Design an Android Education Program using video tutorials in Bangla

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Fall 2010

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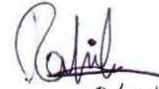
Declaration

We hereby declare that this thesis is based on the results found by ourselves. Materials of work found by other researcher are mentioned by reference. This thesis, neither in whole nor in part, has been previously submitted for any degree.

Signature of
Supervisor

8/12/2010   8/12/2010

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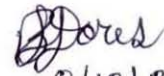Thesis Topic: Design an Android Education Program using video tutorials in Bangla

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Acknowledgements

Special thanks to Mumit Khan sir who taught us how to research on design and developing Android applications, making tutorials and the requirements for that. Also we wanted to give thanks to Matin Saad Abdullah sir who guided us properly.

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Thesis Abstract

This paper describes the tutorial of designing and developing Android in Bangla language. It is best suited for people who do not know programming or do not have any knowledge about developing Android application and eager to learn and develop Android application. This tutorial is divided into four chapters. These chapters are setting up development environment, making Android application with AppInventor, basics of Android, and building up Android application. We made tutorials on three chapters.These are setting up development environment, making Android application with AppInventor, and basics of Android .We did not cover building up Android application chapter. We used Camtasia studio 7 for screen recording and uploaded tutorials on You Tube.

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1. The reason of choosing Android

Android is a smart phone platform which is a direct competitor of the popular iPhone from Apple. But here are some key differences why we chose to perform our thesis study on the android platform.

Open Source: The Android OS powered by Google is an open system, which can be played with by the developers and many cool apps and games would be coming in, and there would be everything available for free, unlike the paid apps as in the App store by Apple.

Can Run Multiple Apps At The Same Time: Android has been able to run multiple applications at the same time regardless of whether they are system apps or apps from the Android Marketplace. The current version of iPhone OS does offer limited multitasking, but only allows native applications such as Mail, iPod and Phone to run in the background. Android users benefit greatly from this discrepancy, as they can receive notifications, listens to music, or even record GPS data without keeping the application open. Apple will try to level the playing field with iPhone OS 4, granting developers access to a small and limiting list of APIs that can run certain services in the background, but it's a long way from the true multitasking that Android has.

Keeps Information Visible on Home Screen: One of the key features Android has is a customizable home screen keeps active widgets right at your fingertips, always accessible and always visible - without having to launch an application first. There are widgets for just about every app in the Android Marketplace from playing music to checking the weather and keeping up to date on Facebook. Meanwhile iPhone users are force to flip through their app list to locate and launch each app. If you wanted to check the forecast, for example, you would have to find the app, launch it, and then wait for it to load. With Android, all of that information can be displayed directly on your home screen, never more than a finger swipe away.

Has Better App Market: Apple's App Store has over 200,000 applications, while the Android Marketplace has only just broken the 100,000 mark but Android's rapid growth and adoption give it the potential to catch up to the iPhone App Store. Android also has another advantage: a completely open market. Apple receives around 10,000 app submissions per week

Gives Better Notification: The iPhone has some trouble with notifications. Because it's restricted to pop-up notifications, it can only handle one at a time and because it lacks multitasking, applications must be open in order for them to make notifications. Android, on the other hand, has a convenient notification bar which displays an icon for every notification you have waiting. The notification bar can also be pulled downward to reveal more detail about each notification.

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You Can Choose Your Own Hardware: Apple users are encouraged to "Think Different" but when it comes to the actual hardware, they don't get much choice. You can pick the color, either black or white, and you get to choose between the 16GB or the pricier 32GB version. Other than that, you're stuck with the 3.5-inch, 320x480 pixel display, 256MB of RAM, and 600MHz processor. Because Android is an open platform, manufacturers have the freedom to pair it with any hardware they want, like the Nexus One (with 3.7-inch, 480x800 pixel display, 512MB of RAM, and 1GHz Snapdragon processor) or the Motorola Droid which has a physical keypad.

Integration: on a Symbian device, a Nokia N97 for example, the user will have to individually download, install, and setup the Ovi Mail, Ovi Contacts, Ovi Calendar, and Ovi Chat accounts. The user also has to repeatedly login to these services, whereas on Android, the user account is always logged in.

