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Problem solving in electric & magnet: animation in hypermedia presentation

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ABSTRACT
Development of technology in education brings extended enhancement of pedagogical in teaching and learning of electric & magnet subject. This paper is focused in designing electric & magnet problem solving tool. Flash8 software is used to develop 15 animations related to the electric & magnet topic: Magnetic field. All those animations are then compiled in a sheet of prezi.com presentation software as an animated mind-mapping hypermedia presentation. Result of the complete page can be accessed in Google website if the keywords were entered. Despite the tool also can be downloaded as apps from your iPad, iPhone or android in the Monkey market or in the Android market. This problem solving aids is also recommended for the tutorial, teaching or e-learning purposes. Although the design focused on the electric & magnet topic, it is also applicable to be performed in any other subject area.

Introduction

Marc Prensky (2010) clarify that nowadays students who known as digital native are growing up in a digital world that learn in new and different ways, thus educators responsible to produce new enhancement pedagogical techniques to make learning real and relevant to them. Najib (2012) also stated that new approaches and strategies required in the process of education transformation for students to master the skills needed in the 21st century. Thus, the transformation in education technology should also lead to an effort to understand and improve the teaching and learning process.

Presentation software generally is programs that are design to create digital support materials for oral presentation. Rob Campball (2010) evaluated prezi presentation software as a great way of visualization of information. This hypermedia presentation will engage the audience with a dynamic and multi-dimensional slide show. A great presentation would include text, graphics, audio, animation, or video clips. The dynamic visual display in animation is would help much in achieving learning objective as give great effect to the presentation (Boyle.T, 1997). In physics, animation able to help students understand difficult complex theory and concept. As animation is capable of expressing a human fantasy into reality, it makes something quite hard to explain using text or static images delivered more easily and effectively (Najib.A.S.M, 2013).

Park and Gittelman, (1992) make hypothesis that animated visual displays would be more effective than static visual displays if animation was selectively used to support the specific learning requirements of a given task. From multimedia theory of multimedia principle, Mayer's (2001) explains that students learn better from animation or picture and narration or words than the words alone. Further, Mayer (2005) concludes that some of multimedia applications as flash animations have been used to identify the most effective tool in facilitating the learning environment.

A research in USA, multimedia education system in physics learning, called LEMMA found that overall respondents enjoyed using the multimodality (text, speech, visualization, 3D interaction) system as tutorial provided with useful visualizations for the abstract concepts which helped in understanding the content. However, the new discover of the hardware and overall system disrupts a bit attention of the respondent from the physics content (Breisinger.M, Hollerer.T, Ford.J.K, Folsom.D, 2006). Therefore, Kobsa.A, Koenemann.J & Pohl.W (2001) suggested selective actions are useful to recognise users' unfamiliarity with system by letting students click on the page themselves.

De Vries, E. (2000) strengthen that usage of hypermedia is one of the innovative pedagogy in presenting information of educational content. Shapiro and Neiderhauser (2004) also discovered that hypertext in computer base instruction is a best approach to improve students' ability to integrate concept, perform problem solving and generate multiple mental representation and understanding.

In additional of the research, the educational apps for mobile device represent extraordinary and large unexplored tools for educators and learners to build skills, knowledge and expertise needed in 21st century. Since the mobile revolution is overcome the world , with the capability and availability of smart phone, iPad and tablet, Bradshaw (2011) claimed that many universities, K-12 school, and institution are choosing the device as their method of teaching and learning and distance classroom education. Mobile learning with rapid growth of mobile technologies is a new which highly available would be an Open Educational Resources have very much potential to revolutionise education in the classroom, workplace, and for informal learning, wherever that may be as education becomes accessible and affordable for everyone (Ally.M & Tsinakos.A, 2014).

As in higher education, electric & magnet is an important subject, the objective of this paper is to focus on the development of the tool in problem solving of electric & magnet topics; Magnetic field. There are 3 main processes in development of the tool:

1) Animation design using flash8 software and export as a movie in .swf file format.
2) Animation will be imported into prezi.com software and organize them as an animated mind- mapping hypermedia presentation.

