



St. Bridget College, College Department

**Math the Builder: An Open-ended City Building Game for Grade 5 with
Math Subject Using Android Platform**

**A Capstone Project
Presented to
The Faculty of Information Technology Program
St. Bridget College
Batangas**

**In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science in Information Technology**

By

**Marasigan, Baby Joy L.
Perez, Alexis C.
Periña, Rodelyn A.
Sarmiento, Glenda D.**

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EXECUTIVE SUMMARY

Title : Math the Builder: An Open Ended City Building Game
for Grade 5 with Math Subjects Using Android Platform

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Authors : Marasigan, Baby Joy L.
Perez, Alexis C.
Periña, Rodelyn A.
Sarmiento, Glenda D.

The proposed capstone project, entitled Math the Builder: An Open Ended City Building Game for Grade 5 with Math Subjects Using Android Platform was developed and designed to help improve problem solving skills of Grade 5 pupils while having fun. This system was intended to benefit both help both the students and the teachers as they engaged in the learning of Mathematics subject.

The system was created through the use of programming language such as HTML, CSS and JavaScript. The proponents also used photoshop and paint for the front-end development framework.



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The project documentation started by means of giving some related ideas or insights about the traditional way of teaching used by the teachers in St. Bridget College Elementary- Grade 5 Department. Through this information, the proponents generalized its project context, purpose and description, objectives, and scope and limitations of making the proposed system.

The related literature and other systems developed by other proponents were discussed and served as guide and a run through for the proponents. The proponents gathered information from several resources, or documentations which are related or the same that parallels with their project being developed. Defining the different terms encountered throughout the whole study was also clearly stated for understanding.

The proponents also used a representation of the organizational chart and workflow diagram. The Organizational Chart of the Elementary department and the workflow diagram of the system. The proponents clearly showed the complete diagram of the people involved with its responsibilities for the system developed.

Throughout the study, the proponents clearly discussed and showed the requirement specification to use a certain type of device, basically an Android device as main requirements of the system. Creation of different diagrams and visually representing the requirements analysis and design of the application was clearly depicted.



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The proponents also conducted a survey for a number of respondents to finish this documentation. With this survey, the results revealed a strong agreement on the use of "Math the Bulider: An Open Ended City Building Game for Grade 5 with Math Subject Using Android Platform" " that complies with the ISO 9126 in the categories functionality with an average weighted mean of 3.41. The in the categories for user interface got an average weighted mean of 3.47, content got an average weighted mean of 3.56, while the portability got an average weighted mean of 3.43.

In terms of ranking, content of the system was considered as the most effective which obtained a weighted mean of 3.56 and interpreted as strongly agree. Second is the user interface category which has a weighted mean of 3.47 and has a verbal interpretation of strongly agree. Third is the Portability category which has a weighted mean of 3.43 and interpreted as strongly agree. The results of the overall weighted mean of the system is 3.47 and interpreted as strongly agree. Lastly, functionality category got a weighted mean of 3.41 and interpreted as strongly agree.

The study aimed to build an open-ended game that would help to enhance the learning process through motivational and critical thinking skills. The game would serve as a supplementary learning tool for the grade 5 pupils to easily understand the lessons in a fun and exciting way. Through this application, the pupils would learn the subject more effectively without any fear or without having Math anxiety.



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Math the Builder is a single player based that can run into different android devices. It has also an android application that has a very small size and requires a very small amount of users' phone memory.

The result of the project showed that the target users strongly agreed on the proposed and developed android application. The result proved that the implementation of the proposed system, learning and understanding Mathematics lessons without any fear would be enhanced.



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And most of all, **Almighty Father**, who unselfishly bestows His wisdom, grace, patience, determination and courage to make this study possible.

Marasigan, Baby Joy L.

Perez, Alexis C.

Periña, Rodelyn A.

Sarmiento, Glenda D.



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DEDICATION

To our beloved parents, for their full support and guidance that inspire us to keep doing this project. They became our strength to overcome all the challenges and help us be more confident.

To our Capstone adviser, who keeps pushing us to the limit in order for us to achieve what is best.

To all of our professors and our school St. Bridget College for showing their support, love, and care, and for sharing their knowledge and expertise with us.

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P.A.C.

P.R.A.

S.G.D.


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CHAPTER I

The Problem and Its Background

Introduction

Currently, the world depends on technology and everyone from young to old seem deeply involved on these changes, thus regarding technology as the most important elements in today's societies. (Sam, 2014) Technological advances had greatly changed the education landscape in that teaching is no longer confined to the traditional delivery of lessons. Indeed, technology is revolutionary.

Technology has a greater and important role as it provides benefits of educational technology in the present day education because technology is shaping every child's future. Traditional methods of educational teaching still prevail in various urban, suburban and certain remote regions of the world. However, few educational institutions have successfully introduced new methods of learning among students through technology. This has also made the learning process more expandable and easier. Technology makes education accessible everywhere (Verma, 2017).

The project "Math the Builder: An Open Ended City Building Game for Grade 5 with Math Subject Using Android Platform" aimed to create a student-centered alternative learning game and build a good perception in math world for grade 5 pupils.



