Mobile Learning Numeracy in Ontario

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Abstract: The growth of mobile technologies and devices has penetrated the world substantially over the last 5 years, and a large percentage of these users are young users. This introduces profound changes to traditional teaching practices which may initially be seen as low-key, but it will eventually create visible side effects in the education domain that cannot be ignored. As we push for effective instruction to be differentiated, we can use mobile technologies to enhance learning. This research will present the mobile device functions suitable for mobile learning and map it to learning topics of Ontario's K-6 Numeracy Curriculum.

Keywords: Mobile learning, instructional strategy, e-learning, Numeracy curriculum, grade K-6, Ontario Ministry of Education

Introduction

Recent research is more focused upon mobile learning and the huge potential it has in the language learning field (Mahruf, Shohel and Power, 2010), it also enhances student learning of mathematics (Rains and Clark, 2011). Although there are many researches on mobile learning, the educational value in the use of mobile technology is still limited (Morgan, 2010) there is no standard or model that formally addresses these relationships. The objective of this research will seek to identify which mobile technologies are most suitable to be integrated in instructional strategies to deliver knowledge and content.

1. Ontario's K-6 Numeracy Curriculum and Instructional Strategy

The numeracy domain has always been an area of strong focus because it an essential part of our life. The learning goals of numeracy as stated by the Ontario Ministry of Education (2003) is to achieve beyond computation skills, instead students are to be able to solve problems, process information from various sources and access and use quantitative information to make knowledgeable decision. Table 1 maps out the learning topics within the domain of numeracy according to the curriculum set up by the Ontario Ministry of Education (2003, 2008a, 2008b, 2008c, 2008d).

Table 1. Numeracy Learning Topics

Learning Domain	Learning Topic
Numeracy	Counting, Operational Sense, Quantity, Relationships, Representation, Geometry and Spatial Sense, Data Management and Probability, Measurement, Patterning/Algebra

Ontario MoE (2003) identified that effective instruction is crucial to the successful learning of mathematical knowledge and skills. There are five categories of instructional

strategy: Direct instruction, Indirect instruction, Experiential learning, Independent study and Interactive instruction. These five categories are inter-related as the instructional mode can be used in more than one strategy. Table 2 shows a snippet of the instructional strategies and its instructional modes.

Table 2. Instructional Strategies and its Instructional Mode (Partial)

Instructional Strategy	Instructional Mode
Direct Instruction	Structured Overview, Lecture, Demonstrations, Guided and Shared
Indirect Instructions	Problem Solving, Case Studies, Reading for Meaning, Cloze Procedure
Experiential Learning	Field Trips, Narratives, Conducting Experiments, Simulations

2. Discovering Relations

Educators recognize the potential of mobile technologies as a learning tool in education. We need to establish how these mobile device functions relate to instructional modes and how the relationship is useful to educators. There are different instructional strategies with its own set of instructional modes that can overlap with each other. Mobile device functions can be used to assist in the delivery of these instructional modes. New and improved devices hardware capabilities, speed and innovative program applications using Web 2.0 technologies (e.g., wikis, Twitter, YouTube, MySpace) have made mobile devices more promising as an educational learning tool (Park, 2011).

Educators can deliver the learning topics like measurement using GPS to see distance traveled from point A to B, or using GPS to calculate length of time before reaching destination. Students can use the camera to capture a chosen location with human traffic during different times of the day as part of a data management topic. Figure 1 below demonstrates the mapping concept for the relation between Learning Topics, Learning Styles, Instruction Mode and Mobile learning mode.