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3) Create applications of the hypermedia presentation for the use of iPad, iPhone and android.

Result of the complete hypermedia presentation is available in the Google website. Keywords "prezi animation model 1" need to be entered to access the link.

While in the other way, the result also can be downloaded as apps at monkey market web http://apps.monk.ee or at android market Google play store from your iPad, iPhone or android by searching "prezi 1 magnetic field".

Material and Method

Preliminary Stage

Preliminary stage focused on the content structuring in the animations design. The Magnetic field topic is chosen and divided into 8 subtopics and 15 animations are developed correspond to the subtopics. Table 1 shows the classification of the subtopics with the number of animation created.

Table 1 Magnetic field subtopics with the number of animation created

Subtopics	Number of animations
Magnetic field on a particle	3
Magnetic field line and solenoid	2
Discovery of electron	1
The hall effect	1
A circulating charge particle	2
Cyclotron and synchrotron	1
Magnetic force on a current carrying wire	4
Torque on a current loop	1

Based on table 1, the number of animations created is accordingly to the needed of the understanding to the subtopics.

Phase 1

Flash8 is software which designed to create colourful dynamism animation. Flash8 imply for animations and interactive animations. Phase 1 is about development of animation using the flash8 software. To start the work page, user need to choose create new "Flash document" at FrontPage as shown in the figure 2 below.

Figure 2: Flash8 Software FrontPage

In order to develop the animation there are a few of basic important flash8 environments that user need to know such as menu bar, layer, tool bar, timeline, panel and stage which are labelled in red text in the work page of flash8 as shown in figure 3.

When first start, user need to select insert at menu bar to insert layer as shown in figure 4. Layer is function to manage flash8 efficiently. Many layers will give good ordered animation and easy use. User is advised to use different layer for different objects such as image, picture, text or graph to avoid the mix-up frame fact because if they are in one layer, they have to share the same frame. In this case, refer figure 4, layer 1 is assigned for changed text and picture, layer 2 for the static or unchanged text and layer 3 for the movement of current and electron.

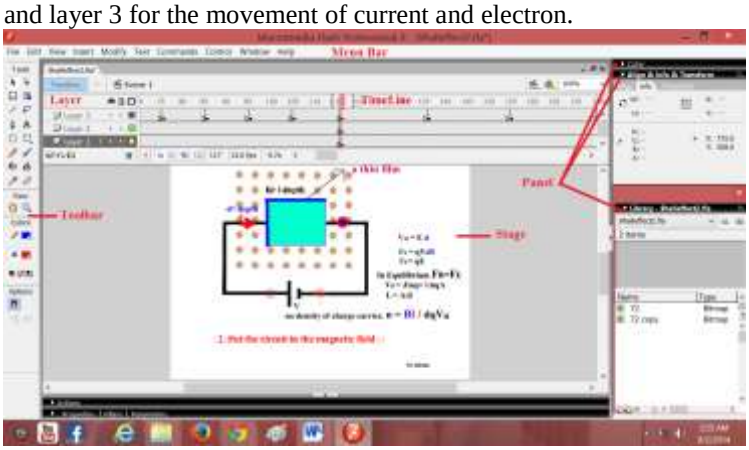


Figure 3: Work Page of Flash8

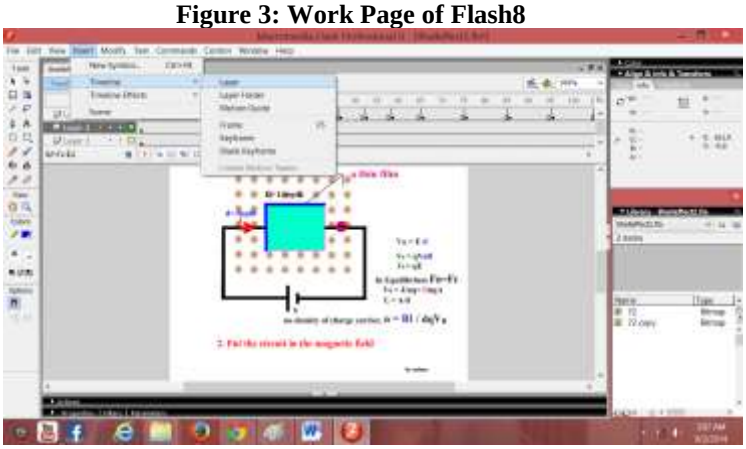


Figure 4: To Insert Layer

The next step is to insert frame and keyframe in the planned timeline for a movement of an object. User has to right click at the frame on the assigned layer as in figure 5 or the function is also applicable at the submenu insert at the menu bar.

