that a teacher could stand in the square space created in the middle and overview the work of all three students. It is satisfying to know that there was a scientific basis for this empirical decision for a group size of 3.

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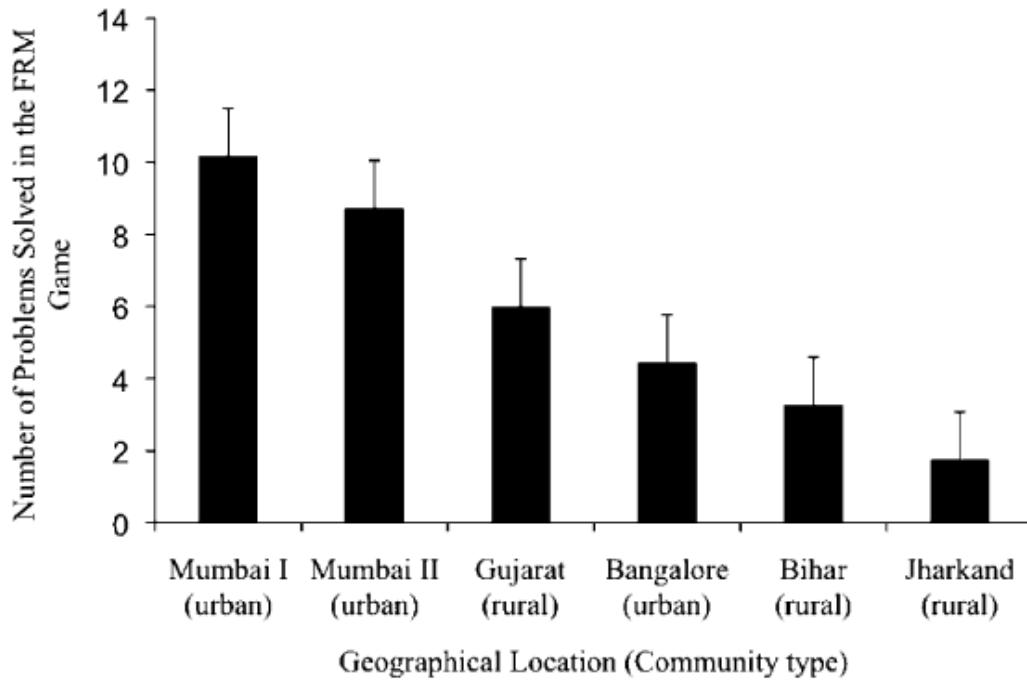## 3.2 Differential in performance between rural and urban children

Fig. 8. Game performance main effect in the FRM based on the geographical locations demonstrating an advantage of urban slum-type setting over rural villages except Gujarat Madari tribal children versus Bangalore slum children.

Figure 2: Game performance as function of geographical location. Source: A comparative analysis of a game-based mobile learning model in low-socioeconomic communities of India

The interpretation that is provided in the paper is that urban communities did better because they had more access to technology and the Gujarati tribal children may have had access to technology in their travels.

An alternative explanation is that nomadic and to a lesser extent children who live on the streets e.g. Mumbai are more accustomed to dealing with uncertainty. Their greater frequency of use of what Reason[2] has called the **attentional mode**[1] means that they are better able to deal with problem situations conducive to uncertainty/novelty. The initial exposure to the game and the devices were prime instances of the challenge of dealing with uncertainty. This aspect has other implications that the interested reader could study under the general heading of Cognitive Engineering.

3.3 Leveraging benefits of technology

The authors state:

"we believe there is a specific need for:

1. more in-depth studies on ICT design variations to meet different challenges of different localities;

2. further analyses on mobile interface designs for game-based learning scenarios;

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[1]described by Reason as "limited, sequential, slow, effortful and difficult to sustain for more than brief periods...within which powerful computational operators (subsumed under the general heading of inference) are brought to bear upon a very limited number of discrete informational elements in a largely voluntary and conscious manner"

3. more studies on potential benefits and possible pitfalls of children-first ICT adoption strategies and how to leverage benefits and address shortcomings of such model"

A potentially important role apropos item 3 above is the element of immediacy of feedback. Few children would have experienced previously the rapidity of feedback that the mobile devices provided them. Immediacy of feedback allows us to drive a bicycle, or play the piano. Just imagine if you were to delay the sound by 1 second after pressing the piano key. How would that affect your ability to play the piano. One could argue that feedback delayed is learning denied.

