

DEVELOPMENT OF PROGRAM WRITING USING BLOCKLY BASIC PLATFORM FOR GRADE 5 STUDENTS, DEMONSTRATION SCHOOL OF SUAN SUNANDHA RAJABHAT UNIVERSITY

Siriluck Lerthirunsap* & Jutharat Siriwiboonpol**

*1 under the Demonstration School of Suan Sunandha Rajabhat University

E-Mail: sirilak.le@ssru.ac.th*, jutharat.si@ssru.ac.th**

ABSTRACT

The purposes of this research were 1) to develop the Blockly platform to promote programming ability, 2) to determine the effectiveness of the developed platform, and 3) to compare the programming ability of students in computational science before and after learning management. The sample group was 97 students from Demonstration School of Suan Sunandha Rajabhat University, obtained through group sampling (Purpose sampling). The tools used to collect the research included statistics used to analyze the data. Determining platform efficiency (E1/E2) and testing T-test Dependent values

The results of the study showed that : Blockly platform optimization promotes programmability of grade 5 students at Demonstration School of Suan Sunandha Rajabhat University. It has an efficiency value of 84.85/87.27 which passes the specified criteria. And the programming ability of grade 5 students who used the basic Blockly platform after learning was significantly higher than before learning by 0.05.

Keywords: Blockly platform, efficiency, programming skills, computing science, Demonstration school of Rajabhat Suan Sunandha University

INTRODUCTION

The 20-Year National Strategy (BE 2561-2580) (Secretary-General's Office of the National Strategy Committee, 2018) is the national strategy aimed at guiding Thailand towards implementation, aspiring for the country to achieve the vision of "a secure, prosperous, and sustainable Thailand, a developed country for the happiness of all Thai people." This includes plans for reforming the education sector and enhancing human resource potential amidst technological transformations and the dynamics of the new era, impacting the lifestyles of people of all ages. To confront these challenges, it's imperative to adapt and change learning management processes and teaching methodologies, placing learners at the center of learning. The goal is to engage students actively, nurturing them towards their maximum potential, and fostering knowledge, skills, and a learning mindset that links acquired knowledge to real-life applications. Life skills in this new era involve staying abreast of societal changes, becoming active citizens, and engaging in competency-based learning.

In line with the aforementioned national strategy, large non-profit organizations such as Google for Education are fostering educational innovation by creating platforms like Blockly, a visual programming tool that enables sequential programming and conditional sequencing. This tool is employed to facilitate learning, enabling students to develop programming skills for their future endeavors.

Starting from this point, researchers are promoting hands-on engagement among students, cultivating thinking skills, systematic analysis, and structured learning through collaborative basic programming practices in the teaching of computing science for grade5 elementary

students at the Demonstration school of Rajabhat Suansunantha University. Additionally, this initiative aims to enhance logical thinking skills, computational thinking processes, and effective learning abilities, thereby nurturing innovation capabilities. By encouraging students to engage in foundational programming, they encounter various learning situations. A positive attitude among students can significantly elevate their innovation capabilities as well (Napaporn, 2015, pp.171-173). Blockly has segmented content that aligns with students' abilities and is beneficial for diverse learning, paving the way for the exploration and application of various programming innovations, particularly in creating different types of games.

Learning in the 21st century to learning skills for living in the 21st century that teachers do not teach, students must learn on their own, but must design and facilitate learning (Vijarn Panich); The policy of the Ministry of Education to develop the nation's youth into the 21st century world by encouraging learners to have virtue, love for Thainess, have critical thinking skills, creativity, technology skills, and can work with others, and can live peacefully with others in the world society, Ministry of Education, 2008). The basic education core curriculum aims to develop all learners, who are the strength of the nation, to be human beings with balance in terms of body, knowledge, morality; consciousness of being a Thai citizen, and citizens of the world, adhere to the democratic system of government with the King as Head of State, possessing basic knowledge and skills as well as a good attitude towards education towards careers and Lifelong education; with a focus on the learner, based on the belief that everyone can learn and develop to their full potential. (Ministry of Education, 2008). Learning is the result of students' doing or thinking, only students' doing and thinking affects their learning, teachers can help them learn, stimulate things. Students do it for their own learning only (Vijarn Panich, 2013).

The researcher has observed the readiness and interest of students in advancing their computer skills systematically, understanding the importance of systematic thinking and problem-solving through programming. This ability is considered crucial for students to develop further skills and capabilities towards higher-level advancements."

Given the significance mentioned above, the researcher is particularly interested in developing a foundational platform using Blockly to promote programming abilities for grade 5 elementary students to develop students have ability in technological literacy in the future.

