ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
Website: https://etcor.org
iJOINED ETCOR P - ISSN 2984-7567 E - ISSN 2945-3577
The Exigency P - ISSN 2984-7842 E - ISSN 1908-3181

Community- Based Learning and Computational Thinking Skills of Low Performing Grade 9 Students

Jonathan D. Abuso*[1], Allen E. Pasia[2]
[1] Adela S. Torres National High School, Division of Quezon, Philippines
[2] Laguna State Polytechnic University, Faculty of College of Graduate Studies and Applied Research
* Corresponding Author email: *Jonathanb.delosreyes@deped.gov.ph*

Received: 19 June 2023 **Revised**: 07 August 2023 **Accepted**: 08 August 2023

Available Online: 23 August 2023

Volume II (2023), Issue 3, P-ISSN – 2984-7567; E-ISSN - 2945-3577

Abstract

Aim: This study examined the impact of community-based learning and computational thinking skills of low performing grade 9 students.
Methodology: This study used an experimental research design conducted at a public high school in Quezon with 30 low performing grade 9 learners. The researchers used surveyed questionnaires to determine how the students perceived when considering community-based learning and validated pretest and posttest to test the students computational thinking skills. The intervention focused on at-risk students and aimed to improve their academic progress. This study was conducted within six weeks of the third quarter. Moreover, experimental and inferential statistics were used. Mean was used to determine how the students perceived when considering community-based learning in terms of student's engagement, application of knowledge and real-world experience, while Pearson Product Moment Correlation Coefficient (PMMC) was used to determine the significant relationship in the perceived community-based learning and computational thinking skills of the respondents. Moreover, T-test was used to determine the significance differences in pretest and posttest before and after the community-based learning.
Results: There is positive acceptance in community-based learning as to student engagement, application of knowledge, and real-world experience. Moreover, the respondent show a significant improvement in their computational thinking skill as to decomposition, pattern recognition, abstraction, and algorithm. Furthermore, the study show a significant difference between the pre-test and posttest score before and after the respondent exposure in community-based learning. However, it shows no significant relationship between the perceived community-based learning and computational thinking skill of the respondents except in the area between real-world experience and pattern recognition.
Conclusion: The study indicates a significant difference between the pre-test and posttest scores, demonstrating the effectiveness of community-based learning in enhancing the respondents' computational thinking skills. While the overall relationship between perceived community-based learning and computational thinking skills may not be significant, the specific domain of real-world experience and pattern recognition stands out as an area where community-based learning can have a meaningful impact. It indicates that community-based learning has the potential to make a meaningful difference in enhancing computational thinking skills when it comes to real-world application and the ability to recognize patterns.

Keywords: **:** community-based learning, computational thinking skills, real-world experience

INTRODUCTION

Mathematics, although seen as complex, is a subject that promotes logical reasoning, critical thinking, problem-solving abilities, and various other valuable skills. It is used in all fields and professions, making it crucial for students to understand from basic to more complex levels of education. By understanding mathematics, students can overcome their fear of the subject and recognize its importance in their lives.

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
ETCOR REVIEW CENTER
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Students have different levels of understanding and computational skills in mathematics, which include the ability to perform basic calculations accurately and quickly. Developing these skills is essential as they form the foundation for mathematical proficiency. Computational thinking, considered one of the most important skills for the 21st century, helps students break down complex problems into smaller steps and solve real-world issues, preparing them to tackle today's challenges effectively.

Computational thinking is a problem-solving approach that involves breaking down problems, finding patterns, simplifying them, and using specific steps or rules to solve them. It consists of four main components: decomposition (breaking problems into smaller parts), pattern recognition (identifying similarities or differences), abstraction (focusing on important details), and algorithms (using specific techniques or steps). These elements help us solve problems effectively by making them easier to understand and solve (Kassan et al, 2016).

Community-Based Learning is an approach that combines community participation, education, and reflection to enhance the learning experience. It allows students to learn from various community members and resources, reinforcing the concepts taught in school and connecting academic learning to real-life situations. It fosters reciprocal learning and meaningful relationships, while also strengthening the ties between schools and the community.