Applications: The number of applications on the Android Market and 3rd party application programs immensely outnumbered those in the Ovi Store. At last count, the number of Apps on the Android Market exceeds the 100,000 mark. Given that the argument that quantity does not imply quality applies , the fact remains that development on the Android platform is much more popular than development on Symbian or any mobile phone OS.

Platform Updates: Example: when you buy a Symbian-powered Smartphone, you get whatever version it comes with — S60v3, S60v3 Feature Pack 2, S60v5, etc, and that's all you get. Most Android-powered smart phones currently shipped with either v1 .5 or v1 .6 pre-installed, but nearly all of them has been formally scheduled for the newer v2 .0 + upgrade sometimes in the future.

Browsing: The built-in browser on Android is noticeably faster than the Symbian one, specifically for large web sites. The Android browser also offers visual bookmarks, which is useful to get a peep at each webpage, and these are updated when you open them, too.

Links and references:
http://blogs.techrepublic.com.com/10things/?p=1131
http://worldvillage.com/androidmeup-five-reasons-why-android-is-better-than-symbian
http://gigaom.com/mobile/windows-mobile-vs-android-winmo-is-better-than-you-think/

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2. Choosing the screen-recording software

We experimented with so many screen recording software for producing video tutorials. They are BlueBerry FlashBackExpress 2, CamStudio 2.0 , CamtasiaStudio7, PrtScr1.5 - a Better Print Screen for Windows.

We needed desktop activity recorder software. The Camtasia studio software was the perfect choice for us. We uploaded a URL to the link of the trial software download. We uploaded a URL to the link of the software cracker. It is amazing software. The features and benefits of Camtasia studio are:

Online tutorial of Camtasia studio: There are online tutorials for Camtasia studio.

New callouts: Add a graphic over your video to direct the attention of your viewers. You can even link to an external webpage or jump to a part of the video.

New cursor effects and workflow: Highlight cursor movements and mouse clicks to help viewers follow the action.

Copy and Paste functionality on timeline: Reuse transitions, zooms, and other effects—just copy and paste to a different spot on the timeline or add it to the library.

SmartFocus performance: TechSmith's SmartFocus technology places smoother, more accurate zooms and pans so your content always looks sharp —a huge time-saver.

Improved recording performance: With Camtasia Studio's flexible recording options, you can choose to capture full screen, window or region. Add in music tracks, microphone, your computer's audio, plus picture-in-picture with your video camera, and you've got a world-class screencast.

YouTube upload: Produce and upload HD-quality videos to YouTube without leaving Camtasia Studio.

Improved Audio Enhancements: Fade the volume of an audio track up and down at any point in your video, using simple controls built into the timeline.

PowerPoint plug-in: The toolbar inside of PowerPoint makes it one-click-easy to record your presentations, either live or from your desk.

Title clips and transition: Walk your audience through your content easily with title clips that introduce or divide your video. Move smoothly between clips with over 20 transition options.

Captioning through speech to text: Camtasia Studio can automatically transcribe your video's audio file into 508-compliant open or closed captions. And by "learning" your voice over time, your captions get more and more accurate.

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Links:
http://www.techsmith.com/camtasia/whats-new/win/
http://www.techsmith.com/camtasia/features/win/

3. Method of recording the video tutorials

a) First we downloaded the software (Java developing kit, Eclipse, Android software development kit, ADT) and tested their performances ourselves before beginning any screen recording.

b) After successfully performing all tests and configurations, we uninstalled everything back to previous system state.

c) We made a new user account in our PC apart from your personal user account which we use for our daily personal and/or academic work.

d) Then we performed our screen records in our new user account to make everything look clean - no desktop icons, no browser histories etc.

e) In recording we only showed where to go and how to start download of the software. After the recording was completed, we cancelled the download.

f) The actual download of the software was performed before hand in steps.

g) After the recording of downloading the software was completed, we recorded how to install the software.

h) After the recording of installing of the software was completed we recorded how to configure the software with each other.

i) It was required that background noises (such as any kind of static or air-conditioners etc) were eliminated from the microphone inputs in order to make the video tutorials highly professional. However, as an academic thesis project team, we did not have the convenience or finances to do our recordings in an actual studio.
Hence, we tried our best from our limitations to produce videos eliminating external noise. Therefore, we did all the recordings at home after midnight - when there is almost zero traffic noise that can be heard through the window. We kept the room's windows closed and also the ceiling fan turned off as the movement of air from the ceiling fan produces quite an ample amount of noise in the recordings. But keeping the windows closed and the ceiling fans turned off resulted a lot of heat and it's unbearable to work in such a condition - that's why we had to keep the Air Conditioner on. This still resulted in minute noise of the AC compressor being heard in some of the videos. But it's much better than the noise produced by air being moved around by the ceiling fan.

