

DOMINATING TRENDS IN EDUCATIONAL MOBILE APPS: THE FUTURE OF EDUCATION

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ABSTRACT

The purpose of this study was to investigate applications tagged as educational in the Apple App Store and Google Play Store in Malaysia between 2013 and 2017. We acknowledge the imbalance of the educational apps categories these past five years in the Malaysian apps market and hence, a content analysis was conducted to analyze the pool of apps on both stores. These educational apps were classified into three categories; skill-based apps, content-based apps and function-based apps. App Annie which is an app analytics tool was used to collect the apps data. The emerging trend that could be seen was the apps targeting toddlers, which was more than half the market in both stores. However, the classification of educational apps was mostly pooled under skill-based apps. These findings could assist the apps developer to design engaging quality apps focusing on educational content based on the current market trend.

Keywords: educational apps trend; educational apps classification.

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1. INTRODUCTION

When the iPhone made its debut in 2007, we did not visualize that mobile applications (referred to as ‘apps’) might become a multibillion dollar market as well as a significant one for children [1]. Less than five years later, more than a quarter of all parents have downloaded apps for their children to use [2]. The earliest research on mobile apps dated back in 2009 whereby it was a year after the mobile apps made its first appearance in the Apple App Store followed by Google Play Store for Android users. Consequently, the previous content analysis study on emerging trends for educational apps was considered in this paper. This is important in identifying the gaps that exist in the previous content analysis done in previous studies. Moreover, the field is emerging so quickly that the research on effectiveness of these apps for learning have lagged and learning apps for mobile devices have become a recent debate on educational technology topic [1].

The lack of empirical study in educational apps has led to the opportunities of conducting this study [3]. Furthermore, the field of educational apps is still a relatively new topic of research [4]. Hence, one reason for conducting this research initially was the way educational apps make a significant impact in the brick and mortar education setting [5]. Apart from that, this study aimed to discover the emerging trends in educational apps in these latest five years starting from 2013 until 2017. We wanted to observe if there were any changes or progressions in the trends of educational mobile apps. The trends that were observed were based on several aspects: age, apps’ star rating, developers, country of origin of the developers, subjects, year published and latest update from the developers. In addition, the classification of educational apps into skill-based, content-based and function based on Blooms revised taxonomy was deemed important. This is because, we could observe these educational apps’ classification in the Malaysian market for Apple App Store and Google Play Store platform. Accordingly, in this paper we highlighted: (1) the emerging trends of the educational apps and (2) the prevailing classification of educational apps; both in the Apple App and Google Play stores in Malaysia between the years 2013-2017.

2. METHODOLOGY

2.1. Apps Selection

We selected the apps by following [6]'s guideline on conducting the content analysis on interactive media. Only the education section of both Apple App Store and Google Play Store were considered. The selection was based on the pool of apps that were available on both platforms on a specific date. Two other criteria were considered including being free of charge and in the education category of the Apple App Store and Google Playstore.

2.2. Instruments

A data collection instrument in the form of electronic coding forms (in the form of a check list) and codebooks were designed and used to collect and extract data. The electronically produced codebooks which included images, diagrams and links to instructive online materials (such as specific exemplars) were used. The codebook consists of the definitions of the themes whereby the educational apps classification framework's explanation was also given. The classification of the educational apps in the Apple App Store and Google Play Store uses the classification framework by [4]. This framework classifies these educational apps based on skill-based apps, content-based apps and function-based apps. Both codebook and coding forms were made available online in Google Form. This was to ensure a seamless collaboration between the coders to code the educational apps while providing an environmentally friendly research for a paperless research.

2.3. Reliability

As suggested by Cherner (Personal Communication, 2017), the inter-coder reliability was calculated using the Pearson Correlation Coefficient calculator. The inter-coder reliability for this study was 0.82 showing a strong positive correlation between coder 1 and coder 2.

2.4. Research Procedure

The research procedure as in Figure 1 shows the overall research procedure applied in the study. Once the coders were trained in using the codebook, they were given a week to code the apps on play mode that we provided on both the iPad and tablet depending on the operating system. Then we collected the coded forms via the Google Forms link to analyze the results. Sorting and sifting the educational apps as well as selecting and coding apps were done continuously and iteratively throughout the research. Consequently, discoveries were

found on the emerging trends together with the classification of educational apps in Apple App Store and Google Play Store.