Moreover, it has advantageous for students as it fosters a deeper sense of connection with their environment. It also challenges them to develop a diverse range of intellectual and academic skills, enabling them to better understand and address the challenges they encounter in their daily lives. By bridging the gap between knowledge and action and aligning academic standards with the real-world experiences of their communities, community schools empower students to apply their learning and contribute meaningfully to their surroundings. (Lenton et al. 2014)

The primary objective of the research is to address the needs of students who are lacking of foundational skills required for learning higher-level mathematical concepts. The importance of focusing on students who have learning difficulties or are affected by various factors that hinder their progress in mathematics. These students require targeted interventions to bridge the gaps in their understanding and improve their computational thinking skills. Moreover, it acknowledges that students in Grade 9 are still struggling with computational thinking skills, indicating a persistent issue that needs to be addressed. Furthermore, recognizing the potential of community-based learning as an effective approach in addressing the learning needs of struggling students in mathematics. By implementing community-based learning strategies, which leverage real-world experiences and practical applications, the research aims to explore its impact on improving computational thinking skills.

Thus, the researchers aimed to assess the effectiveness of community-based learning in enhancing students' computational skills. By implementing this approach, they seek to address the needs of students struggling in math and provide them with meaningful learning experiences. Community-based learning offers learners the opportunity to develop essential skills, become responsible community members, and prepare for their future careers.

Research Questions

The main aim of this study is to determine the relationship and the impact of the community-based learning and computational thinking skills of low performing Grade 9 students. Its main goal is to answer the following questions:

1. How do the respondents perceive when considering community-based learning in terms of:
   1.1 student engagement;
   1.2 application of knowledge; and
   1.3 real-world experience?
2. What are the mean pretest and posttest scores of the respondents in the computational thinking skills as to:
   2.1 decomposition;
   2.2 pattern recognition;

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
Website: https://etcor.org
iJOINED ETCOR P - ISSN 2984-7567 E - ISSN 2945-3577
The Exigency P - ISSN 2984-7842 E - ISSN 1908-3181

2.4 abstraction; and
3.4 algorithm?
3. Is there a significance differences in pretest and posttest before and after the community-based learning?
4. Is there any significant relationship in the perceived community-based learning and computational thinking skills of the respondents?

Hypothesis

Given the stated research problem, the following hypotheses were tested on 0.05 level of significance:
Hypothesis 1: There is no significance differences in pre-test and posttest before and after the community-based learning.
Hypothesis 2: There is no significant relationship in the perceived community-based learning and computational thinking skills of the respondents.

METHODS

Research Design

This research employed an experimental research design to assess the effectiveness of community-based learning as an intervention for low-performing Grade 9 students in computational thinking skills. The specific areas of focus were decomposition, pattern recognition, abstract thinking, and algorithmic problem-solving. Community-based learning intervention was chosen as the treatment because of its potential to enhance students' computational thinking skills. By immersing students in authentic, real-world experiences and providing opportunities to apply computational thinking in practical contexts, community-based learning offers a hands-on and engaging approach to learning.

Likewise, correlational method employed to determine the relationship of community-based learning and computational thinking skills of low performing of the Grade 9 students of Adela S. Torres National High School.

Population and Sampling

This study was conducted at 30 low performing grade 9 learners in a public high school in Quezon using purposive sampling technique.

Instrument

The study utilized a pretest-posttest design to examine the differences in computational thinking skills between the two groups. The researcher sought helped to the master teacher who were expert in conducting community-based learned to examine and validate the instrument have been used. Both pretest and posttest are researcher-made test which comprises of five question with guide questions aligned to the core component of community-based learning. Before administering the questionnaire and reseacher-made test, both instrument were undergone in pilot testing. Furthermore, the pretest served as a baseline measure, assessing the initial proficiency levels of the students in the targeted areas. Following the CBL intervention, a posttest was administered to evaluate any changes or improvements in the computational thinking skills of the participants.

Data Collection

The researchers meticulously followed a systematic procedure for this study, which included seeking advice and obtaining approval from various stakeholders and experts. Permissions were secured from relevant authorities to conduct community-based learning activities. To establish a baseline, a pretest was administered to the respondents before the intervention began. Afterward, the researcher conducted an orientation session to inform the respondents about the schedule of the community-based learning program that will be held in two barangays (local communities). The intervention itself took place every Saturday for a duration of six weeks, with each session lasting 60 minutes. Engaging community activities were designed to enhance computational thinking skills, including a scavenger hunt, exploration of parallelogram properties within the community, and activities centered around trapezoids and kites, such as matches and designing.