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j) Videos uploaded to YouTube by standard account holders are limited to 15 minutes in duration. So we had to make sure that each of our produced videos is within that length.

- YouTube accepts videos uploaded in most container formats, including AVI, MKV, MOV, MP4, DivX, FLV, and ogg and.ogv. These include video formats such as MPEG-4, MPEG, and WMV. It also supports 3GP, allowing videos to be uploaded from legacy mobile phones.
- For that reason we used the mp4 format which is a high quality low file size format and 1280 x 800 screen resolutions to enable wide screen view recommended by YouTube. YouTube sets a video length limit of 15 minutes.

4. The video tutorials divided into 4 parts

a) Setting up the development environment by downloading and configuring java, android SDK, Eclipse, ADT plug in etc.

b) A dive into AppInventor – web tool for quickly making simple android applications

c) Basics of Android - the android architecture and application fundamentals (process management, task management, inter-application communication)

d) Building android applications – not touched in this thesis semester

5. The maintenance of repositories of our project work

a) After a video production from a Camtasia project was complete, we exported the project into a distributable zip file rather than just saving it as Camproj file.

b) Advantages of producing a distributable zip file:
   * Camtasia automatically finds out the referenced files used in the project - such as video files, image files, audio sequences, screenshot files etc.
   * Then Camtasia brings them altogether, binds them altogether and saves them all in a single package.

c) So that whenever the project file is passed on to some other computer, the user does not have manually make sure that all required files and contents are present in his/her computer and so that, the user does not have to link up the files and contents himself - everything is handled and performed automatically by Camtasia when select to import from zip project file.

d) Then we maintained our repository of project zip archives and the produced videos into a free account of cloud-based file sharing software www.mediafire.com

e) The reasons of choosing mediafire and not other file-sharing services like 4shared etc.
   * It allows 200 mb per file upload in a free account - most other competitors don't allow such a huge upload amount per file.
   * It boasts unlimited bandwidth and unlimited storage space per users in free account

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6. Communications and collaboration within the team

a) We choose Google Wave for communication with each other. Because it has so many benefits.

b) Benefits and features of Google Wave:

- **Real time news all in one:** With Google Wave, a user such as a witness of the incident can edit, add in his or her comments or share knowledge regarding the news.

- **Cuts down conversation waiting time:** MSN, the world's most popular instant messenger is good but not great. Often, we have to wait for the other party to type their message and hit enter before we can formulate our thoughts and reply. Fortunately, that's not the case in Google Wave. Whatever your friend is typing at that moment, you can see it appearing real time and start formulating your thoughts for the next message. It's like a real verbal conversation with friends.

- **Nice extensions of work and play:** In Facebook applications, we can expect quite some Google Wave extensions. These extensions are classified as either robots or gadgets. A robot is an automated participant on a Wave. It can read, edit and share outside content to a Wave. It can also create new Waves, blips and add and remove participants. A gadget is like an application like games and survey forms etc. If you're having fun with Facebook applications, Google Wave could very well provide the same or higher level of entertainment.

- **Multiple users instant messaging gets easy:** It is easy to have multiple friends chatting in a Wave. Simply drag and drop their avatar and they are in the conversation! Most of the time when there are multiple users chatting, it is hard to keep track of who is talking to who exactly. Google Wave helps to organize the conversation in a neat threaded fashion.

- **Easy project collaboration:** Collaboration is Google Wave's specialty. Every Wave works like a wiki or a Google doc. It places everyone's work into one Wave, real time. This is an extremely useful tool during meetings when everyone can take notes and input their thoughts into a single Wave. At the end of the day, everyone gets the same set of meeting notes, ensuring consistency and avoiding miscommunication.

