**Multimedia Survey Paper Assignment**

**A Survey for Multimedia User Interface for Mobile Devices**

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**Abstract:**

 This survey paper guides the user into the aspect of using Multimedia on Mobile Phone’s UI. Users have an opportunity to understand why the use of multimedia is so essential nowadays, how to use multimedia in UI properly and why technology, especially software development, is focusing more on the UI instead of the functionality like it was before. UI is the main reason that makes users want to use the software, besides its functionality. That means a proper UI application capable of less functionality is still prefer more to users than a wrong UI application with a well-developed functionality. A result of this survey paper includes a multicultural aspect of Multimedia UI, when to use it and when not to use it. Multimedia begins to take crucial roles in delivering and convey messages to readers, it is encouraged to use but not always required, or to overuse it.

With the quick pace of developing technology these days, every day, we are receiving new pieces of technology, from hardware to software, from performances to features. One of the most developed areas of technology is Mobile Phones. In the past ten years, we can see the changing, improvement and enhancement of Mobile technology in both hardware and software. The market for mobile phones starts to attract many new companies when we transitioned from buttoned, flipped phones to a smartphone, with many fewer buttons and given more space to interact and a touch screen to engage. From there, many phone companies join the market and start to build smartphones with distinct advantages from the rest of the competitors. For example, Sony is well-known in the market for its camera and video quality, iPhone for user-experiences and simplicity, Samsung for sturdy hardware and freedom of control, and more. Since then, they all actively compete with each other, and every year, new technology is released, as a move to scare their competitor. With the further improvement of technology, the software is also improving to handle such powerful hardware and also to take advantage of a reliable hardware system and give extra user features that they might need. With all of this improvement, the one that is benefits is the user. A vast market with different price segments and a lot of brands to choose from, users now have a variety of mobile phone options. With all that saying, a more modern smartphone can handle lots of multimedia and can also able to handle many multimedia at the same time. Compared to the past, while using a small flipped phone, we rarely see any multimedia context. From the Operating System to the Internet, we can all see text and text. In the past, everything display in text, button functionality, content display, file searching, and more. It was hard at the time to search for an image because the image is just a small thumbnail on the left and the rest of the space is the file name, which is useless for most of the time. But now, when we look into our smartphone, all of that functional button has changed from text to image, and we still know right away what it does by just looking at the image. When we go to the gallery, a list of the image is display without any extra information or even better? On some smartphones, when you select a particular video, it plays a demo for it. And that is just a small part of how smartphones have innovated multimedia into UI. With that saying, understand how multimedia is developing is very important, and how to use multimedia context properly is another story, not to mention that the technology world nowadays is focusing more on Multimedia UI.

The way that smartphone improves has changed the way how human behaviour as well as shifting the world focus. In the past, people used phones for calls, texts, some low-quality music and video files. Phones nowadays have to support multi-features, new applications and performance. People start spending more time on their phones (*Mobile App Maintenance: Know Why Important for Business ....* [*https://www.imobdevtech.com/Blog/mobile-app-maintenance-know-why-important-for-business/*](https://www.imobdevtech.com/Blog/mobile-app-maintenance-know-why-important-for-business/)) just because they found some cool apps that can help them from daily working. And to attract more users to use the app, the app has to change itself, from implementing more features until usability. What that means is, users will capture their first impression by looking at the UI. The better the UI, the more user will expect from the app and give the app a try. Multimedia play a significant role in how UI looks like and how it can be displayed to attract users. Take a small example of this, in the past, all the application’s instruction was in the text, and sometimes users can be very confusing. But now, with the enhancement of multimedia, all the directions can be found via image or even video. According to ScienceDaily, people are spending an average of 40% of the time on their smartphones to do stuff, from searching for navigation using Maps application, chat with friends using social media apps, listening to music and watching videos. And they are all multimedia application related. With a top 25% user answer, the survey said their “typical motive” to use phones is to kill time. In that top 25% of users, 87% use their Internet Browsing daily, 100% of email and 69% of camera usage (ScienceDaily). As we can see, the more multimedia develop, the more user will engage and use multimedia. Beyond that, many new applications have enriched multimedia functionality into another level. Users now can use their phone for e-Learning purposes, use it for video streaming and even further, TV streaming. With all of that multimedia enhancement, users are getting tighter with their smartphones, and multimedia usage is increasing every day, and it is becoming the standard of entertainment. Multimedia carries lots of information in just even a picture or a short video. It is easy and quick to read and understand, sometimes even skimming, or some also carry more than one meaning. Imagine looking at a picture, and you can think about lots of things, unlike reading text in the past, where you sometimes cannot even understand a situation.

While we have learned how multimedia has transitioned from the past until now and how important and beneficial it gives, let’s discuss how to use multimedia context properly. We have learned and discover that multimedia brought a lot of benefits to the user; however, we also have to avoid overusing. What that means is, not because an image can help the user understand the context better and visualize more things doesn’t mean we have to use pictures all the time. Using too many images can confuse users because they don’t know what to focus, small details or big picture, as they could have thought differently from what the image is supposed to mean. What that means is, words and explanations are still the keys, and we only use a picture just as a supportive way to help the reader understand the context better. That is why, in most phone UI, there is a mix of multimedia and text (for example, functional icon). Beyond that, let’s talk about the application that contains multimedia that the smartphone will use. A quick a good example would be web browsing. A person is on their way to the supermarket to buy her stuff, but she forgot to check if the store she is going to has the item or not. In just 3 minutes and a few clicks and types, she can find things she needs and where the location is. All of the action is completed on a smartphone. To achieve this result, developers have to build a website with the components fitting for smartphones user instead of laptop users. Video, Images, any multimedia pieces must be selected must have low in file size, so they don’t take much time and consume much data to load (especially in 3G/4G/5G). They also have to make sure the quality isn’t too bad that users have to zoom in (unless it has too many details) or unable to figure out. It has to ensure that, the item isn’t too big that take up to an entire screen or too small that when user scroll they can easily miss it. However, when implementing multimedia into usage, developers have the option that the media is only loaded when they scroll. What that means is, a supermarket can have a thousand product but the time user go to the page, there are only ten products that appear on the screen. The system will only load the one that is on the screen and put that into cache memory, so when a user scrolls away and come back, they don’t have to load the images or video again. Another aspect we need to consider is resolution. Undoubtedly, the more resolution, the bigger and the better the media is. But, not all the phone support that scale. A phone that is released five years ago might only support up to 1080p video, but a modern phone nowadays can easily play a 4k video. You never want to upload a 4k video to a website and then see a user with a 1080p device watch it. A developer should know the phone models, identify the maximum resolution, and connectivity to play the videos at the highest possible resolution.

