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The Interplay of Parental Support, Knowledge in Culinary Mathematics and Grade 8 Students' Cookery Performance

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Abstract

Cookery as a learning area requires the integration of theoretical knowledge and practical skills, and its effectiveness is often reinforced by parental support. Parental support encompasses the various ways parents or guardians guide, encourage, and assist learners throughout their academic tasks. However, classroom observations revealed a noticeable lack of such support in students' learning activities, raising questions about its potential association on their performance in cookery. This study investigated the association between parental support and students' knowledge in culinary mathematics to their overall cookery performance. Anchored in Incremental Theory and Ecological Systems Theory, the study employed a descriptive-correlational research design. Data were gathered from 88 Grade 8 students enrolled in Cookery and analyzed using descriptive statistics and Pearson Product–Moment Correlation Coefficient. Findings indicate that both parental support and culinary mathematics skills exhibit significant positive correlations with students' cookery performance. These results suggest that parental involvement and mathematical competence meaningfully contribute to students' success in practical cookery tasks. The study highlights the essential role of different dimensions of parental participation and applied culinary mathematics in strengthening students' cookery performance. These findings underscore the need for enhanced parental engagement initiatives, integrative instructional strategies, and future research exploring supportive factors that can further advance cookery education.

Keywords: Parental Support, Knowledge in Culinary Mathematics, Cookery Performance

Introduction

The inclusion and integration of disciplines such as Cookery and other fields in the Philippines' system of education demonstrates the importance of the implementation of theory into practice that must be done as a pedagogical approach. This practice is not merely a response to the curriculum requirements but an answer to societal and educational demands and concern and a facilitating factor to the long-term vision of the nation in terms of its development (Kipper et al., 2021). During the past years, the Philippines has seen far reaching reforms in the education system to abreast with the fast globalization. The transition to blended learning and adaptive education, particularly the emphasis on it in the context of the COVID-19 crisis, promotes the attempt to balance the needs of students and the overall objectives of lifelong learning (Times Higher Education, 2021). This direction was reinforced by a more competency-oriented revision in subjects and hands-on skills in specialized tracks provided to students in the Enhanced Basic Education

Act of 2013 (Republic Act 10533), which provides students with a more integrated and inclusive education (Philippine Business for Education, n.d.).

It was in 1994 that the Technical Education and Skills Development Authority (TESDA) came into existence and it became a turning point in the process of integrating technical-vocational programs into the educational system. TESDA contributed to the agenda of the government to provide trainees with practical skills and competencies that are geared towards the AmBisyon Natin 2040 vision of developing a globally competitive citizenry by fostering training in bartending and automotive repair (FutureLearn, 2021; Symaco and Bustos, 2021). Cookery is in this regard a necessary study connecting theory and practice. Its program helps learners to enhance their expertise through integrating both hands-on experience in the kitchen and academic learning, helping to make effective, versatile individuals ready to live in the rapidly evolving world (Askren and James, 2019; Greenway et al., 2019).

Simultaneously with these changes, parent involvement is a popular field of study in education (Jeynes, 2021). The studies have always indicated a positive correlation between parental involvement and the academic performance of the students. The effect of parental involvement was especially tangible the pandemic-wise as parents were instrumental in helping children learn at home (Hassan, 2023; Tus, 2021; Quijano et al., 2023). Although it is known that parental support is very important, there are gaps in the knowledge on individual parental involvement, the academic, emotional, financial and social, and their impact on performance in the practical field of study such as Cookery.

The element of cookery is also well placed in the K to 12 curriculums since it is an element that is inherently mathematical in nature, given the concepts of measurement, ratio, and estimation are inherent in cooking. Although, the global literature indicates the new-found interest in linking mathematics to real-life context (Goos et al., 2020), the studies that specifically investigate this relationship within the Cookery are not numerous, especially in the Philippines. This disparity bring to focus the necessity to study the correlation between the performances of students in practical subjects with their mathematical skills.

Under these conditions, the researcher as a Grade 8 Cookery teacher saw that the support of the parent may be insufficient that can affect the performance of the students. Such research, and the association between the mathematical ability of learners and their cookery ability will give us a good understanding of how the Philippine K to 12 education system works overall. This study targets Grade 8 learners and is therefore expected to help in the formulation and implementation of policies and strategies that can improve student learning with the view of having a balanced coverage of theory and practice throughout the curriculum.