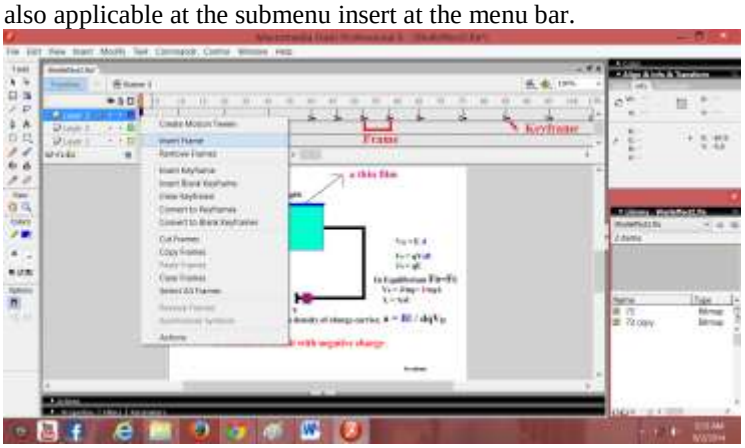


Figure 5: To Insert Frame and Keyframe

Next, draw or insert the object in the stage. Initial object is inserted in the created frame at certain timeline and position of the object is changed in the next keyframe and at the next timeline to generate animate movement. At one layer, user can use unlimited timeline started with timeline 1. User also can control the length of a time for one picture or image by extending or shorten a frame at the timeline.

As seen in figure 6 below, layer 3 at timeline 115, figure shows the electron and current is outside the thin film. While at layer 3 timeline 135 as in figure 7 shows the electron is entering the thin film and appearance of the symbol V_d and F_B at the electron. The different between one keyframe to another at certain timeline makes them looks animate.