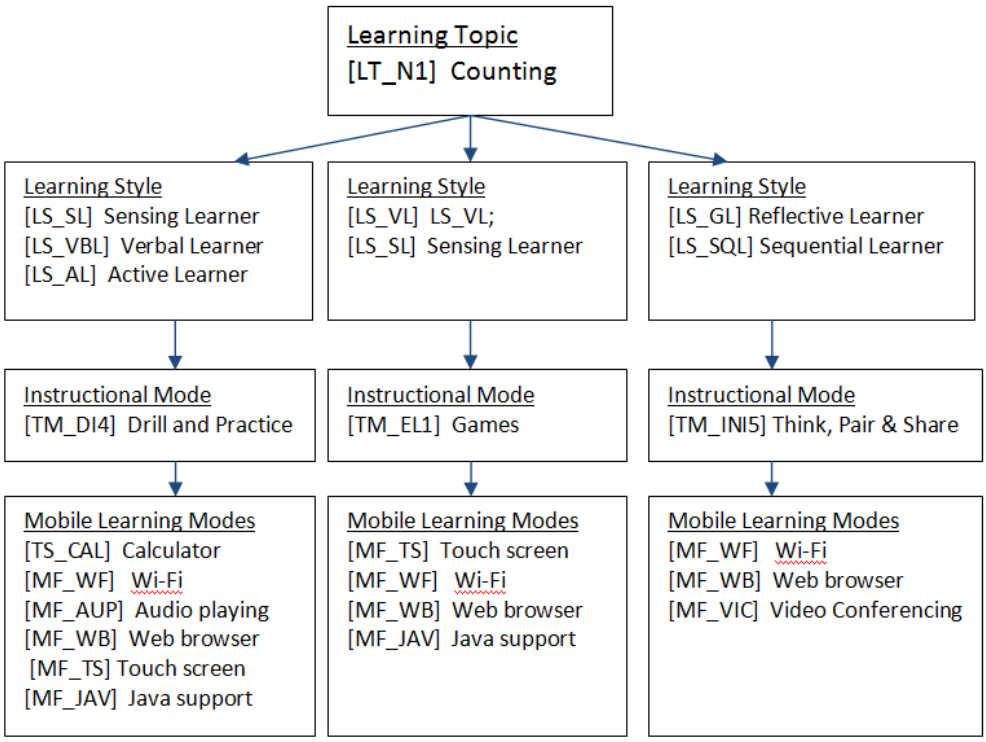

Figure 1. Mapping of Learning topic (Counting), Learning Styles, Instructional Mode and Mobile Learning Mode

3. Discussions

In Figure 2 below, a tally of mobile learning mode across all instructional modes was total and charted. There is clear indication based upon the list of instructional modes; there are some mobile learning modes that are more frequently considered useful. The chart has Bluetooth at a zero count, it indicates that it not considered useful for any delivery of instructional mode or learning domains.

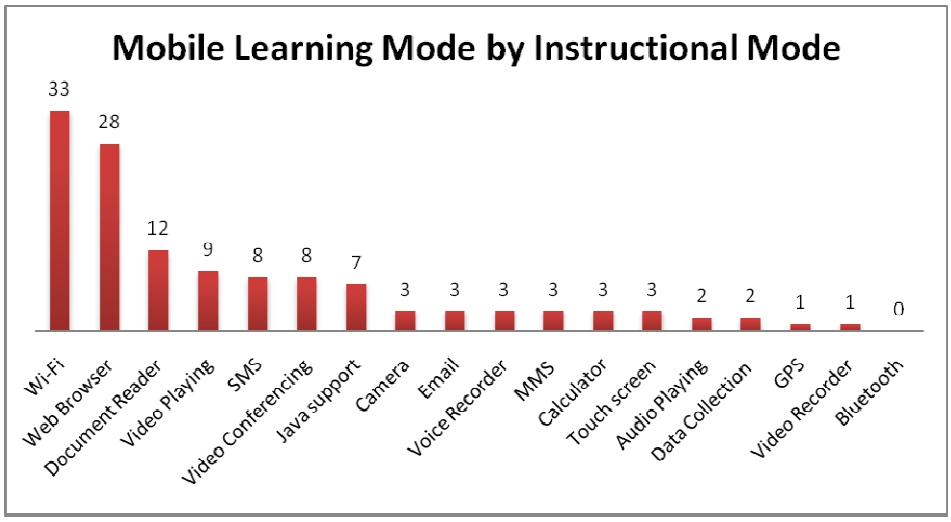

Figure 2. Mobile Learning Mode by Instructional Mode

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