At the conclusion of the six-week program, a posttest assessment was administered to evaluate the impact of the community-based learning intervention. The assessment utilized rubrics to assess students' performance and a questionnaire-checklist to gather feedback on their perception of the intervention and its effectiveness.

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
ETCOR REVIEW CENTER
iJOINED ETCOR P - ISSN 2984-7567 E - ISSN 2945-3577
The Exigency P - ISSN 2984-7842 E - ISSN 1908-3181

Treatment of Data

In this study, experimental and inferential statistics were used. Mean was used to determine how the students perceived when considering community-based learning in terms of student's engagement, application of knowledge and real-world experience, while Pearson Product Moment Correlation Coefficient (PMMC) was used to determine the significant relationship in the perceived community-based learning and computational thinking skills of the respondents. Moreover, T-test was used to determine the significance differences in pretest and posttest before and after the community-based learning.

Ethical Considarations

The researchers demonstrated unwavering commitment to upholding ethical research protocols, meticulously safeguarding the well-being and interests of every individual and organization involved in the study. With meticulous attention and unwavering dedication, the researcher ensured that all parties were protected, fostering an environment of trust, respect, and fairness throughout the entire research process. By adhering rigorously to ethical standards, the researchers provided a solid foundation for the study, enabling the generation of meaningful and reliable insights while upholding the highest moral principles.

RESULTS and DISCUSSION

PART I. RESPONDENTS' PERCEPTIONS ON CBL

Table 1. Respondents' Perceptions on CBL in terms of Student Engagement

Student Engagement	M	SD	VI
1. I enjoy attending the community intervention.	3.17	0.65	Agree
2. I participate in these activities to learn more.	3.43	0.63	Agree
3. Interaction with others boost my confidence.	3.07	0.74	Agree
4. It helps me to develop my ability as part of the group.	3.27	0.64	Agree
5. It improves my communication skills with others.	3.40	0.56	Agree
6. I am more active to participate in class discussions.	3.38	0.68	Agree
7. I love to share my ideas and thought with my colleagues.	2.97	0.49	Agree
8. I recognize my own strengths and weaknesses by participating in learning activities.	3.27	0.69	Agree
Overall	3.24	0.37	Agree

Legend: VI -Verbal Interpretation, N = 30. 3.5 – 4.00 Strongly Agree, 2.50 – 3.49 Agree, 1.5 – 2.49 Disagree, 1.00 – 1.49 Strongly Disagree

Table 1 shows information about how the students feel about community-based learning and how engaged they are. The average rating for student engagement is 3.24, which means that, on average, the students agree that they are engaged in the learning activities. The standard deviation of 0.37 tells that there is some variation in how engaged the students are.

Looking at specific aspects of student engagement, it shows most students agree they participate in these activities to learn more (m=3.43; sd=0.63). They also agree that community-based learning helps them develop their abilities as part of a group (m=3.27; sd=0.64) and improves their communication skills (m=3.40; sd=0.56). The students actively participate in class discussions (m=3.38; sd=0.68) and recognize their own strengths and weaknesses through these activities (m=3.27; sd=0.69).

The data shows that the students generally see community-based learning as engaging. They believe it helps them learn, develop their group abilities, improve communication, actively participate, and become aware of

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
Website: https://etcor.org
iJOINED ETCOR P - ISSN 2984-7567 E - ISSN 2945-3577
The Exigency P - ISSN 2984-7842 E - ISSN 1908-3181

their strengths and weaknesses. However, the data also reveals that students are less enthusiastic about sharing their ideas and thoughts with their peers (m=2.97; sd=0.49).

This contrast suggests that while students recognize the benefits of community-based learning overall, they may feel less comfortable or motivated to share their own ideas with their classmates. This could be influenced by factors like individual personality traits, confidence levels, or communication preferences.

