Bound: An Application Limiter with Usage Statistics

Grace L. Lasco, Edrian E. Mislang, Emmanuelle Jim "EJ" B. Arce,
Joenald D. Torres, Justin Danielle D. Estrella,
and *Rafaelo John M. Rafael*
Adviser: *Clarissa P.Vicente*

Abstract

Most countries have forced lockdown to break the chain of local area transmission of this notorious infection COVID-19, which has changed the manner in which people are accustomed to living in. This self-isolation or quarantine has urged individuals to go to their cell phones to remain associated and connected progressively. This badly affected children which more likely to develop problematic use patterns. The researchers developed an application limiter to provide a barrier between in online and offline world. This is to remind every child and parent that technology is a very powerful platform but it can be a distraction, it may be a part of what keeping a person stuck in the place he/she wants to escape. The researchers formed an idea of preventing such risks in a more convenient way by developing an application which limits the smartphone engagement that may lead to smartphone addiction of children with just a tap. The proponents used Internet in order to access search engines for finding related literatures, studies and articles to support the research and Google Forms for an online survey to gather data for the research method. Furthermore, the survey results showed that the application developed by the researchers will be very useful, user-friendly and met the general and specific objectives of the study.

Keywords: COVID-19, quarantine, children, smartphone addiction, application limiter, user-friendly, Google Forms.

The worldwide pandemic changed the things humans used to do. It includes the way of working, socializing and schooling. The manner in which kids invest their energy after school has changed significantly with the expansion of innovation, web-based media, and online exercises. In a cutting edge world, society in general explores the advanced climate of kids' extra time, and guardians are regularly left pondering: "What is the most ideal approach to allow kids to utilize and profit by innovation while keeping them safe and healthy?".

A smartphone is an amazing instrument that permits individuals to learn and create. It is an enormous piece of day-by-day life activity in business, in school and even at home. But the usefulness of internet does not mean that constraints is not present. Though smartphone with the use of internet is a great way to keep children socially engaged, secured and updated in the modern age, there is a need to provide a barrier between in online and offline world. The current situation on health crisis spreading Coronavirus Disease (COVID-19) which started in the year 2019 breaks the typical daily practice of a child who used to play proactive tasks outside. When everyone is encouraged to stay at home, it abruptly transformed into fixation of utilizing distinctive web-based media application which incorporates TikTok and YouTube. Though such application requires age limit, parents or guardians should always be cautious and aware of its consequences.

In the previous few years web enslavement or Internet Addiction (IA) and Internet Gaming Disorder (IGD) have continuously caused, numerous character and mental problems including lack of confidence, impulsivity, poor rest quality, mind-set issue, and self-destruction.

However, in spite of the negative effect of smartphone addiction to children it still has its great advantage in their educational undertakings. It serves as a

guide for a child who is willing to learn something new through watching educational videos, tutorials etc. But it is not always like that, guardians are the ones who are battling in restraining their youngsters as child tend to disobey time limits that have been set for smartphone usage that causes aggressiveness.

The project aims not to end or prevent the positive effect but to lessen the risk, of the most powerful platform which is technology to children. Bound will serve as a tool for a child to avoid the excessive use of mobile applications in a more convenient way. Hence, it will benefit both child and parent being healthy physically and emotionally by having knowledge on how to curb smartphone addiction efficiently.

Significance of the Study

The project acknowledges the series of problems experienced by every parent especially during the pandemic. Excessive usage of smartphones can negatively impact lives of children which more likely to develop problematic use patterns. This may lead to various harmful effects in terms of mental health such as anxiety, depression, sleep deficits and insomnia. In the year 2020, 21st day of February an article written by Chase McNamara says that those with smartphone addiction showed material changes to the size of the brain which is similar to drug addiction. Furthermore, back in July 6, 2017, UNTV News and Rescue reported a news about a child who suffered from focal seizure due to prolonged used of gadgets which the child couldn’t move her arm and couldn’t speak. These are just few of those major problems cause by the excessive use of smartphone the application would like to prevent.