- **Retrace with playback:** You would probably feel lost when you are new to a Wave your friends just added you into. Fret not, its playback function helps you understand how the conversation or email has evolved to what it is at the current moment. Putting the playback function in the news context, you can literally see how breaking news was first reported, commented, updated and concluded.

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- **Easy file sharing:** File sharing is simple on Google Wave. Just drag and drop the files into the intended Wave (with your Wave members in it) and sharing done.

- **Embedding web to your site:** Embedding a Wave into your blog allows you and the other users in the Wave to edit or add new content to it via Google Wave. Changes are as usual real time and comments on your blog posting via Google Wave are automatically updated to your blog.

- **Competition drives quality:** With the number of benefits Google Wave can bring, as a collaborative and communication platform, it will certainly drive up the quality of what competitors (social sites, cloud computing products and etc) are going to provide in the future.

c) We did not use any paper for resources and references - all citations and links were crucially organized into Google Wave - including picture and video illustrations.

d) Google Wave allowed us not to depend too much on emails either to share contents and resources - everything was effectively synchronized among the team via Wave

Links:
http://www.penn-olson.com/2009/09/09/10-google-wave-benefits
http://thinkvitamin.com/web-industry/six-ways-that-google-wave-is-going-to-change-your-business-career-and-life/

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7. Process of studying and sharing resources of our thesis

a) We followed the DevGuide section in the android developers site – http://developers.android.com

b) We went through the topics. The topics are: what is android, features, architecture (application, application framework, libraries, android runtime, Linux kernel), application fundamentals, application components, activating components, shutting down components, the manifest file, intent filters, activities and task, clearing stack, processes and threads, component life cycle, user interface, creating layout in eclipse, creating menus, creating dialogues, application resources etc.

c) Then we continuously jotted down key ideas of every topic in order into the Google Wave.

d) We did not use any paper for resources and references - all citations and links were crucially organized into Google Wave - including picture and video illustrations

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8. The reason of choosing YouTube:

a) **Video embedding:** Users can insert a YouTube video into Facebook and MySpace accounts, blogs, or other Web sites where anyone can watch them.

b) **Public or private videos:** Users can elect to broadcast their videos publicly or share them privately with friends and family upon upload.

c) **Subscriptions:** Users are able to keep track of their favorite users' new videos.

d) **Share Opinions:** Users can share their opinion or comments or suggestions for videos.

e) **Likeness rate:** Users can show likeness or dislike in YouTube video.

f) **Easily Portable:** YouTube makes easy portable across all devices with HTML 5 video support. It means video tutorials made from this thesis are accessible from cell phones as well.

g) There are so many popular video sharing web services like: Vimeo , Vildder, Blip.TV, Yahoo Video, Metacafe, Flickr, Photobucket, Daily Motion, Rediff, Rambler Vision, 4Shared, Your File Host etc. We have given YouTube vs. Vimeo below:

YouTube	Vimeo
- Owned by Google. - Videos cannot exceed 10 minutes in length or 2GB in size. - Bigger community - Widely accepted across several OEM devices - Supports mobile view effortlessly	- Owned by IAC. - Videos cannot be larger than 1GB,cannot upload more than 500MB per week - Small community - Not so popular across OEM devices - Not been revamped for mobile friendliness

Links:

http://www.reelseo.com/list-video-sharing-websites/

http://successcreeations.com/1710/video-sharing-sites-not-youtube/

http://www.webfuel.ca/youtube-vimeo

http://www.reelseo.com/list-video-sharing-websites/

http://www.youtube.com/t/fact_sheet

http://en.wikipedia.org/wiki/YouTube

http://hubpages.com/hub/-Best-Video-Hosting-Service-Youtube-vs-Vimeo-For-Embedded-Streaming-Video

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9. The reason of using Eclipse IDE rather than others such as Netbeans IDE

Google officially publishes the Android Development Toolkit plugin for Eclipse IDE. There are other plugins for other IDEs as well (such as nbandroid_for NetBeans). But these plugins are not officially released by Google in the Android Developers' Site.