Table 2. Respondents' Perceptions on CBL in terms of Application of Knowledge

Application of Knowledge	M	SD	VI
1. When learning new information, I try to put the ideas in my own words.	3.33	0.61	Agree
2. I make up my own examples to helps me understand the important concepts I learned.	3.30	0.65	Agree
3. During session, I try to combine different pieces of information to create new things	3.03	0.49	Agree
4. I learn to translate ideas into visualizations.	2.93	0.52	Agree
5. I do craft and sharing information through written and oral means.	3.07	0.58	Agree
6. I learn to set goals and choose to proceed.	3.33	0.48	Agree
7. I became more creative in creating unique ideas.	3.17	0.65	Agree
8. I learned to connect new ideas to process information.	3.33	0.61	Agree
Overall	3.19	0.37	Agree

Legend: VI -Verbal Interpretation, N = 30. 3.5 – 4.00 Strongly Agree, 2.50 – 3.49 Agree, 1.5 – 2.49 Disagree, 1.00 – 1.49 Strongly Disagree

Table 2 shows that the respondents generally have a positive perception of applying their knowledge in community-based learning. The average rating for knowledge application is 3.19, indicating agreement among the respondents. Most students agree that they try to explain new ideas in their own words, create examples to understand concepts, set goals and make choices, and connect new ideas to process information. They also agree that they learn to visualize ideas, communicate through writing and speaking, and generate unique ideas.

These findings suggest that students actively engage with the learning material and know how to apply their knowledge effectively. Community-based learning helps them express and communicate their ideas visually and verbally, and fosters creativity in generating new concepts. While students recognize the importance of integrating information for innovation, there is still room for improvement in this aspect.

The data indicates that students perceive the application of knowledge in community-based learning positively. They actively engage by explaining ideas, creating examples, setting goals, connecting concepts, and demonstrating creativity. Community-based learning promotes active learning, communication skills, and creativity. It also helps students develop goal-setting and decision-making abilities, empowering them in their learning journey. However, there is a need to further enhance the integration of different information to foster critical thinking and problem-solving.

Table 3. Respondents' Perceptions on CBL in terms of Real-world Experience

Real-world Experience	M	SD	VI
1. I figure out how the information might be useful in the real world.	3.43	0.63	Agree
2. When I study, I try to connect what I have learned with my own experiences.	3.60	0.56	Strongly Agree
3. I apply my learnings into real- life setting.	3.33	0.66	Agree
4. I able to relate the topic on real life situation.	3.30	0.65	Agree

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
ETCOR REVIEW CENTER
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

5. I enjoy doing activities that involve personal experience.	3.43	0.50	Agree
6. I learned to connect the concepts and ideas into real-world situations.	3.17	0.70	Agree
7. The lesson becomes interesting using-real world setting.	3.07	0.58	Agree
8. It improves my insight in real-world situations.	3.17	0.65	Agree
Overall	3.31	0.42	Agree

Legend: VI -Verbal Interpretation, N = 30. 3.5 – 4.00 Strongly Agree, 2.50 – 3.49 Agree, 1.5 – 2.49 Disagree, 1.00 – 1.49 Strongly Disagree

Table 3 provides insights into how the respondents perceive real-world experience in community-based learning (CBL). The data shows that students generally agree that CBL offers real-world experience. They strongly believe in connecting what they learn with their own experiences and understanding how the information they acquire can be useful in real-life situations. They can relate the topics they learn to real-life scenarios and apply their learning in practical settings. However, there is some room for improvement in making lessons more interesting when presented in real-world contexts. Nevertheless, students enjoy activities that involve personal experiences, showing their enthusiasm for hands-on learning. Overall, the data supports the effectiveness of CBL in providing real-world experience and bridging the gap between theory and practice.

PART II. PRETEST AND POSTTEST SCORES IN CTS

Table 4. Pretest Scores of Respondents on Computational Thinking Skill

	Decomposition		**Pattern Recognition**		**Abstraction**		**Algorithms**		Level of Computational Thinking Skills
	f	%	f	%	f	%	f	%	
16-20	-	0.00	-	0.00	-	0.00	-	0.00	Exemplary
11-15	-	0.00	1	3.33	-	0.00	-	0.00	Proficient
6-10	28	93.33	27	90.00	27	90.00	8	26.67	Developing
1-5	2	6.67	2	6.67	3	10.00	22	73.33	Emerging
Total	30	100.00	30	100.00	30	100.00	30	100.00	

Table 4 shows the scores of the respondents on a pretest that measured their computational thinking skills. None of the respondents reached the highest level of performance, but one person achieved proficiency in pattern recognition. Most of the respondents showed a developing level of understanding in decomposition, pattern recognition, abstraction, and algorithms. However, the skill of algorithms had the lowest scores, indicating challenges in comprehending and creating efficient algorithms. Most respondents demonstrated a basic understanding of decomposition, pattern recognition, and abstraction, but there is still room for improvement before reaching proficiency in these skills.