Parents. This will be of great help to parents in monitoring the smartphone activities of their children. Thus,

it will provide quality time bonding between and among the members of the family.

Children. This will help them develop a sense of responsibility and time management applying the limitation set by their parents in dealing with internet/social media activities. It will help them maximize their time lessen the risks of the negative effect of mobile application. Bound will also help in the prevention of slow language and verbal communication development of school children. Furthermore, children will not be addicted in the virtual world and can still develop better social relationship.

Future Researchers. This study gives premise to additional investigations about the task that gives an outline to the current circumstance of the application. The project will give future specialists information about an application limiter and the current circumstance of rudimentary understudies which needs a consideration about the out-growing number of kids being dependent on web.

Related Literature

Dipo Daramola (2015) conducted a research about young children as internet users and parents perspectives. First, the thesis provides a related research on young children and their relationship with technology advancement. All in all, the internet is like fire. If properly utilized, the gains are exponential. On the other hand, misuse of the internet can destroy the society by destroying the lives of children making them irresponsible adults. Somehow it is true that the children are unable to spend even a day without their modern gadgets and life without Internet is utterly unthinkable and impossible for them. However, the surveys all over the world have proved that the children are the masters of the game they are born with the intellect and speed required to survive in this swift age and era. Although they believe that there are children who are excessively

vulnerable to the excessive use of internet and its adverse outcomes and these are those children who are older, exhibit high levels of sensation-seeking and have emotional problems. Spending excessive time online may lead these children who are by now psychologically weak and defenseless to reach pathological levels of extreme use.

Francesca Gottschalk (2019) studied a research about impact of technology use on children. Generally speaking, the research is mixed in terms of health outcomes for children and technology exposure. If screen time is displacing other activities, such as physical activity, interacting with family and peers, or sleeping for adequate periods of time, this would be cause for concern. However, research linking moderate technology use to increased participation in sports and clubs (somewhat negating the displacement hypothesis) should provide some solace to parents and educators who are worried about children interacting with screens.

Daniel Kardefelt-Winther (2017) conducted a study of how does the time children spend using digital technology impact their mental well-being, social relationships and physical activity. An important challenge as research on children's use of digital technology moves forward is to understand where to draw the line between healthy and harmful use, which is likely to require an individual approach where each child and their life context is considered separately. Although few negative impacts have been found in relation to the time children spend using digital technology, in order to maximize the positive impact younger children may require provisions and support of a different nature than older children. Similarly, what is harmful for a very young child to see or do online may be largely unproblematic or even positive for an older child. In this respect, blanket-recommendations and policies are unlikely to be effective.

Franklina Adjoa Yebowaah MS (2018) studied a research about internet use and its effect on senior high school students in Wa Municipality of Ghana. The availability of different internet sources to students does not grant all of them immediate access. The various Senior High Schools are not resourceful enough to grant internet access to students. Despite the alternatives to school- based internet, access to internet among Senior High School Students is still limited. Besides, access to internet sources is promoting academic performance among students since those with access showed more improvement in academic performance than those without access. However, different uses of internet do not influence 26 academic performance. This suggests that students with access to internet facilities have been using them in ways that will promote their academic achievement.

Daria J Kuss and Olatz Lopez-Fernandez (2016) conducted a research about internet addiction and problematic internet use. The systematic literature review identified a total of 46 relevant studies. The included studies used clinical samples, and focused on characteristics of treatment seekers and online addiction treatment. Four main types of clinical research studies were identified, namely research involving (1) treatment seeker characteristics; (2) psychopharmacotherapy; (3) psychological therapy; and (4) combined treatment. A consensus regarding diagnostic criteria and measures is needed to improve reliability across studies and to develop effective and efficient treatment approaches for treatment seekers.