4 Learnings for developing a better educational system

4.1 Defining goals

It is possibly important to clarify what one's goals for an educational system should be before we decide to impact one.

4.1.1 Some pertinent views - Yang and Damasio

I have been personally influenced by the words of Yang and Damasio when they say[1]:

"With evolution and development, the specifications of conditions to which people respond, and the modes of response at their disposal, become increasingly nuanced. The more people develop and educate themselves, the more they refine their behavioral and cognitive options. In fact, one could argue that the chief purpose of education is to cultivate children's building of repertoires of cognitive and behavioral strategies and options, helping them to recognize the complexity of situations and to respond in increasingly flexible, sophisticated, and creative ways. In our view, out of these processes of recognizing and responding, the very processes that form the interface between cognition and emotion, emerge the origins of creativity — the artistic, scientific, and technological innovations that are unique to our species. Further, out of these same kinds of processing emerges a special kind of human innovation: the social creativity that we call morality and ethical thought"

4.1.2 Some pertinent views - Gardner and Five Minds for the future

Gardner in his presentation to the Ross School - Youtube Video: Five Minds for the Future - talks of [2]:

1. The Disciplined Mind: the mastery of major schools of thought, including science, mathematics, and history, and of at least one professional craft.

2. The Synthesizing Mind: the ability to integrate ideas from different disciplines or spheres into a coherent whole and to communicate that integration to others.

3. The Creating Mind: the capacity to uncover and clarify new problems, questions and phenomena.

4. The Respectful Mind: awareness of and appreciation for differences among human beings and human groups.

5. The Ethical Mind: fulfillment of one's responsibilities.

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[2]http://howardgardner.com/five-minds-for-the-future/

4.2 The common ground

There is some fundamental underpinning structure behind the apparently disparate expressions of Yang and Damasio and Howard Gardner in terms of :

- The idea of a mental model: the outcome of a meaningful education would be expected to manifest itself in certain types of behaviour that produce the outcomes desired by a society. Both speak of the nature of these outcomes e.g. Yang and Damasio on "recognizing the complexity of situations" and Gardner when he talks of the different minds is by implication laying the idea of a mental model which activates these minds into a single purpose e.g. for making a decision.

- the idea of decision competence: When Yang and Damasio speak of the chief purpose of education being connected to recognizing and responding, there is an inherent link between those two events and that is the generation of a decision. Decision making is also the outcome of the different minds.

- the idea of morality and ethics: Both citations above refer to these.

- the idea of communication: Gardner stresses the requirement for communicability to express the output of the synthesizing mind while Yang and Damasio talk of the "nuanced" expression of mature response.

It is interesting to see that leadership and individuals rising above the crowd do not seem to find any place in these thoughts. Yet, our school systems focus on ranks, certificates, and awards more from the view point of filtering out large segments of the population from opportunity e.g. university education rather than acting primarily as motivators. In the latter case, there would be many more awards for a whole variety of achievements.

4.2.1 Does it work - whats the evidence

The Human Development Index (HDI) is an indicator of human well being and is compiled by the United Nations every year now. The latest compilation puts Norway, Australia and The Netherlands in the first three positions of 187 countries.

These countries put a high value on education, human rights, and democratic functioning and cultivate a healthy tolerance of diversity. They are different from each other in many other ways - the ethnic diversity within their populations, national languages, forms of governance, and urban population densities. In doing this they reflect many of the Five Minds that Gardner has espoused for the future.

5 Applying the lessons to educational environments

For many years, educators worked with the idea of education being related to teaching rather than to learning. My fear is that teaching has now been replaced by technology.

Prof. Kim's focus on the pre-requisite of a Learning Needs Analysis is well founded. Such an analysis can yield goals, constraints and resources. Meeting the goals must be paramount for an education system whose infrastructure must be subservient to the higher cause of the goals. An LNA should be culturally appropriate to the society that it intends to serve.

The primary learnings from this article that I would like to use in defining a new educational system would be:

1. the key to learning is engagement and immediacy of feedback. Children were engaged in the technology and the games and got immediate feedback, as for instance, when they clicked the wrong button.

2. technology has an important part to play both in the acquisition of data and providing a medium for communication. However, we need to monitor if the goals of learning are being achieved.

3. the idea of children working in groups is fundamental to a collaborative environment. Groups of three make an effective grouping

6 Implementation

6.1 Engagement and Feedback

In the AGEM system we engage the children and provide immediate feedback through a system of wireless keyboards. Click this short video to see it happening.