Table 5. Posttest Scores of Respondents on Computational Thinking Skill

	Decomposition		**Pattern Recognition**		**Abstraction**		**Algorithms**		Level of Computational Thinking Skills
	f	%	f	%	f	%	f	%	
16-20	26	86.67	24	80.00	20	66.67	7	23.33	Exemplary
11-15	4	13.33	6	20.00	9	30.00	20	66.67	Proficient
6-10	-	0.00	-	0.00	1	3.33	3	10.00	Developing

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
iJOINED ETCOR P - ISSN 2984-7567 E - ISSN 2945-3577
ETCOR REVIEW CENTER
The Exigency P - ISSN 2984-7842 E - ISSN 1908-3181

1-5	-	0.00	-	0.00	-	0.00	-	0.00	Emerging
Total	30	100.00	30	100.00	30	100.00	30	100.00	

Table 5 shows the posttest scores of the respondents in computational thinking skills. Most respondents achieved an exemplary level in all four skills, demonstrating high competency in decomposition, pattern recognition, abstraction, and algorithms. They showed the ability to identify patterns, break down complex problems, and effectively apply computational thinking. Some respondents scored at the proficient level, indicating a good understanding of the concepts and their application. A few respondents scored at the developing level, suggesting the need for further improvement in certain skills. However, no respondents scored at the lowest level, indicating the effectiveness of the intervention in improving computational thinking skills. Overall, the intervention successfully enhanced the respondents' abilities to solve complex problems and think critically.

Table 6. Test of Difference in the Pretest and Posttest Scores on Computational Thinking Skill

	Posttest		Pretest		Mean Difference	t	df	Sig. (2-tailed)
	M	SD	M	SD				
Decomposition	16.97	1.88	8.77	1.76	9.06	19.566	29	0.000
Pattern Recognition	17.40	2.03	8.57	1.83	9.82	18.324	29	0.000
Abstraction	15.93	2.63	7.33	1.27	9.79	14.814	29	0.000
Algorithms	13.93	3.05	5.27	0.45	9.84	15.046	29	0.000

if p ≤ .05 (significant); if p > .05 (not significant)

Table 6 presents the results of the pretest and posttest scores for computational thinking skills. The data shows that there is a significant difference between the pretest and posttest scores for all four skills: decomposition, pattern recognition, abstraction, and algorithms. The intervention in community-based learning had a positive impact on the respondents' understanding and proficiency in these skills.

For decomposition, pattern recognition, abstraction, and algorithms, the posttest scores showed a substantial increase compared to the pretest scores. This indicates that the intervention effectively enhanced the respondents' abilities in breaking down problems, recognizing patterns, abstracting information, and designing algorithms.

The interactive and collaborative learning environment in the community-based setting played a crucial role in improving the respondents' computational thinking skills. Engaging in active learning experiences and applying these skills in real-world contexts helped students develop a deeper understanding and intuition for these concepts.

The intervention also fostered critical thinking and problem-solving skills among the respondents. Through hands-on activities, group discussions, and sharing different perspectives, students refined their skills in abstraction and problem analysis.

The findings support the relevance of computational thinking beyond the classroom and highlight the importance of community involvement in promoting these skills. By incorporating computational thinking into different communities, students can understand how these concepts apply to their daily lives and engage in interdisciplinary projects that require higher-order thinking skills (Mohaglegh and McCauley, 2016).

The intervention program successfully improved the respondents' computational thinking abilities, enabling them to tackle complex problems and apply these skills in real-world scenarios.

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
iJOINED ETCOR P - ISSN 2984-7567 E - ISSN 2945-3577
ETCOR REVIEW CENTER
The Exigency P - ISSN 2984-7842 E - ISSN 1908-3181

Table 7. Test of Relationship in Perceived Community-based Learning and Computational Thinking Skill

Correlations

	Decomposition	Pattern Recognition	Abstraction	Algorithms
Student engagement	0.237	-0.234	-0.163	-0.207
application of knowledge	0.084	-0.190	-0.136	-0.336
real world experience	0.221	-.368*	0.032	0.085

**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed).*

Table 7 presents the correlations between the dimensions of computational thinking skills (decomposition, pattern recognition, abstraction, and algorithms) and three external factors of community-based learning (student engagement, application of knowledge, and real-world experience).