Menon et al. (2018) conducted a study of internet addiction. In this study, the researcher found no evidence in severe internet addiction. The addiction was more in the range of moderate to mild addiction. However, it is possible that the reported scores were related to internet work in the campus and did not include the use of smartphones and the time spent on using social websites using smartphones.

Objectives of the Study

The application's objectives are divided into two types: the general objectives and the specific objectives which will be discussed below.

General objectives of the study

The project's main objective is to control and lessen the smartphone engagement of children who are more likely to develop problematic use patterns in a more convenient way.

Specific Objectives of the Study

- To lessen the day-by-day screen time of children.
- To prevent social media and internet addiction disorder or web enslavement issue.
- To give guardians genuine feeling of serenity that their youngsters' smartphone engagement is leveled out.
- To assemble and work a very much planned application that will cause the understudies to feel like simplicity in utilizing it.
- To monitor mobile application usage statistics of a child.

Conceptual Framework

Figure 1. Conceptual Framework

The framework shows the process of the project. First step will be the project planning which includes the identification of the target audience, purpose, requirements, goals and scope of the project. The second step will be the project execution where requirement analysis, creating system design or workflow and implementation of the program code will be accomplished. Third step is the project monitoring, this involves the application testing and deployment for the project to be evaluated with respondents. Afterwards, maintenance will be needed just to make sure that the application is working smoothly. Last step will be the project closure where the researchers finalizes the documentation of the research to be able to assess the success of the project.

Methodology

This research employed descriptive or quantitative research method and waterfall modeling in developing the application named Bound. Descriptive research method allows research to be conducted in the respondent's natural environment, which ensures that high-quality and honest data is collected.

Sampling Procedures

The study used Waterfall modelling which involves a rigid structure that demands all system requirements be defined at the very start of a project, only then can the design and development stages begin. This is a classical model used in system development life cycle to create a system with a linear and sequential approach. It is divided into different phases which are the requirement analysis or gathering and analyzation of data, implementation or coding, testing, maintenance and deployment. Every phase has to be completed before the next phase starts and there is no overlapping of the phases.

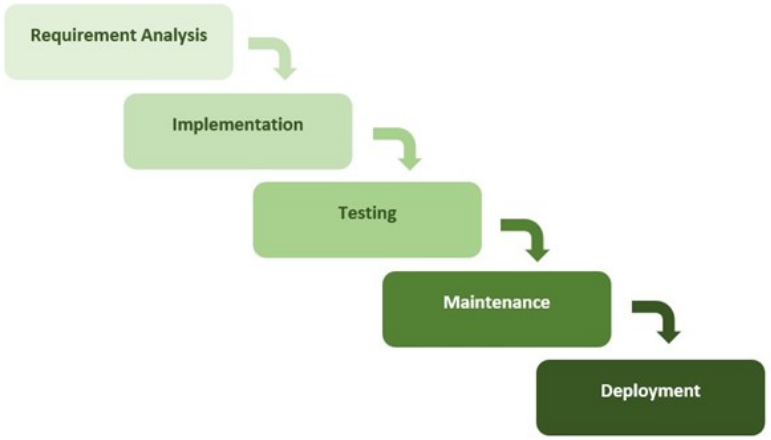

Figure 2. Conceptual Framework

The project starts with identifying the target audience, defining the purpose, requirements, goals and scope of the projects which are all included with the requirement analysis. After completion with the phase one, the execution of code will follow. This includes the system design and structure and implementation of codes. Phase three will be the testing of the application; this is to ensure that the implementation matches the user experience with the app design. This also involves the testing of visuals, workflow and interactivity of the application. The fourth phase which is the maintenance will help to keep the application compatible with the latest changes in mobile technologies for a better user experience. Deployment will be the final phase, the application is ready to launch.