Research question

"Will the platform using Blockly effectively enhance programming abilities for grade 5 elementary students as a result of the implemented teaching strategies?"

Research objectives

1. To develop an effective educational approach utilizing the Blockly platform for programming among grade 5 elementary students, measured through a criterion of 80/80.
2. To compare the learning outcomes of students after implementing the computational science teaching strategies.

RELATED DOCUMENTS AND RESEARCH

Cornell University Communications professor and Microsoft Tarleton L. Gillespie wrote in a May 1, 2010 article. Platforms, Computers, Platforms, Software, Platforms, Applications or Platforms, Digital Marketing Platforms, and many more. Social media such as Facebook, X(Twitter) and Instagram are no longer commonly referred to by pronouns as "social networks". Popularly referred to as "The Politics of 'Platforms'", this can have many possible meanings. The difference may be overlooked by the listener or speaker. Over the past four

years, the Blockly team has learned many lessons that can be applied to block programming in general.

An open-source toolkit called Blockly makes it simple to integrate block-based visual programming into an application. It is made to be adaptable and offers a wide range of functions for various uses. It has been applied to the creation of tale screenplays, animated character programming for screens, robot control, and even the generation of legal papers. However, Blockly is not a language in and of itself; programmers that utilize Blockly design their own block languages. When utilizing Blockly to construct an app, developers should carefully examine the style, which blocks to employ, and which language features and APIs are appropriate for their target user base. Index Terms: Visual Projects; Education

Neil Fraser, November 20,2023 The Blockly team has gained a lot of knowledge over the past four years that can be used to block-based programming in general. Ten blunders that we have made or that other people have made frequently are listed below. Without any supporting evidence, each topic is presented as uncontroversial folk knowledge.

Definitions of Terms:

Platform or Modern Technology Platform refers to the foundational working system, the basic structure of computer architecture that serves as a foundation for computer devices and programs to operate in the same environment. It supports software, facilitates collaborative work, and serves as an intermediary connecting technical data management. Platforms are primarily developed to cater to the most current needs and conveniences.

Blockly is a visual programming development tool that uses puzzle-piece-like visual symbols to represent instructions arranged in sequences according to desired conditions. Developed by Google for Education, it offers a "Try Blockly" feature and includes groups of symbols comprising Logic, Loops, Math, Text, Lists, Color, Variables, and Functions.

Program refers to the process of instructing computers to perform tasks in specified sequences and formats. The algorithm is a step-by-step problem-solving process or method, a group of methodical steps or guidelines leading to problem-solving, comprising a set of clear and guaranteed steps. When executed accurately and in full accordance with the steps, it yields the desired results.

RESEARCH METHODOLOGY

Programming Ability involves learning that fosters critical thinking and problem-solving skills, which are essential skills for learning in the 21st century. Students develop reasoned, systematic, and creative thinking, enabling them to apply these skills in problem-solving, creating quality work, and sustaining life in the present while fostering sustainable learning for the future.

1. Population and sample

- The population for this research includes 97 grade 5 students at Demonstration school of Rajabhat Suansunantha University.

- The sample group consists of 33 students from 5/3 of the mentioned elementary school (Purposeful Sampling).

2. Research Variables: Independent Variable: Teaching using the Blockly platform.

- Dependent Variable: Programming abilities.

Research Framework: Hypothesis: Students using Blockly for simple programming tests will show improved post-test results compared to their pre-test scores.

Research Tools: Programming Ability Assessment Test.

Blockly Platform for basic programming.

3. Data Collection

The research follows an experimental design, specifically, The One Group Pretest-Posttest Design. Data Collection Procedures: The study conducted experiments on grade 5 students in the 2023 academic year, specifically the 5/3 class comprising 33 students.

1. The students took a pre-test to measure their programming performance. This test lasted for 50 minutes, and their scores were recorded for statistical analysis.

2. The researcher then conducted teaching sessions using the Blockly platform, introducing the tool, building knowledge, solving problems, and engaging students in four complete lessons.

3. After the lessons, the same group of 33 students underwent a post-test using the Blockly platform to assess their programming abilities. The scores from this test were also recorded for statistical analysis.

4. The researcher compared the pre-test and post-test scores to evaluate the improvement in simple coding abilities using Blockly and performed statistical analysis to test the hypothesis.

Data Analysis and Statistical Methods Used in Data Analysis: In this research, the researcher employed the following statistical methods:

1. Basic statistics including Mean and Standard Deviation.

2. Statistical analysis to check the tool's quality by employing the E1/E2 criterion at the 80/80 standard.

3. Statistical analysis is used to test hypotheses, specifically the Dependent Samples t-test.

RESULTS

The researcher presented the data analysis results according to the research objectives, divided into two parts:

Part 1: Efficiency analysis of learning management by using Assessing the effectiveness of the simple programming test using the Blockly platform among grade 5 students, Demonstration School of Suan Sunandha Rajabhat University according to the specified criteria: 80/80 results are as follows.