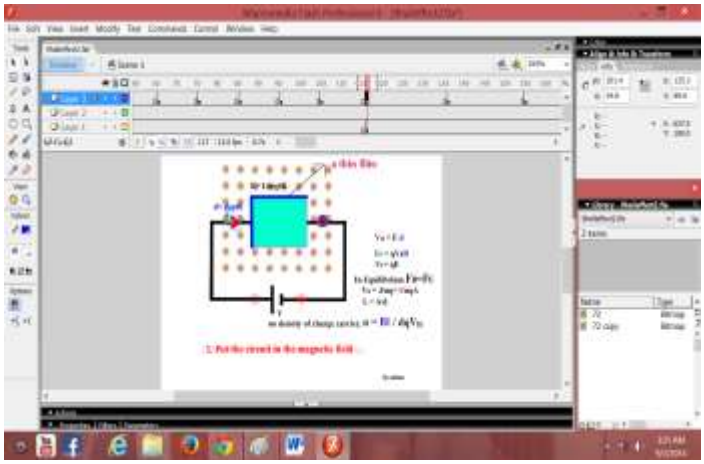


Figure 6: Layer 3 at Timeline 115

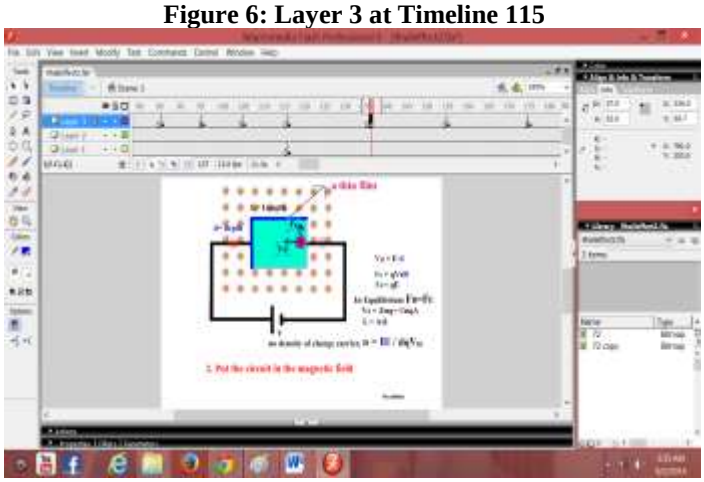


Figure 7: Layer 3 at Timeline135

Finally, when complete the design of all frames, ".fla" file is exported to ".swf" file as shown in figure 8. This step is important as continuously in phase 2, prezi.com software only can recognize animation in .swf file format.

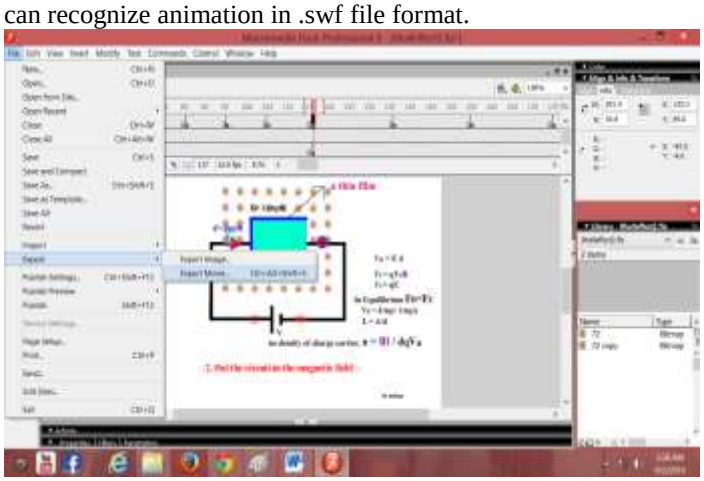


Figure 8: Export Movie

Phase 2

Prezi is a presentation software which appear as a virtual whiteboard that allows people to see, understand and remember ideas. The zoomable characteristics of prezi let people enjoy when exploring ideas in the slides. The new approach in Prezi is the two way presentation as people could actively interact with audience (S. Cameron, 2013). In Phase 2, the mind-mapping presentation slide will be developed in prezi software. First to enter the software, google the prezi.com and click log-in in the prezi-Ideas matter web page as shown in figure 9. If user first time log-in, registration must be done to create new account. User can follow the step guided in the web page.

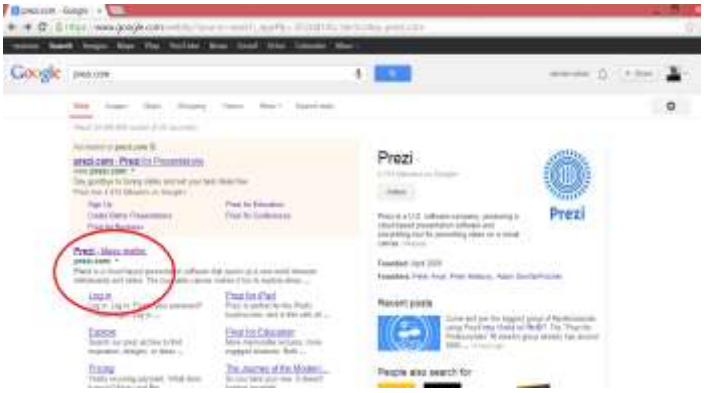


Figure 9: Prezi.com Software

After log-in in the created account "aainaa salwa mohd najib", the page will appear as in figure 10. To create a slide presentation, click new prezi and the page will ask user to choose a theme for the slide. The theme can be chosen as in figure 11. The created slide, can be updated or changed anytime when enter the web page by clicking edit at the presentation slide.

Figure 10: Prezi Presentation Slide

Figure 11: Theme Selection

Next, the most important part in phase 2 is to import the .swf file into the slide. As shown in figure 12, to insert the .swf file, user must click insert and insert from (PDF, video…), then browse the file from personal computer where it's located.