Research Instrument

The developed system was tested by seventy-five (75) respondents which is categorized by three (3): students, parents and instructors. The main research instrument used in the study was the questionnaire developed based on the

ISO/IEC 25010:2011 Systems and Software Quality Requirements and Evaluation (SQuaRE) to assess the function and quality of the application. The ratings and technical comments and suggestions from the experts were used to further enhance and refine the developed system.

Results and Discussion

Indicators	Evaluation E 5	VS 4	S 3	P 2	VP 1	Mean	INTERPRETATION
Usability						4.44	Very Satisfactory
Functionality						4.57	Excellent
Reliability						4.53	Excellent
Efficiency						4.42	Very Satisfactory
Total						4.49	Very Satisfactory

Under the criteria usability, three sub criteria were considered: ease of use of the application, the design has an effective color scheme, and does not contain irrelevant information in the user interface. Regarding with the ease of use of the application, results showed that fifty-three (53) respondents or seventy-one percent (71%) gave an excellent rating. Eighteen (18) respondents or twenty-four percent (24%) granted a very satisfactory rating and three (3) respondents or four percent (4%) answered a satisfactory while one (1) respondent or one percent (1%) gave a poor rating for the ease of use of the application which received a mean score of 5 and adjectival description of excellent. In terms of the design with an effective color scheme, thirty-five (35) respondents or forty-seven percent (47%) gave an excellent rating. Twenty-seven (27) respondents or thirty-six percent (36%) answered a very satisfactory and twelve (12) respondents or sixteen percent (16%) granted a satisfactory while the one (1) respondent or one percent (1%) gave a poor rating. This scored 4 in the mean with an adjectival description of very satisfactory. In regards to the application

does not contain irrelevant information in the user interface, forty (40) or fifty-four percent (54%) gave an excellent rating. Twenty-five (25) respondents or thirty-three percent (33%) answered a very satisfactory and nine (9) respondents or twelve percent (12%) granted a satisfactory while one (1) of the respondent or one percent (1%) gave a very poor rating when it comes in the application does not contain irrelevant information in the user interface. This scored 4 in the mean with an adjectival description of very satisfactory.

To determine functionality, the researchers included the application monitors the usage statistics of used installed application efficiently, the application tracks data consumed, app launch numbers and how long the user used a certain application accurately and the application will lessen the day -by-day screen time of a child. Regarding with the application monitors the usage statistics of installed application efficiently, results showed that fifty (50) respondents or sixty-seven percent (67%) gave an excellent rating. Twenty (20) respondents or twenty-seven percent (27%) granted a very satisfactory rating and five (5) respondents or six percent (6%) answered a satisfactory rating which received a mean score of 5 with an adjectival description of excellent. In terms of the application tracks data consumed, app launch numbers and how long the user used a certain application accurately, forty-seven (47) respondents or sixty-three percent (63%) gave an excellent rating. Twenty-one (21) respondents or twenty-eight percent (28%) answered a very satisfactory and seven (7) respondents or nine percent (9%) granted a satisfactory rating. This scored a mean of 5 and with adjectival description of excellent. In regards to the application will lessen the day-by-day screen time of a child, forty-nine (49) or sixty-six percent (66%) gave an excellent rating. Twenty-one (21) respondents or twenty-eight percent (28%) answered a very satisfactory and four (4) respondents or five percent (5%) granted a satisfactory

while one (1) of the respondent or one percent (1%) gave a very poor rating when it comes in the application will lessen the day-by-day screen time of a child which scored a mean of 5 with an adjectival description of excellent.

Two criteria were considered to determine reliability, namely the accurate password validation and the application has a strong security in order to prevent a child accessing the app. In terms of the accuracy of password validation, forty-eight (48) respondents or sixty-four percent (64%) gave an excellent rating. Twenty-two (22) respondents or thirty percent (30%) answered a very satisfactory and five (5) respondents or six percent (6%) granted a satisfactory rating which scored a mean of 5 with an adjectival description of excellent. In regards to the application has a strong security in order to prevent a child accessing the application, forty-four (44) or fifty-nine percent (59%) gave an excellent rating. Twenty-three (23) respondents or thirty-one percent (31%) answered a very satisfactory and eight (8) respondents or ten percent (10%) granted a satisfactory rating. This received a mean score of 4 with adjectival description of very satisfactory.