Depends on the category, multimedia content can use differently. For example, in the business environment, text, images and videos are strongly encourage to use but never try to use such as gif, animation or interactive content. In Education, animation, interactive content and videos will mainly in use, while for entertainment purposes, gif, animation and interactive content will prefer. So based on that, it depends on the intention, category of usage, different types of media will prefer to be used, and different kinds of media will need to avoid. Another aspect of being considered is about cross-country culture usage. Two countries on the same continents can even have two distinct cultures (like China and India), not to mention two countries on two different continents. It is significant for developers to understand the culture that they about to export the application to. Especially the use of multimedia, as one could look fun in a country culture but becomes offensive to the other country. It is always essential, to work with developers in country of the application is exporting to (except the case if it is worldwide, you can’t satisfy everyone?) and give an opportunity to cross-test the feature as well as UI of the app built and record their behaviours while using. Records will be used to design and improve the app to support better with cross-culture aspect, for regular use and disability users. Post-Task usability is recommended to take preferences from the user and get to understand what needs to be changed and what needs to be improved.

Since we have understood why multimedia is essential and how do we use it across context, it is time to know how multimedia would UI be in the future. In advanced economy countries, an average of 94% of people own at least one phone, and the smartphone owner is at 76%. Because of that, everyone can quickly get access to any web browsing or applications. From there, to attract more customers to access the web page or use the app, it has to look nice first, and that is where UI and multimedia kick in. In the past, we don’t care about appearance as we didn’t have many choices back then. An app that allows a regular person with no tech background can still use the program without any help and also complete the task is practical. Nowadays, we have so many options for about the same purpose of using (for example, a Music app on the mobile phone can have many options such as Youtube Music, SoundCloud, Spotify, etc.). A regular user will rarely touch any advanced features so we can set that aside. When it comes to daily functions such as listening to music, they have all of that option, and the only thing that can make them decided is how they visually look.

About 99% of webpages and applications are using multimedia; we have to admit that page with good looking design plus a good use amount of external media such as image and video will catch more attention than a regular plain text with just text. In the future, the mobile application will actively expand to all of the environment. The business environment begins to use more multimedia methods to advertise their product, such as online catalogues, online advertising and marketing top engage more users with their business. Some business companies even start to use multimedia and enhance it to create a product demo for users (ex. A demo of a new game in an advertisement). In Education, School is now in the transition of enhancing Education by using more multimedia methods across the teaching. Besides textbook and audio, classes now also will have access to video and graphic media, etc., It helps students to engage more, understands faster and broader, as well as allow them to have clear thinking. With this advantage, students with a disability now can also have more options to choose besides old-fashioned writing and reading from the textbook. According to a survey in classroom activity, it is easier to learn from images rather than text and audio is the best source to improve language pronunciation. In-home entertainment usage, people begin to use their smartphone to check for information like cooking instruction and entertainment purposes and sometimes for extra valuable information like gardening and home design and remodel. In advanced hardware features such as VR (Virtual Reality), a lot of multimedia contents has used to construct a 3D to a 4D image via a “glass” to users. It uses media such as image, sound and animation to create a 3D visual, then uses the image transition to create vibration (where applicable) with enhanced audio and animation to create a 4D experience. VR usability range is quite small; in fact, it is usually used around for purposes like simulation, gaming and video experience. Above is just a few examples where Mobile Application will take place in the future, and there are a lot more in the market depends on the usability and needs. However, due to this massive amount of application support, technology generally and mobile devices specifically no longer limits the age of using. From a small child to an elderly, they all can use a smartphone and developers for those apps should make it as easy as it could so that it doesn’t require lots of knowledge or reading or understanding to use it. And all of this information can be delivered via media. With just a right amount of images with a relatively short description show on each step and an instruction video at the end for a tutorial, everyone can be able to understand and use it well. Using multimedia helps the user to have a deeper understanding (use the brain’s ability to create a connection between verbal and visual representations of content to bring a broader explanation into mind) and improve problem-solving skills (increase attention and retention and help visualize the problem better).

In conclusion, this survey has welly demonstrate the expanding of technology, especially software aspects in mobile phones, how not to overuse the number of multimedia or where is required to use and understand the future of mobile application is UI, before app functionality. It is quite noticeable and understandable when we compare an article written ten years ago versus one today, where media isn’t very developed and rarely use. With the usage of media, the user is no longer required to know how to read to understand the information or spending too much time on an article. Sometimes, users curious about info by reading the title and with just a few scrolls and see some images, they already know what was happening without reading a word. It is quite significant as a developer to understand multimedia well and apply it to the applications so that in the future, the app will not get-out-of-attention from the users.

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