iTouch and iLearn – an examination of "educational" Apps.

By Kristy Goodwin (Every Chance to Learn) and Kate Highfield (Macquarie University)

Abstract

With over 15 billion Apps downloaded since the inception of Apple's App Store, there is a preponderance of Apps marketed as 'educational' and designed for young children. Both teachers and parents seek educational Apps to use on touch devices like the iPhone, iPad and iPod touch. Despite the plethora of Apps currently available for young children in the iTunes Store, there has been limited systematic analysis of educational Apps and those designed specifically for young children. Researchers have failed to keep pace with the exponential growth in this technology. This presentation aims to introduce a content analysis of the paid Apps which are currently available as educational content in the iTunes App Store. The findings of this study provide important information for both parents and teachers and can also inform App developers when considering future designs.

Purpose

The emergence of mobile touch devices, such as the iPhone, iPod touch and iPad, provide rich opportunities for young learners. Teachers in the early years are seeing these as valid pedagogical devices (Olney, Herrington, & Verenikina, 2008) as they compensate for the fine motor skills required to operate a traditional computer with a mouse and allow young children to easily manipulate and interact with screen objects and create digital content. Informal observations suggest that some of the Apps designed for these devices allow young children to learn and discover in ways that are commensurate with their preferred learning modes: physical touch, trial and error and repetition (Michael Cohen Group LLC, 2011). These attributes make touch devices an appealing platform for young learners and may account for why parents and teachers are embracing these technologies.

Background

In two recent American studies, conducted by the Joan Ganz Cooney Center at Sesame Workshop (Chiong & Shuler, 2010; Takeuchi, 2011), a new phenomenon among parents was identified: 'the pass-back effect'. This involves a parent passing over their mobile device to a child. Parents reportedly do this for two reasons: (i) to induce passivity in the child whilst queuing or traveling in a car and (ii) to promote learning as many parents believe that touch devices are an educational tool and are therefore searching for 'educational' Apps to install. The parental assumption that mobile Apps are a source of learning is interesting as there is limited research to confirm this belief. Whilst some preliminary research has been conducted to determine the effectiveness of mobile Apps (PBS Kids, 2010, Shuler, 2009), much of the research has been conducted by large media organizations and are predominantly usability studies (Rockman et al, 2010). As an emerging technology, it is not surprising that there are no known empirical studies, to substantiate the educational efficacy of Apps specifically for young children.

A content analysis of the iTunes Store, conducted by Shuler (2009) found that 47% of the top 100-selling Apps (for iPhone and iPod touch devices) were designed for preschool or elementary aged children, with foreign language and literacy the most popular categories of Apps (Shuler, 2009). Watlington (2011) conducted a similar study in 2010, classifying the types of free Apps available for the iPod touch and iPad via the iTunes App Store. This study used the Haughland Developmental Software Scale (1998) to rate the free iPad Apps' developmental appropriateness and found that only 48% of the 108 Apps that were analyzed were classified as developmentally appropriate and recommended for educational use. This study also found that foreign languages and the Language Arts areas were also the most popular Apps for iPod touches. The findings from Watlington's (2011) study highlight the need of a systematic review of Apps marketed towards young children and classified as 'educational'. Given that anecdotal reports suggest that teachers and parents most frequently look for Apps for young children in the 'Education' section; a systematic analysis of the content and pedagogical design is warranted.

Method

The current study involved a systematic analysis of the "Top Ten" 'Education' Apps at four different points in time (six-monthly intervals) from April 2010 to October 2011. Paid iPad Apps were analyzed because Watlington's (2011) study found that of the Top-100 free iPod Apps analyzed, 65% were 'lite' versions

Goodwin, K., & Highfield, K. (2012*) iTouch and iLearn: an examination of 'educational' Apps.* Paper presented at the Early Education and Technology for Children conference, March 14-16, 2012, Salt Lake City, Utah.

which have limited functionality in an attempt to entice the user into buying the 'full' version. It is important to note that the researchers acknowledge that there are many quality free Apps, but it was beyond the scope of this study to include these Apps.