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Many pupils in the Elementary Department of St. Bridget College, worry about failing or making mistakes especially in Math subject. This feeling can lead into math anxiety and develop negative attitude. Pupils are afraid of testing or learning new strategies and ideas because of the pressure of being graded.

This application was designed pupils understanding and learning in Math subject. It provided opportunities for building and developing positive attitude towards mathematics, through reducing the fear of failure and error. In this game, greater learning can occur through the opportunities to test intuitive ideas and problem solving strategies. Children can practice their strategical and logical skills. These changes can lead to innovations of mind and learning skills. Through the application, the learning experience of the pupils will improve.



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Project Context

The Capstone project entitled "Math the Builder: An Open-ended City Building Game for Grade 5 with Math Subject Using Android Platform" is a 2-Dimensional game-based learning application for Grade 5 pupils with Math subject. It focuses on the learning enhancement of the Grade 5 pupils in St. Bridget College, Elementary level. This project started last July 2017 and was done last December 2018.

This project was intended to help the Grade 5 pupils to enhance their learning in Math. It would serve as a supplementary aid for improving problem solving skills aside from daily lessons and exercises from the teachers. This is an open-ended game or an application without any planned way of ending that can be a nice adjustment from paper-pencil school works and can help reduce academic stress. Through an open-ended game, pupils can be more engaged to a fun and better learning environment. Moreover, this application focused on specific math skill such as problem solving. The game includes mathematical problems, with different levels of difficulties. To play this, first, a mathematical problem would pop up for the player to answer. If the player got the right answer, he/she would gain additional blueprints and materials. These blueprints and materials would be used for upgrading houses to make their village look more attractive. It was believed that through this application, Grade 5 pupils would have better and faster solving skills.



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The system analyst of the project recommends the use of Construct 2 and photoshop. The system was created through the use of programming language such as HTML, CSS and JavaScript. The proponents also used photoshop and paint for the front-end development framework.



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Purpose and Description

The Capstone project entitled "Math the Builder: An Open-ended City Building Game for Grade 5 with Math subject Using Android Platform" is intended to enhance the learning and understanding of grade 5 pupils in such a way that they may gain more interest in their area of discipline.

The project aims to build an open-ended game that will help on enhancing the learning process through motivational and critical thinking skills. The game will serve as a supplementary learning tool for the grade 5 pupils easily understand the lessons in a fun and exciting way. Through this application, the pupils will learn the subject more effectively without any fear or without having Math anxiety.

The Math teachers: The Math faculty be of assistance to the researchers to gather the necessary data about the different topics of grade 5 pupils in the subject Mathematics. The project will help the teacher for better assessment of the subject learning materials. It is an additional tool for enhancing the pupils' learning in Mathematics Subject.

The Grade 5 Pupils: The project will help the grade 5 pupils to learn while having fun. This application is a game-based learning enhancement for the pupils. The grade 5 pupils of this institution can be able to learn the subject with the use of different instructional materials and learning aids like PowerPoint presentation etc. Moreover, through the strategy that will be implemented, the learning enhancement of the children will improve.



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Objectives

General Objectives

The study aimed to develop a two Dimensional open-ended game using android as a platform.

Specific Objectives

1. to design a two dimensional android application called "Math the Builder" in terms of:
 - a. a user friendly application with enhance learning environment
 - b. a mobile android friendly that will run smoothly on android device even from desktop down to tablet and handheld smart phones
2. to develop a two Dimensional android application that will be capable of:
 - a. graphical user interface in a two Dimensional design
 - b. giving excitement to the pupils
 - c. providing interactive activities for the pupils
3. to evaluate the two Dimensional android application for Grade 5 pupils with Math subject that complies with the ISO 9126 for software development.
4. to implement the developed two Dimensional interactive android application with Math subject for Grade 5 pupils.



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Scope and Limitations

The Capstone project focused on the learning enhancement of grade 5 pupils in the subject Mathematics of St. Bridget College, Elementary level. The application involves the use of Mathematics for Grade 5 pupils of St. Bridget College, Elementary level. Specifically, it generates Mathematical problems that only cover the topics for grade 5 pupils.

The application also includes inside game which is called tower jump which help to collect more blueprints to be used in upgrading different houses. The upgraded houses determined the player's accomplished levels.

However, the application is a single player based that only runs on android devices. The appearance of the application is limited to 2D designs only. The application is intended for Grade 5 pupils only.

**Definition of terms**

Android Platform. The Android platform is a platform for mobile devices that uses many ways to reach an objective. An open world facilitates greater exploration a modified Linux kernel.

Android. This is a Linux-based mobile phone operating system developed by google.

Open-ended. An open ended is a level or game designed as nonlinear, open areas with than a series of smaller levels, or a level with more linear challenges. It is used by the proponents to capture the interest of the users.

GUI(Graphical User Interface). This is an interface through which a user interacts with electronic devices such as computers, hand-held devices and other appliances. This interface uses icons, menus and other visual indicator representations to display information and related user controls. It is also used by the proponents to give accurate display information and control.

2Dimensional. This refers to something with only two dimensions, and that thereby appears flat to the viewers' perspective. This type of graphics is used by the proponents to build the application.

Game-based Learning. This is a type of game play that has defined learning outcomes. The proponents used it to balance subject matter with game play and the ability of the player to retain and apply the said subject matter into the real world.