We also add to this by representing the data that children generate to aid understanding of how the class responded and what the differences of opinions were.

The illustration below relates to a question answered by a group of more than 20 principals. We showed here the response of the total group and a breakup of those who were aged 50 years or less as opposed to the older subset.
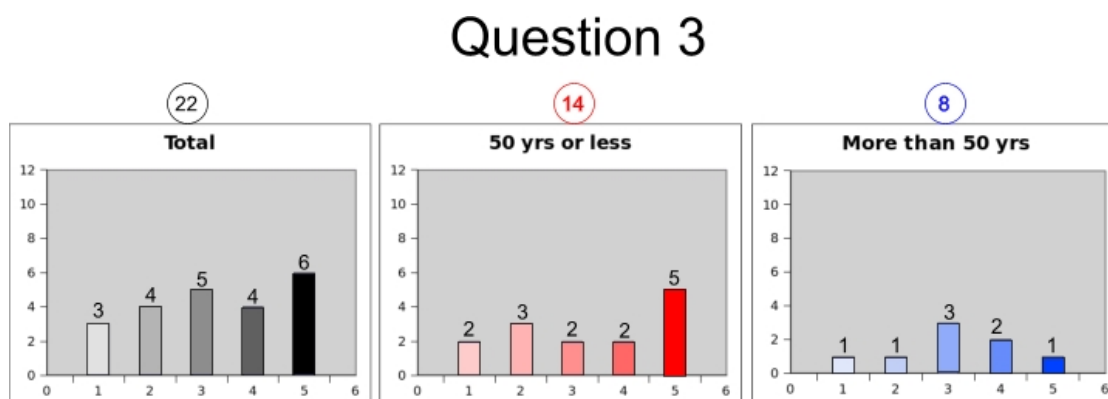

As these results are recorded the measurement of learning is relatively immediate. Typically students will answer 10 to 30 questions per hour. Response times have been averaging less than 30 seconds in a pilot project.

6.2 Data acquisition, error and sensitivity

Within an elite school environment we have used Vernier Sensors to give children an understanding of both the error component and the sensitivity component of observations. Similarly the sensors and associated software available in Tablets provided considerable scope for deployment within an appropriate regime of instruction.

6.3 Working in groups

This works well within a well resourced school. These desks are made using CNC technology and are therefore out of reach to our weakest schools where having a place to sit is a luxury.
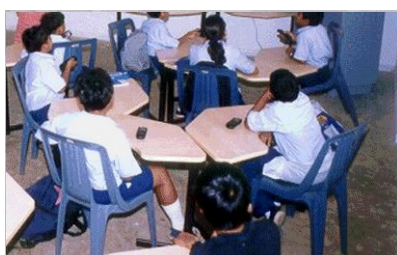
7 Conclusions

I am left with the deep feeling that technology is the flavour du jour, especially in its online rendition but I do believe that in the developed world it has an important part to play. Within the context of the developing world there are many challenges that include expense, availability of electrical power and the quality of power, as well as access to support both for instruction and for repair.

Prof. Kim in an earlier video put it very well when he said, "Pedagogy. I see far too many projects that deploy hardware, but without any pedagogical model whatsoever. I guess people were hoping that teachers on the ground somehow would magically come up with reasons and ways to use such technology and enhance teaching and learning."

If the goals are properly defined they can become a basis which can help us decide the type of technology that should be used, how often it should be used and how it should be used within a broader pattern of education. In general, if technology is to be used then its use should be monitored to see if it is having an effect that could not be more cheaply and/or effectively obtained without it.

My colleague and I did some work with children affected by the Tsunami of Dec., 2004 on Child Led Social Equity Audits (CLSEA) at one year intervals in rural Tamil Nadu from 2005-2007. An impact assessment of that work was conducted by an independent researcher about a year after we concluded the program. For those who are interested I provide a report of Phase II of that work and also the Report of impact - pages 6 to 22 - by the independent researcher. Minimal technology was used, but the project connected children with their communities. In doing so the project appears to have served some fundamental educational goals. Two of the children have been presented to the President of India for the work they have done, and at least one of the girls is now pursuing a course in college. That was unthinkable when we started to work with them.

References

[1] Damasio A. Immordina-Yang H. The relevance of affective and social neuroscience to education. Mind, Brain and Education, 1:7, 2007.

[2] J. Reason. Human Error. Cambridge University Press, 1990.