Data were obtained for three countries, with a focus on English-speaking countries, to enable comparison: United States of America, United Kingdom and Australia. An aggregate data analysis website was used to ascertain the "Top Ten" Apps at four intervals and were verified by the analytic data available from the iTunes Store. A database was established to record and analyze the data. All Apps (n = 240) were coded using the following characteristics:

1. Age: the specified age of the target user was ascertained from the App description or was determined by the researchers. The classifications were: Toddler (Birth-5 years), elementary (6-12 years), secondary (13 years plus) and multi-age (App could be used across multiple age ranges).
2. Subject: ten different curriculum areas were identified: Mathematics, Literacy (encompassing Language Arts), Foreign Language, Creative Arts (which also included Music and Drawing Apps), Science, History, Geography, Economics, General Learning (this includes Life Skills such as 'UK Car Driving Theory') and Multiple Curriculum Areas (for example, when numeracy and literacy activities were included within the one App).
3. Classification of Pedagogical Design: Each App was then viewed and classified according to its pedagogical design features, based on a classification scheme used to analyze interactive multimedia (Goodwin, 2009). Three broad classifications were proposed, based on the learner's locus of control over the activities presented in the App and their level of cognitive investment. The three broad classifications were *instructive*, *manipulable* and *constructive*. Two other sub-categories also emerged from the preliminary analysis: *Constructive/Manipulable* and *Manipulable/Instructive Apps.* These Apps contained a hybrid pedagogical design, with elements from both classifications.
   - *Instructive Apps* had elements of 'drill-and-practice' design, whereby the App delivered a predetermined 'task' which elicited a homogenous response from the user. These Apps required minimal cognitive investment on behalf of the learner. "Math Bingo" by ABCya.com is an exemplar of *instructive* design.
   - *Manipulable Apps* allow for guided discovery and experimentation, but within a pre-determined context or framework. These Apps required more cognitive involvement than *Instructive Apps*, but less than *Constructive Apps*. An example of a *manipulable* tool is "Toontastic" by Launchpad Toys.
   - *Constructive Apps* were characterized by a more open-ended design which allowed users to create their own content or digital artefact using the App. Musical Apps and drawing Apps are emblematic of *Constructive Apps*. "Drawing Pad" by Darren Murtha is an example of this pedagogical design.

Results and Discussion

Of the 'Education' Apps analyzed 23% were designed for Toddlers and 25% for elementary children. This finding is consistent with Shuler's study (2009). Also interesting was that a large proportion (38%) were classified as 'Multi-age' whereby the App was suitable for a wide range of students.

Analysis of the content presented indicates that Literacy (21%) and Science (20%) were the most popular subject areas represented in the Apps analyzed with another 18% addressing multiple curriculum areas in the one App. While many Apps embed mathematical processes, these may be considered under-represented in the 'Education' section, with only 14% focusing on mathematical content and processes. Creative Arts is also significantly underrepresented in 'Education' with only 4% of apps in this curriculum area. There may be a correlation between the frequency of subject areas and the age range of the students, with 57% of the literacy apps being designed for toddlers. This may reflect parents' concerns about school readiness and the perceived need to acquire literacy skills prior to starting school.

Analysis of the data set for 'Classification of Pedagogical Design' and reveals that 75% 'Educational' Apps were classified as *instructive*. There are several proposed explanations to account for this finding. Firstly, App developers may have an entrenched philosophical view of what constitutes learning, which may be aligned with more of a behaviorist approach. In addition, the linear and prescriptive design of such Apps may also be easier for developers. An alternative explanation may be that parents view learning in terms of more traditional 'drill-and-practice' activities and may search for Apps designed in this way.

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From an early childhood educator's perspective there is a notable absence of *Constructive Apps* in the 'Education' classification, with only 4% of Apps classified as *Constructive* or *Constructive/Manipulable.* If open-ended, learning and representation is essential to foster young children's creativity and thinking skills their absence in the 'Education' category is noteworthy. Interestingly, further analysis indicates that these Apps are available in the App Store but were located in either the 'Apps for Kids' or 'Entertainment' sections of the App Store, rather than classified as 'Education'.

Conclusions

Although this study is limited by its focus on one media platform, that is Apps available in the App Store, three main conclusions may be drawn from this analysis. Firstly, the fluid nature of the current iTunes classification system of Apps makes it difficult for both parents and educators to easily access quality 'educational' content, with a limited range of curriculum areas present and some spurious content classified as 'Educational'. If the classification as 'educational' is perceived as an endorsement of content this could be problematic. Secondly, the considerable presence of an instructive pedagogical design, with limited *manipulable* or *constructive* Apps easily accessible to educators is noteworthy. While these apps may be present in other sections of the App Store, the current process of classifying Apps may in fact restrict parents' and teachers' access to valuable educational tools. Finally, this research highlights the need for further research examining children's use of Apps and the impact of pedagogical design on learning and play.

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