Links:
http://www.eclipse.org/downloads/
http://developer.android.com/sdk/eclipse-adt.html/

10. How did we share the produced videos in the World Wide Web

a) We opened up a gmail address by android.bracu@gmail.com

b) Then we opened up a youtube channel by www.youtube.com/androidbracu

c) We used the mp4 format which is a high quality low file size format recommended by YouTube. We used 1280 x 800 screen resolution to enable wide screen view.

d) Videos uploaded to YouTube by standard account holders are limited to 15 minutes in duration. The 10-minute limit was increased to 15 minutes in July 2010. So we had to make sure that each of our produced videos is within that length.

e) Before uploading the video into YouTube at first we created playlists according to chapters.

f) After completing every production we uploaded the produced mp4 videos into YouTube one by one.

g) After uploading the video, we assigned the videos into its respective playlist which we made previously in step 5.

h) Within the first day of first upload, there were several students from BRAC University who saw the YouTube videos and liked, commented and shared those videos from our channel.

i) We started looking for many different YouTube channels which are enthusiastic about android evolution - we subscribed to those channels and also added many of them as YouTube friends.

j) Hence, after every video upload or playlist update, we send out a YouTube announcement from the android Bracu user account, and all the subscribers

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and friends, get to see the announcement in their YouTube homepage when they log in. or it gets delivered to their email addresses.

k) Then to promote our YouTube channel we made a twitter account by www.twitter.com/androidbracu.

l) From that account we started following our personal twitter accounts.

m) Then we started following the followers of our personal accounts and also the people who we were following.

n) Most of the twitter accounts we search for android related twitter accounts - there are hundreds of twitter accounts which are enthusiastic about development and evolution of android.

o) Once after we are set with having a substantial number of people to follow on twitter, we started sending out tweets about the Android Education Program by BRAC University.

p) To increase the word of mouth further, we twitted and re-twitted these things from our own personal twitter accounts and we post status updates into our personal facebook accounts.

q) The YouTube insight which is accessible from the YouTube channel account tells us a lot about the trend of popularity of our contents on the web.

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11. AppInventor – a web tool for quickly making android apps

App Inventor for Android allows people with minimal programming experience to create simple, personal apps for Android devices. It has a number of features which ease app development. App Inventor is best suited for people who are eager to learn the basics of programming and are interested in making basic apps for their personal use.

You can build many different types of apps with App Inventor. Often people begin by building games like MoleMash or games that let you draw funny pictures on your friend's faces. You can even make use of the phone's sensors to move a ball through a maze based on tilting the phone.App Inventor is simple to use, but also very powerful. Apps you build can even store data created by users in a database, so you can create a make-a-quiz app in which the teachers can save questions in a quiz for their students to answer.

Because App Inventor provides access to a GPS-location sensor, you can build apps that know where you are. You can build an app to help you remember where you parked your car, an app that shows the location of your friends or colleagues at a concert or conference, or your own custom tour app of your school, workplace, or a museum.You can write apps that use the phone features of an Android phone. You can write an app that periodically texts "missing you" to your loved ones, or an app "No Text While Driving" that responds to all texts automatically with "sorry, I'm driving and will contact you later". App Inventor provides a way for you to communicate with the web. If you know how to write web apps, you can use App Inventor to write Android apps that talk to your favorite web sites, such as Amazon and Twitter.

App Inventor is currently available as an invitation-based beta product. We are limiting access in order to ensure that our systems can handle the load. We worked hard for developing an application to talk to our favorite web site Twitter by AppInventor. There is a online tutorial for AppInventor. The needed things to start up with App Inventor:

- Set up your phone and computer.
- Connect your phone to your computer.
- Complete the basic tutorials.

Links: http://appinventor.googlelabs.com/about/

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12. Challenges while performing the thesis

a) **Noise suppression:** we tried our best from our limitations to produce videos eliminating external noise. Therefore, we did all the recordings at home after midnight - when there is almost zero traffic noise that can be heard through the window. We kept the room's windows closed and also the ceiling fan turned off as the movement of air from the ceiling fan produces quite an ample amount of noise in the recordings. But keeping the windows closed and the ceiling fans turned off resulted a lot of heat and it's unbearable to work in such a condition - that's why we had to keep the Air Conditioner on. This still resulted in minute noise of the AC compressor being heard in some of the videos. But it's much better than the noise produced by air being moved around by the ceiling fan.

b) **Making errors in choosing the right word while speaking:** As we did not use script so it created problem inchossing right words while speaking.

c) **AppInventor trouble:** We did the graphical part. But the logical part was not compiled. Because application not launch and system was offline.

d) **Limited time:** We covered 3 out of 4 curriculum contents. But for time limit we could not cover the application.