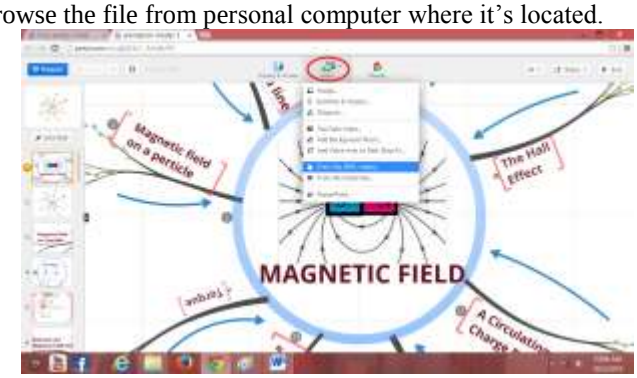


Figure 12: To Insert .swf file in Prezi.com

Phase 3

How to publish apps in www.infinitemonkeys.mobi/

1. Enter the web www.infinitemonkeys.mobi/ and enter the title of your apps, then click "Get Started!" as shown in figure 13.

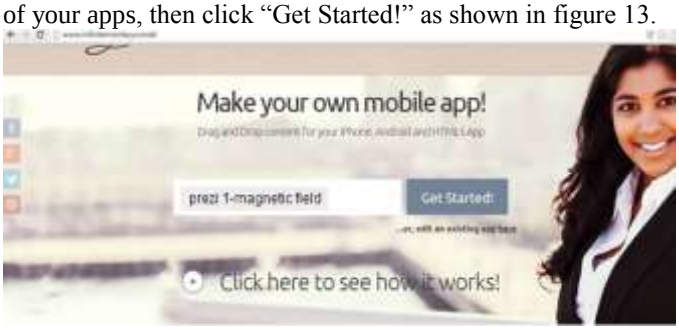


Figure 13: Get Started

2. Google was choosen to sign-in to next page or can be facebook, twitter or yahoo as seen in figure 14.

Figure 14: Sign-in

3. After sign-in, (figure 15) Publisher Dashboard will be appeared and ready with your app to be filled in and completed. Click edit.

Figure 15: Publisher Dashboard

4. Step 2 as in figure 16 has to be filled and completed which consist of background, header and Icon.

Figure 16: Background, Header and Icon in Step 2

5. Step 3 as in figure 17 have to be filled and completed which consist 1-10 items of Project Title, Pick your HTML5 Domain, Choose your Icon, Write a Description, Write a Welcome Message, Add some additional info, Add some tags, Publish Categories, Contact Information and Demographics. When complete every items have to be saved and click next.

Figure 17: 10 items in Step 3

6. Finally, choose how you want to publish your app. Then click "Publish Your App Now" (figure 18). The apps will be published in a few hours.

Figure 18: Publish the apps

How to publish apps in Google Play Store

1. Google to "Google Play Developer Console". Sign-in page will be appeared. Sign in to enter the work page as seen on figure 19. Attention that developer has to create an account in Google Play Developer Console that need to pay some amount which stated in the web site in order to sign-in.