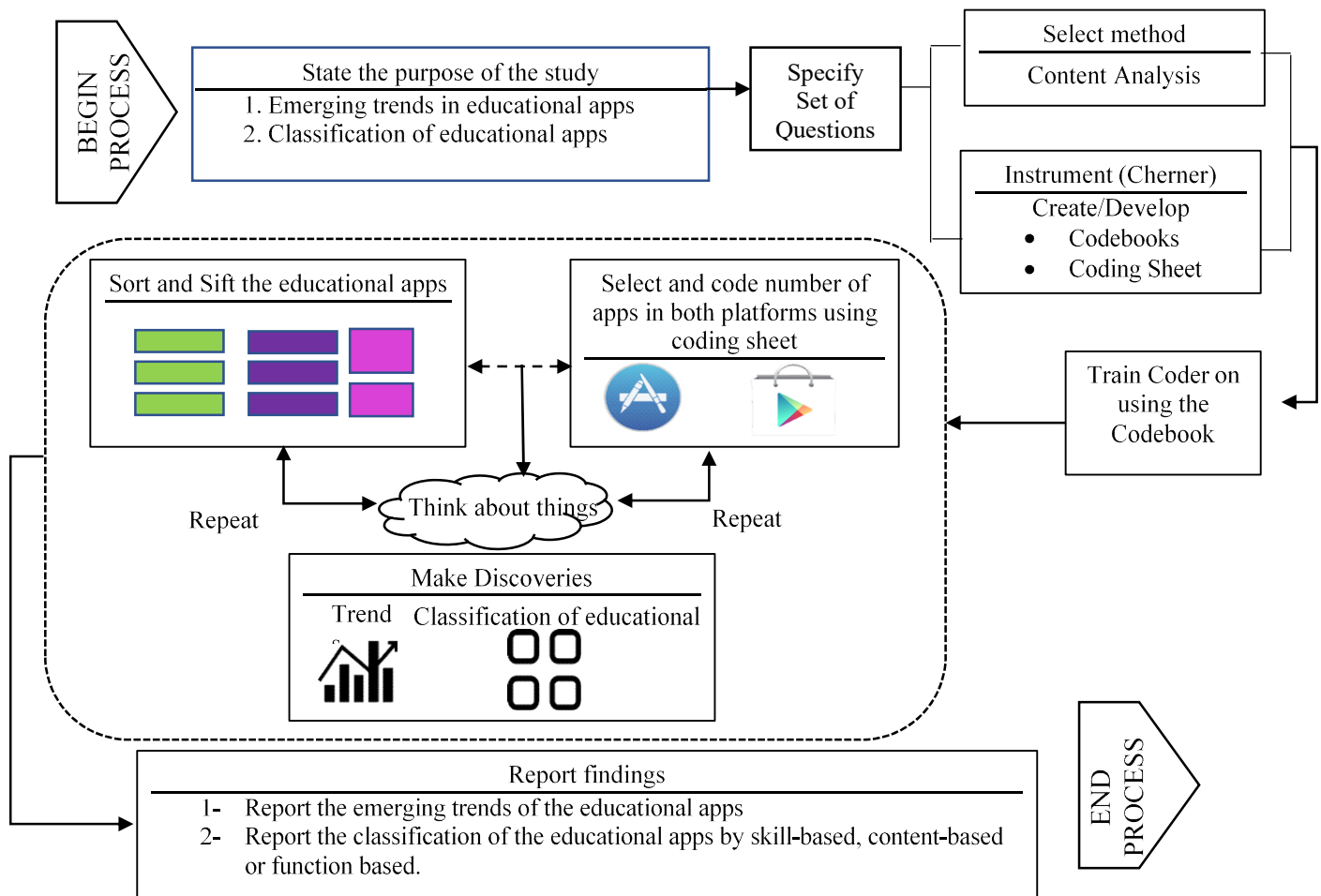


Fig.1. Research procedure diagram adapted from [7]

2.5. Data Collection and Analysis

The data was first generated by App Annie which automatically filters the apps based on the education category; top free apps, education section and availability of the apps in the Malaysian market. A total of 686 apps were listed and generated; then, we manually sort and sift the apps to ensure the apps fit the purpose of the study. From 686 for both Apple App Store and Google Play Store, a total of 229 apps fit the filtering categories. After the process was completed, we downloaded the data from Google form in Excel .csv files. Additionally, the data in Excel sheet were separated by their respective research questions. From there, the data were analyzed using pivot table feature in Excel.