In the area of efficiency, the application will help prevent social media or internet addiction disorder and the application provides awareness about harmful impacts or effects of smartphone addiction were determined. In terms of the application will prevent social media or internet addiction disorder, forty-three (43) respondents or fifty-eight percent (58%) gave an excellent rating. Twenty (20) respondents or twenty-seven (27%) percent answered a very satisfactory and ten (10) respondents or thirteen percent (13%) granted a satisfactory while two (2) respondents or two percent (2%) gave a poor rating which scored a mean of 4 with an adjectival description of very satisfactory. In regards to the application provides awareness about harmful impacts or effects of smartphone addiction, forty-three (43) or fifty-seven percent (57%) gave an excellent

rating. Twenty-three (23) respondents or thirty-one percent (31%) answered a very satisfactory and nine (9) respondents or twelve percent (12%) granted a satisfactory rating. This received a mean score of 4 with an adjectival description of very satisfactory.

Conclusion

Based on the results of the study and the evaluation of the respondents of the system, the following conclusions were derived.

1. The application is user friendly. It is easy to navigate and understand.
2. The user interface has an effective color scheme and does not contain irrelevant information.
3. Bound can monitor the usage statistics of installed application including its data consumed launch numbers and running duration in a certain period of time.
4. The application can effectively lessen the day-by-day screen time of a child.
5. It has an accurate password validation and has a strong security in order to prevent child accessing Bound.
6. Bound will help prevent social media or internet ddiction disorder.
7. The study and application as well provides awareness about harmful impacts or effects of smartphone addiction.

Recommendation

For other researchers along this line, the following recommendations for further improvement are forwarded:

1. Add a selection of time on how long the child will access a certain application automatically and if the desired time reached, the selected application will be automatically locked.

2. Include an alarm to avoid entering a period of access limitation repetitively.
3. Find an alternative way to get away from the restrictions in the background services placed by Android so that the application can run smoothly in a higher version of the operating system.
4. Provide a protection for app uninstallation in order to secure its purpose.
5. Impart a notification which notifies users about locked application they selected.

References

Aiko M. (2017). *Prolonged Use of Gadgets Causes Seizure in Children – Medical Expert.* Retrieved from https://untvweb.com/news/prolonged-use-gadgets-causes-seizure-children-medical-expert/

Daniel Kardefelt W. (2017). *How Does the Time Children Spend Using Digital Technology Impact Their Mental Well-Being, Social Relationships and Physical Activity? An Evidence-Focused Literature Review*. Retrieved from https://www.unicef-irc.org/publications/925-how-does-the-time-children-spend-using-digital-technology-impact-their-mental-well.html

Dara J Kuss and Olatz Lopez-Fernandez (2016). *Internet Addiction and Problematic Internet Use: A Systematic Review of Clinical Research.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4804263/

Dipo D. (2015). *Young Children as Internet Users and Parents Perspectives*. Retrieved from https://www.researchgate.net/publication / 277247569_Young_Children_as_Internet_Users_and_Parents_Perspectives

Franceska G. (2019). *Impacts of Technology Use on Children: Exploring Literature on the Brain, Cognition and Well-Being.* Retrieved from https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP%282019%293&docLanguage=En

Franklina Adjoa Y. (2018). *Internet Use and its Effect on Senior High School Students in WaMunicipality of Ghana*. Retrieved from https://digitalcommons.unl.edu/libphilprac/1817/

Nicola D. (2019). *One in Four Children Have Problematic Smartphone Use*. Retrieved from https://www.theguardian.com/society/2019/nov/29/one-in-four-children-have-problematic-smartphone-use