The findings show that there is no significant relationship between student engagement and the four dimensions of computational thinking skills. Higher levels of student engagement were associated with lower scores in decomposition, pattern recognition, abstraction, and algorithms. This suggests that the community-based learning approach, focusing solely on student engagement, was not sufficient to enhance the respondents' skills in these areas.

Similarly, there is no significant relationship between the application of knowledge and the four dimensions of computational thinking skills. The practical problem-solving focus of application of knowledge did not have a substantial impact on the respondents' proficiency in these skills.

Regarding real-world experience, there is a significant negative correlation with pattern recognition. As the perception of real-world experience increases, the ability in pattern recognition decreases. However, there are weak to moderate positive correlations between real-world experience and decomposition, abstraction, and algorithms, but not strong enough to be significant. This suggests that the respondents' perception of real-world experience did not significantly impact their proficiency in these computational thinking skills.

The negative relationship between real-world experience and pattern recognition highlights the trade-off between real-world experiences and the development of pattern recognition abilities. It is important to carefully balance the inclusion of real-world experiences with the development of pattern recognition skills in community-based learning interventions.

The findings emphasize the need to consider multiple aspects of the learning experience, incorporate both theoretical and practical components, and provide diverse and challenging experiences to enhance computational thinking skills, particularly pattern recognition.

In contrast to a previous study, the results contradict the notion that active participation in community-based activities alone has a profound impact on the development of computational thinking skills. It is crucial to recognize the significance of student participation in the community process and provide opportunities for them to contribute positively to their community while considering the holistic development of computational thinking skills.

Community-based learning programs should aim to enhance engagement and other critical aspects of the learning experience to foster computational thinking skills effectively (Jiang et al, 2021).

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
ETCOR REVIEW CENTER
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Summary, Conclusions, and Recommendations

This research aimed to determine the effects of integrating community-based learning as intervention on developing the computational thinking skill of Grade 9 students in Adela S. Torres National High School which specifically deal with identifying the perceptions of respondent in community-based learning in terms of student engagement, application of knowledge, and real-world experience using survey questionnaire. Likewise, the pretest and posttest were used to determine the mean scores of the respondents on computational thinking skill in terms of decomposition, pattern recognition, abstraction, and algorithms. Similarly, this also sought to assess if there is significant difference in pretest and posttest before and after the community-based learning, and significant relationship in perceived community-based learning and computational thinking skill of the respondents.

To analyze the data, experimental research design was used to identify and examine the effectiveness of community-based learning of low performing students in computational thinking skill in terms of decomposition, pattern recognition, abstraction, and algorithms in grade 9 students at Adela S. Torres National High School. The respondents, thirty (30) students, are purposely chosen wherein the researcher considered the performance of numeracy test since it composed of basic skills with computational thinking. The survey was validated by the expert to determine the perception of the respondents. The pretest and posttest questionnaires that are validated were used revolving around topic on Geometry and were scored using rubric. Frequency, percentage distribution, paired t-test, and Pearson product moment of correlation were all utilized to comprehensive and statistically analyze the data.

There is positive acceptance in community-based learning as to student engagement, application of knowledge, and real-world experience. Moreover, the respondent show a significant improvement in their computational thinking skill as to decomposition, pattern recognition, abstraction, and algorithm. Furthermore, the study show a significant difference between the pre-test and posttest score before and after the respondent exposure in community-based learning. However, it shows no significant relationship between the perceived community-based learning and computational thinking skill of the respondents except in the area between real-world experience and pattern recognition.

It was recommend to the math teachers are encourage to incorporate community-based learning activities in their lesson plans to help students apply their mathematical knowledge in real-world situations. Additionally, teachers may focus on developing activities that foster pattern recognition skills in students, as this skill was found to be strongly correlated with community-based learning.To the school heads may encourage and support the implementation of community-based learning activities in their schools. They should ensure that teachers have the necessary support and resources to effectively implement these activities. Additionally, they should facilitate partnerships with community organizations to provide students with opportunities to apply their learning in real-world setting during weekdays without interruption of lesson. To the parentsare also recommended to join and support the community-based learning efforts, offering their assistance or expertise when applicable. By actively participating and supporting community-based learning, parents can help their child make meaningful connections between math and the real world. It is important for parents to stay informed about the community-based learning initiatives implemented by their child's school, attending meetings and engaging in discussions with teachers to understand how these activities align with the lesson. At home, parents can reinforce the concepts and skills learned through community-based learning by encouraging their child to apply mathematical knowledge in real-life situations. Moreover to the future researchers may investigate the impact of community-based learning on other cognitive skills, such as problem-solving, critical thinking, and decision-making. Additionally, they can examine the effectiveness of community-based learning across different subject areas and in various school settings to determine its generalizability. Finally, they can investigate the long-term impact of community-based learning on students' academic and career success.