3. RESULTS AND DISCUSSION

3.1. Emerging trends of the educational apps section of the Apple App Store and Google Play in Malaysia between 2013-2017

Age. There were four main age categories that we observed in this study: Multiage category (has the potential to be used for all age), Primary category (6-12 years old), Secondary category (13 years and above), Toddler category (birth to 5 years old). The most popular category in both stores was the Toddler category, which comprise of 66.38% out of the total market segments for other age categories. This result was aligned with several studies (such as [1, 5, 8-9]), which state that the apps market in the education category focused on children. But, there was some improvement from what [5] had discovered, which now the educational apps for the apps targeting multi age was the second highest pool of apps under the education category in both Apple App Store and Google Play Store.

3.1.1. Stars Rating

Most of the educational apps in the Apple App Store were rated as 4.5 stars followed by no rating category with a total of 56 apps. Only 8 apps were categorized as 5 stars rating in the Apple App Store. Star ratings on Apple App Store were mostly in 0.5 range increment. An inconsistent apps star rating could be observed in Google Play but the ratings for most apps were much higher in Google Play Store. This could be due to Apple making it mandatory to log into iTunes account in order to leave a review or rating. It is troublesome to just log in the iTunes for the sake of rating the apps [10]. On Google Play, reviews were integrated with Google and if one was an Android user, the Google Play was already integrated with Google+ account hence rating and reviewing the educational apps were much easier compared to Apple App Store [10]. There were 24.5% of the total apps analyzed that have not been rated and this is mostly from Apple App Store. The apps in Google Play Store overall were rated because the developers in Google Play Store need to complete a rating questionnaire for their apps in Google Play Developer Console as it was the requirement for all apps submitted to Google Play store [11].

3.1.2. Developers

We managed to see the pattern of Apple App Store and Google Play Store dominant developers in the Malaysian market. The highest developers with the most published apps in

the Malaysian market were published by Babybus with a total of 60 apps overall which targets the children educational apps. As for Google Play Store, the most published apps were by the developers of Teachers Paradise, Edubuzz Kids and Mage studio with 5 apps respectively.

3.1.3. Country of Origins

The Malaysian market in the Apple App Store was dominated by the developer from China which was Babybus. The second highest is the personal/private app developer category, which consists of 38 apps developer that the country of origin could not be traced. As for Google Play Store developers' country of origin, the highest apps were developed by personal/private developers but their country of origin was not mentioned in the Google Play Store platform consists of 65 developers. Thus, from this pattern, the developer from China marks the Malaysian educational apps' market followed by a less than a quarter of apps around 28.4% apps that could not be traced the country of origin since it is published by private/personal publishers.

3.1.4. Subjects

The highest subject category for apps in the Apple App Store was General Learning with a total of 56 apps while on Google Play Store was categorized as Literacy subject. The second highest subject was Creative and practical arts with a total of 50 apps and the third highest app targeting Literacy with a total of 49 apps on both Apple App Store and Google Play Store. Mathematics followed next with a total of 24 apps, trailed by multiple curriculum areas with a total of 23 apps and Science app with 13 apps in total. However, the lowest subjects include History, Religious and Coding with 2, 4 and 8 apps respectively. Findings showed that the general learning apps and the creative and practical arts dominates the Malaysian market. This result was unlike the previous study by [1] that stated a low number of creative apps in the market at that point of time. But, on the other hand, the result was quite the same regarding the general learning in the Shuler's study. Religious apps were on the rise as well as the coding app. Even though the coding apps were not as abundant as the other subjects' category, the presence could be felt in a sense of the ability to code such as C++, Swift, C#, Java were on demand since they were amongst the top programming languages from a career perspective [12].