Figure 19: Sign-in

2. Click at " Add new application" and enter your apps name. Start with store listing as shown in figure 20.

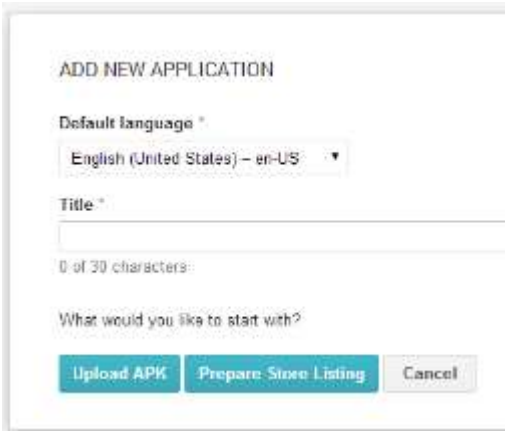


Figure 20: Prepare Store Listing

3. Upload the .apk file from desktop or pc as in figure 21.

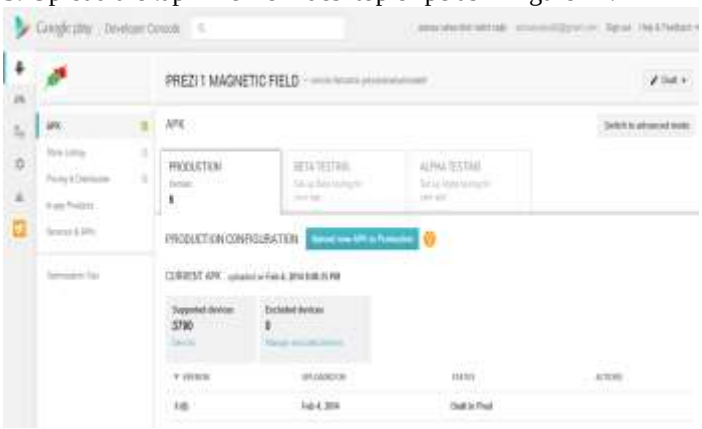
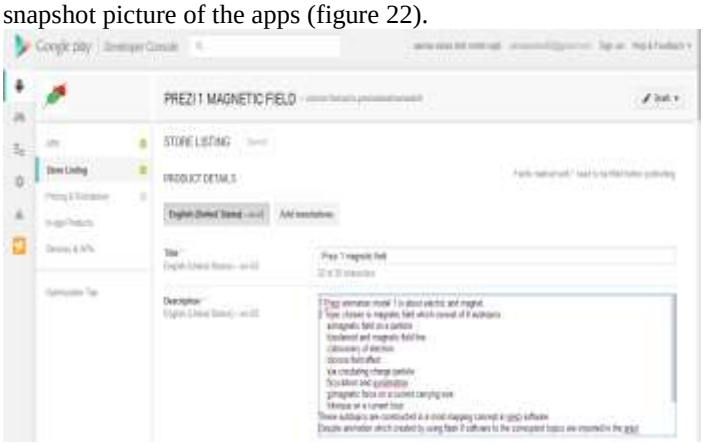
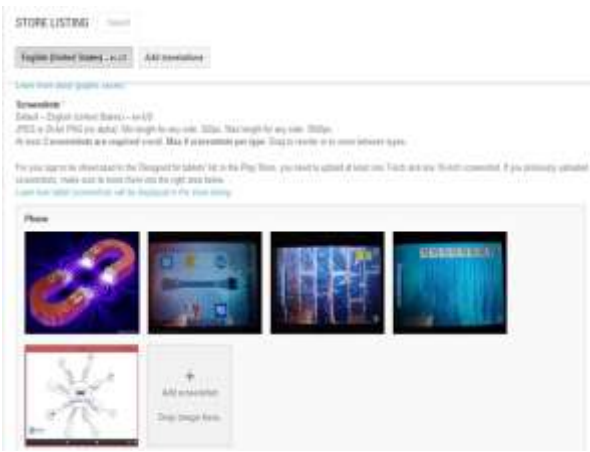