Table 1: Results of assessing the skill practice using Blockly among 5/3 grade students, Demonstration School of Suan Sunandha Rajabhat University.

(n=33)

Number of students	Process efficiency (E1)	Outcome Efficiency (E2)
Total	84.85	87.27

From Table 1, it is evident that the skill practice using Blockly among grade 5 students at Demonstration school of Rajabhat Suansunantha University met the criterion of 84.85/87.27.

Part 2: Comparative analysis of programming abilities using Blockly among grade5 students before and after the lessons.

(n=33)

Configure	\bar{x}	S.D.	ΣD	ΣD^2	df	t
Before	5.82	1.24	3.09	1.42	32	12.48*
After	8.91	1.01				

From Table 2, the data analysis revealed that grade5 students learning programming using the Blockly platform had an average test score of 5.82 before the lesson and 8.91 after. Comparing the scores before and after the lesson, it's evident that these students had significantly higher scores after the lesson at a statistical level of .05.

CONCLUSION

Conclusion and Research Suggestions: Developing the basic Blockly platform to enhance programming abilities for 5th-grade students at the demonstration school of Rajabhat Suansunantha University, the analysis of E1/E2 efficiency indicates students met the 80/80 standard. The test scores before programming were 84.85 and after were 87.27, with a learning duration of 50 minutes. Analyzing data using the t-test for Dependent Samples revealed pre-programming scores of 5.80 and post-programming scores of 8.91, with standard deviations of 1.24 and 1.01 respectively, consistent with findings by Erik Pasternak, Rachel Fenichel, Andrew N. Marshall in "Tips for Creating a Block Language with Blockly." The study emphasizes the ease of rectifying errors in block-like tool usage.

Suggestion

1. Students may still struggle with conditions and loops, necessitating increased practice time for more than one condition.
2. Extend the use of this basic Blockly programming development to other grade levels to foster ongoing programming skill development.

ACKNOWLEDGMENT

This research owes its success to the contributions of many people. Most appreciation goes to those experts for their advice and also to Suan Sunandha Rajabhat University for their valuing this research and funding support. Special thanks also go to participating teachers at Demonstration School of Suan Sunandha Rajabhat University for their questionnaire responses. Utilization of the current research results will be ensured.

REFERENCE

- Burin Rujjanaphand. (2018). What is Computing Science? Retrieved August 6, 2023. From <http://www.thaiall.com/computingscien>.
- ETDA. (2022). Knowledge Library. Retrieved August 6, 2023. From <https://www.etda.or.th/terminology-detail/980.html> Retrieved on June 6, 2020.
- F. Turbak, J. Gray, C. Kelleher, & M. Sherman (Eds.), (2017). IEEE Blocks and Beyond Workshop (B&B) (pp. 21-24). IEEE.<https://doi.org/10.1109/BLOCKS.2017.8120404>

- Sararat, Chokpraiwan, and Yodkamol (2018). Digital marketing strategies on online platforms. Study). Bangkok:Faculty of Arts, Siam University.
- kroobannok. (2022). Rounded Teacher:Search Retrieved December 15,2022. from https://www.kroobannok.com/board_view.php?b_id=186946
- Pasternak, E., Fenichel, R., & Marshall, A. N. (2017). Tips for Creating a Block Language with Blockly.
- Sawitree Phewngam. (2021), Information technology for Digital Learning Management Supporting Happiness of Secondary Students, Suan Sunandha Rajabhat University Journal Suan Sunandha Rajabhat University ISSN : 2351-0811 Vol. 13 No.2.
- Supornwichit and Prachya Premma. (2018) Guidelines for teaching and learning management according to learning standards and indicators, Science Learning Subject Group (2017 revised edition) according to the core curriculum. Bangkok: Aksorn Charoen Tat.
- Viruth Fast subjects. (2017). How to install and use Iblockly. Retrieved August 21, 2018, from <http://doc.inex.co.th/useiblockly>
- Vijarn Panich (2013) “Creating Learning for the 21st Century”(1st edition): Siam Commercial Foundation, Bangkok
- Watcharapol Viriy and Chatuphon Sriprom. (2023). The development of the web application “BlueSkyEvent” for searching interesting events. Thesis Graduate school Suansunandha Rajabhat University.
- Worapoj Ongvimonkarn and Suksadee Nattawut Sit, Retrieved (November 19,2023), The Development of Enterprise Management System in Digital Platform Case Study Agriculture Farm Business