The set of video tutorials were divided into:

a. Setting up the development environment by downloading and configuring java, android SDK, Eclipse, ADT plug in etc.

b. A dive into AppInventor - tool for quickly making simple android applications

c. Basics of Android - the android architecture and application fundamentals (process management, task management, inter-application communication)

d. Building android applications – not touched in this thesis semester

e. Hardware limitations – all the testing tools we had to ourselves was the Android Virtual Device and not an actual Android Handheld Device – hence, application tests for chapter 4 were not thorough enough.

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13. Feedbacks

a) Taking time to study the matter and producing scripts before beginning recording is essentially very important for a project

b) Making subtitles of the same videos in English can prove to be much more appealing for worldwide viewers.

c) Studying the entire program and scheduling of the progress beforehand is essentially very important as we have experienced crossing out certain agendas of our tutorial program due to lack of adequate time

d) Must try to avoid recording in a room of the house which is right beside the road - sudden sounds of street-hawkers (which can be avoided if recorded at night) or sudden beeps of the car-horns (which really cannot be avoided at any time of the day or night) can cause distraction in the viewers attention.

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14. Scopes of the thesis output

a) The current thesis output gives a full tutorial set of
   a. setting up an android development environment,
   b. quick app building using some simple web tools,
   c. and a brief look at the system architecture of android system

b) From here onwards any student with the right excitement and enthusiasm for teaching the world about android can extend this set of tutorials further towards user-end application development education using the android framework APIs.

c) We have tried best to utilize cartoons, graphics and pictures and slide animations to explain the technical theories of how the back-end activities of android work - hence, these tutorials can act as a suitable method for understand technical documentations of android in a graphically more appealing manner.

d) The result of this thesis can possibly be the next big android development initiative coming from Bangladesh - using the video tutorials produced out of this study, we can engage a whole new bunch of computer science students of Bangladesh into learning the back-end system designs and user-end application development on the android platform - thus, it is fair to anticipate that the output of this thesis can leverage further development of the open-source smart phone platform coming from the brains of Bangladeshi student

e) All the produced tutorials from this thesis are already up on www.youtube.com/androidbracu in web friendly .mp4 format - but it is of limitation for most internet users of Bangladesh as the band-width is a big issue in our country and streaming videos from YouTube is quite a challenge. Hence, a nice workaround can be making the .mp4 videos available in .3gp formats which have significantly much lesser memory footprint, and much lesser file size - of course, with the trade of video screen resolution. Then these 3gp formats can easily be ported into anyone's cell phone and can be enjoyed by any enthusiastic android learner from his/her cell phone while he/she is travelling by bus - nowadays relatively a LOT of students have multi-color display cell phones with audio video capabilities - so reaching out to a MASS population using the immensely small .3gp format is a real scope we are talking about here.

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f) As this education program is intended to be a widespread delivery of knowledge for FREE - we can expect this thesis output to go across borders and essentially produce a great impact of android education on a multi-national scale

15.Individual contributions

Specification of thesis topic	Syed Rakib Al Hasan, Bellona Lillian Dores
Planning	Syed Rakib Al Hasan, Bellona Lillian Dores
Research and selection of screen-recording software	Syed Rakib Al Hasan
Researching and studying the Android developers tutorials and other resource materials	Syed Rakib Al Hasan, Bellona Lillian Dores
Performing software tests before recording tutorials	Syed Rakib Al Hasan, Bellona Lillian Dores
Test with AppInventor – a web tool for quickly creating simple android applications	Syed Rakib Al Hasan, Bellona Lillian Dores
Screen recording with live narration and post-recording edit	Syed Rakib Al Hasan, Bellona Lillian Dores
Producing PowerPoint slides before recording certain chapters	Syed Rakib Al Hasan
Report-writing	Bellona Lillian Dores
Delivery	Syed Rakib Al Hasan, Bellona Lillian Dores

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