Figure 21: Upload .apk file

4. Click at store listing and fill in the needed information and snapshot picture of the apps (figure 22).





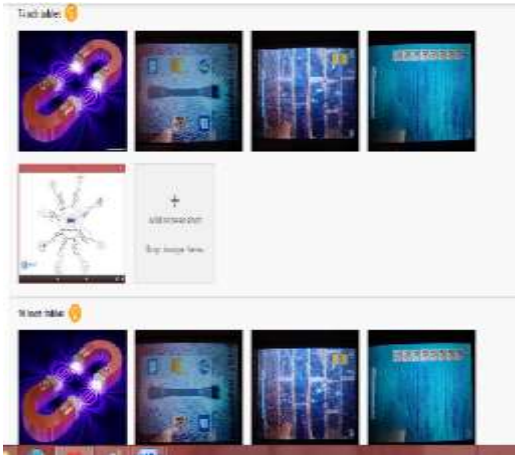


Figure 22: Store Listing

5. Click at Price & distribution and fill in the needed information of the apps as seen in figure 23.

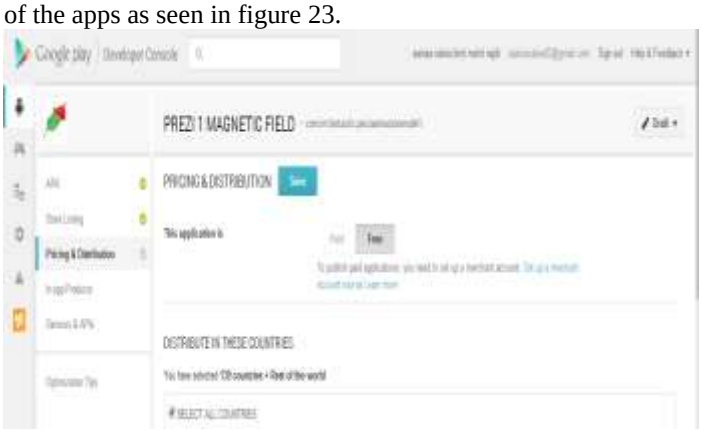


Figure 23: Pricing & Distribution

6. Finally, after finish fill in .apk file , Store Listing and Pricing & Distribution, click "Publish" the apps (figure24). The apps will be published in several hours.

Figure 24: Publish the apps

Result

Google

The animated mind-mapping hypermedia presentation slide can be viewed by entering the keywords in the Google as in

figure 25. Slide will appear as shown in figure 26. User can view the slide and repeat as per required.

Figure 25: Access Prezi Slide

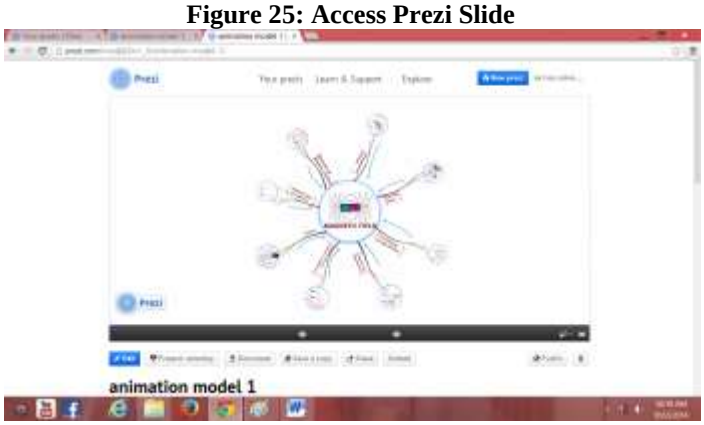


Figure 26: Prezi Mind-Mapping Presentation

While, if using creator's account, online presentation can be done as shown in figure 27 by clicking "present remotely". To start online presentation, link must be sent via email to invite audience. Only 30 audience maximum can follow the presentation.