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
ETCOR REVIEW CENTER
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

REFERENCES

Bedri, Z., de Fréin, R., & Dowling, G. (2017) Community-based Learning: A Primer. Dublin: Technological University Dublin.

Baker, L. (2019). Community-based service-learning in language education: A review of the literature. International Journal of Research on Service-Learning and Community Engagement, 7(1), Article 2.

Barrett M.S. (2012). An introduction to community-based learning. Donelan Office of Community-Based Learning.

Capate, R. & Lapinid, M.PhD (2015, May 24) Assessing the Mathematics Performance of Grade 8 Students as Basis for Enhancing Instruction and Aligning with K to 12 Curriculum

Carlisle S.K., Gourd, K., Rajkhan, S. & Nitta, K. (2014). Assessing the impact of community-based learning on students: The community-based learning impact scale (CBLIS). University of Washington, Bothell.

Chepkuto, W. et al. (2021) Effectiveness of Community Based Learning: A Review of its Application in the Kenyan Situation, International Journal of Research, and Innovation in Social Science (IJRISS) |Volume V, Issue IV, April 2021|ISSN 2454-6186

Doleck, T., Bazelais, P., Lemay, D.J. et al. (2017) Algorithmic thinking, cooperativity, creativity, critical thinking, and problem solving: exploring the relationship between computational thinking skills and academic performance. J. Comput. Educ. 4, 355–369 (2017).

Jiang, L., Li, S., Wu, X., Han, W., Zhao, D., & Wang, Z. (2021). A weighted network community detection algorithm based on deep learning. *Applied Mathematics and Computation*, *401*, 126012.

Kassan, S., Fatt, L. K., & Meng, T. Y. (2016). Asas Sains Komputer Tingkatan 1. *Kurikulum Standard Sekolah Menengah*.

Lenton, R. L., Smith, R., Munro, Y., Sidhu, R., Kennedy, B., Conrad, M., & Kaur, S. (2015). Community service learning and community-based learning as approaches to enhancing university service learning.

Mohaghegh, D. M., & McCauley, M. (2016). Computational thinking: The skill set of the 21st century.

Megahed, N., Purinton, T., El-Shimi, A., Skaggs, J. & Amer, M. (2018). Examining the effectiveness of community-based learning in promoting student "civic-mindedness" At Universities: A Case Study in Egypt. Asia Pacific Institute of Advanced Research, 4(1), 151 – 160.

Oluk, A. (2017). Investigation of Students' Computational Thinking Skills in Terms of Logical Mathematical Intelligence and Mathematics Academic Achievement. Unpublished Master Thesis. Amasya University Institute of Science and Technology, Amasya

Sarıtepeci, M. (2017). Examination of computational thinking skills at secondary education level in terms of various variables. 5th International Instructional Technologies & Teacher Education Symposium Proceedings Book. October 11-13. Izmir: Dokuz Eylul University, (pp218-226).

Swick, T. C. (2020). Improving Computational Thinking: Action Research Implementing a School Makerspace with Elementary Students.

Turan, B. (2019). The Effect of Problem-Based Learning on Problem Solving and Computational Thinking Skills in Game and Robot Projects Developed by Secondary School Students.

ETCOR Educational Research Center PHILIPPINES
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Google Website: https://etcor.org
NBDB NATIONAL BOOK DEVELOPMENT BOARD PHILIPPINES
ETCOR REVIEW CENTER
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Vind, D. (2019,April 17) Five Core Computational Thinking Skills that Strengthen Students Humanities Skills,

Yadav, A., Hong, H. & Stephenson, C. (2016) Computational Thinking for All: Pedagogical Approaches to Embedding 21st Century Problem Solving in K-12 Classrooms. TechTrends 60, 565–568 (2016).