3.1.5. Year Published and Latest Update from the Developer

Most of the educational apps were published in 2015 and the lowest was in 2013 with a total of 48 apps and 6 apps respectively. There was none for Google Play Store since the platform did not provide publication date. With respect to the latest update from the developer most the apps were updated in 2017 for both the Apple App Store and Google Play Store with a total of 109 apps and 63 apps respectively.

We noticed the difference in the year that the apps were published on Apple App Store. Most of the apps were published in 2015 but were still in the market as of 2017. We saw that there was no content about the year of educational apps being published in the Google Play Store, only the latest year published has been provided by this store. This was due to Google Play will only let the users install the latest version of an app and that is why, the users could not check the version history as in Apple App Store [13]. For the developer in Google Play Store, the apps are mostly latest as it is typically supposed to be an improvement over previous versions such as bug fixes, better support, and others [13].

3.2. Classification of Educational Apps in the Apple App Store and Google Play in Malaysia between 2013-2017

Table 1 recorded the classification of educational apps on Apple App Store and Google Play Store Malaysia. A total of 121 apps were recorded under skill-based apps in Apple App Store and 89 apps on the Google Play Store which was the highest category recorded for both platform. Next, for content-based apps and function based apps categories, both categories were only available in Apple App Store with a total of 16 apps and 3 apps respectively. The highest classification on both platform falls under skill-based category with a total of 210 apps followed by 16 apps in content-based, and 3 apps for function-based. The result of this study has observed a distinct classification whereby more than 90% of total apps population are under the skill-based apps. Skill-based apps are apps that use recall, rote memorization, skill and drill strategies and it falls under the lowest level on Blooms' taxonomy which are:

3.2.1. Remembering and Understanding

This result could be due to the trends mentioned in the previous research question, which are the vast array of apps that has been analyzed are targeting toddlers. For that reason, this is why the classification of these apps falls under the skill-based category with the lowest level

in Bloom's revised taxonomy. The apps in this category build students' foundation in literacy abilities, numeracy skills, standardized test readiness, and subject area knowledge. Table 2 shows an example of the apps within the classification scheme. From a personal perspective, there is no need for higher order thinking skills when involving toddlers' educational apps since a strong foundational knowledge is sustainable according to their respective age. This skill-based knowledge could be embedded at an early age, therefore, the focus on ensuring the children memorize and understand the concept before moving to a higher level of thinking is preferred.

Table 1. Classification of educational apps on Apple App Store and Google Play Store

Classification	Apple App Store	Google Play Store	Total
Skill-based Apps	121	89	16
Content-based Apps	16	0	3
Function-based Apps	3	0	210
Grand Total	140	89	229

Table 2. Examples of apps according to classification scheme

Skill Based Apps	Content Based Apps	Function Based Apps
1. First words	1. Learn to Code with C++	1. Pyonkee
2. Baby learns transportation	2. Learn to Code with Python	2. Toontastic3D
3. Laugh and Learn puppy's player	3. Learn to Code with C#	3. Sketchbook for Education

4. CONCLUSION

The trends that could be observed from this study was that the educational apps market in Apple App Store and Google Play Store Malaysia were catered to the toddlers aged from birth until five years old. The difference in how the apps were rated varies from Apple App Store and Google Play Store due to the different method of rating in both stores. Furthermore, the increment of star ratings was also different when it comes to Apple App Store, the increment is at 0.5 per increment on the other store and inconsistent increment could be noticed. Furthermore, the developers that developed most of the educational apps was Babybus from

China. The highest score for subject's category comprised of General Learning and Creative and Practical Arts. It could be seen that year of the apps published category was not available in Google Play Store since the user of it can only download the latest version of the educational apps and half of the apps are latest updated in 2017.

With respect to the classification of educational apps, a majority of apps were categorized as skill-based apps compared to content-based apps and function-based apps. This could be traced back to these educational apps catered to children, which do not require a higher order thinking skills at a certain age. In a nutshell, the findings of this research could be used to further improve the quality of educational apps and as well as developing the apps into other categories of age as well so there will be less imbalance in apps preferences for all learners. Moreover, the apps developed has to be in higher cognitive level according to the age category and not just covering the surface level. Hopefully, the educational apps ecosystem will be much improved and innovative in the future for the sake of our future generations' quality education.

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