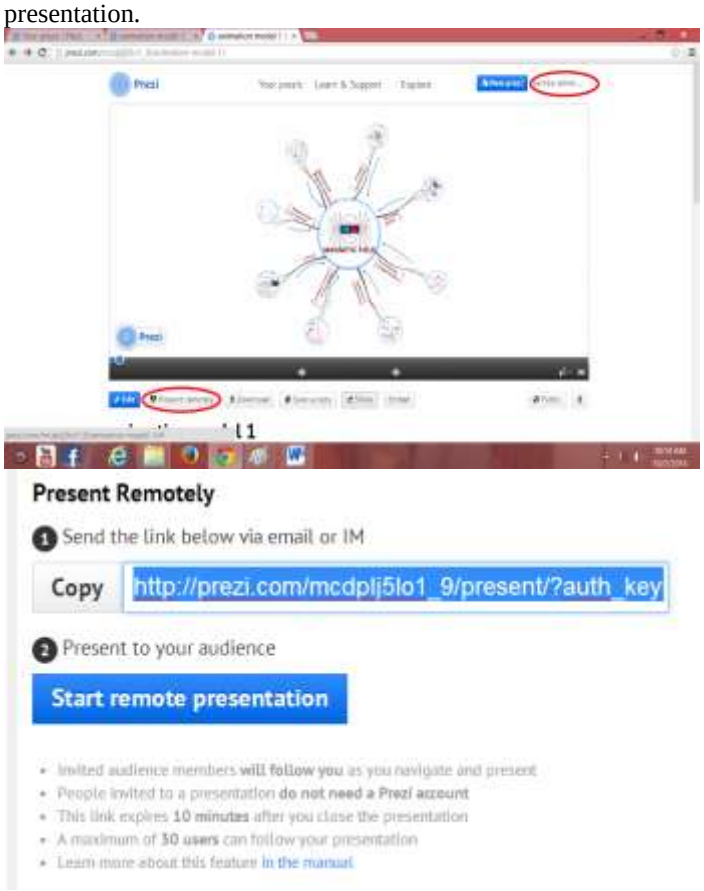


Figure 27: Online Prezi Mind-Mapping Presentation

Applications (Apps)

In the other way of reaching the prezi slide, user also can download the app from their ipad, iphone or anaroid which is created and published in the web http://apps.monk.ee as shown in figure 28 or in the play store as shown in figure 29 by both searching "prezi 1 magnetic field".

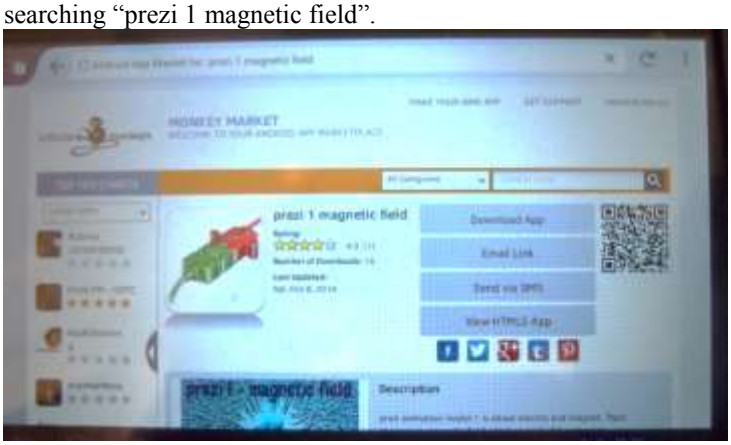


Figure 28: Application in the web http://apps.monk.ee

Figure 29: Application in the play store

Discussion and Recommendation

To view the prezi slide, users can access anytime even they do not have account in prezi.com software. Animated prezi presentation slide is easy and friendly use as user can directly access the hypermedia slide by just Google and enter the keywords. Extended in the other way, user also can access the hypermedia slide as apps from ipad, iphone or anaroid. Additionally, instead of the hypermedia presentation in prezi web, the apps also prepared with the power point presentation and question bank together with the answers scheme related to every subtopic for the problem solving purpose which user don't need internet to access the icon. However, to view the icon prezi web in the apps, user need to get connect.

Furthermore, for the creator, online presentation can be performed by sending the provided linkage via email to up to 30 audiences in one time. In this case, the slide also can be multiply use as teaching and tutorial material and even for e-learning purposes which every audience could see the presentation move as per presenter sheet move. Thus, the audience will not lost while do learning.

According to the interactive principle (Clark and Mayer, 2003), deeper learning happen when learners are allowed to control the presentation rate than they are not. However, a problem occur that control buttons to start, stop or pause defined in the flash8 software function well are not so when the animations .swf file imported to prezi.com software. It also happened to the sound imported from .swf file. Thus, the sounds need to be put directly in the prezi.com software and there is no control buttons allocate in the completed prezi presentation

slide. Limitedly, for the free package of prezi software, only 100Mbyte of memory are located. User need to pay some amounts which are announced in the website if user wants unlimited memory by download the prezi desktop software.

Suggested more hypermedia mind-mapping presentation slide with scientific animations and application will be generated in future.

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