Research Objectives

This study aims to investigate the interplay of parental support with various dimensions, namely: academic, emotional, financial, and social as well as knowledge in culinary mathematics to the cookery performance of Grade 8 students.

Methodology

The research study used a quantitative research approach, particularly applying a descriptive-correlational design to investigate the association of parental support and knowledge in culinary mathematics to the cookery performance of Grade 8 students to the three public schools in Camiguin.

Using this design in presenting the study, provides an inclusive and measurable investigation of important variables like parental support, knowledge in culinary mathematics, and the performance of Grade 8

students in Cookery. This is especially useful in studying the associations between these variables in their natural form thus providing a true picture of reality. Central to this design is the use of a questionnaire as the primary data collection tool, a method well-recognized for its effectiveness in descriptive research.

The research study involved 88 Grade 8 students from aged 13-14 years old, who were enrolled in Cookery classes across three public secondary schools in a district in Camiguin. The study was conducted during the fourth quarter of the school year 2023-2024. The three public schools, with varying features and location of students, was the foundation of using total population method. This method allows the consideration of all the students as the participants in the research study.

The data collection process in this study involved the use of a questionnaire carefully designed to address the specific research questions and the use of rubrics to measure the cookery performance. A 40-item questionnaire has been adapted and developed by the researcher to measure parental support comprehensively. This research instrument was particularly organized to evaluate four fundamental dimensions of parental support, to wit: academic support, emotional support, financial support, and social support. The dimensions related to emotional, financial, and social support were validated items from the study of Wong Siew Yieng et. al. (2020). Items from these dimensions has been adapted and indicators of academic support was a researcher-made questionnaire anchored from relevant studies.

On the other hand, Cookery Module 5 of Technology and Livelihood Education 7 and 8 issued by the Department of Education has been the basis in designing the 20-items questionnaire intended to evaluate the knowledge in culinary mathematics. It was divided into two parts: Parental Support was emphasized on the first part and Culinary Mathematics was focused on the second part. The two distinct part of the questionnaire gave certainty on the precise collection of data and the ability to answer the problem of the study.

The researcher adapted the questionnaire for the sections associated with emotional, financial and social support. Then carefully crafted the questionnaire for academic support, gleaning information from different relevant studies. Three experts on the field reviewed and validated the content of the questionnaire to ensure its validity. These three experts provided valuable comments and recommendations, which includes decision-making regarding the inclusion, revision, or removal of specific indicators of the questionnaire.

Pilot testing was done after the process of content validation conducted to Grade 8 students who were not part of the actual study. The pilot test served as a critical initial assessment to refine the clarity of the questionnaire. Cronbach Alpha Coefficient was used to ensure the consistency and reliability of the questionnaire. The result of the statistical analysis have an alpha values of 0.84 for Academic Support, 0.71 for Emotional Support, 0.72 for Financial Support and 0.76 for Social Support. This provide insights into the ability of the questionnaire to quantify the intended concepts consistently. The questionnaire having went through meticulous improvement and validation confirms the reliability and accurate data collection of the study.

Descriptive statistics was used in the study for addressing Problems 1, 2 and 3. This includes the mean, frequency, percentage distribution and standard deviation. The utilization of these descriptive statistics helps to furnish an inclusive explanation of important aspects. Particularly, they were utilized to further elucidate the level of parental support, the skill in culinary mathematics, and lastly, the overall performance in Cookery. On the other hand, Pearson Product-Moment Correlation was used in the study for answering Problem 4. This technique is appropriate to calculate the occurrence and degree of a significant relationship between parental support and knowledge in culinary mathematics in relation to the

performance of the participants in Cookery. Through calculating the strength and path of these correlations, the analysis will clarify on to the degree to which parental support and knowledge in culinary mathematics influence the performance of students in Cookery. The assumption of normality of data was assessed using the Kolmogorov-Smirnov test.

This research aims to explore the association between parental support and knowledge in culinary mathematics to the performance of Grade 8 students in cookery as shown in the schematic diagram.

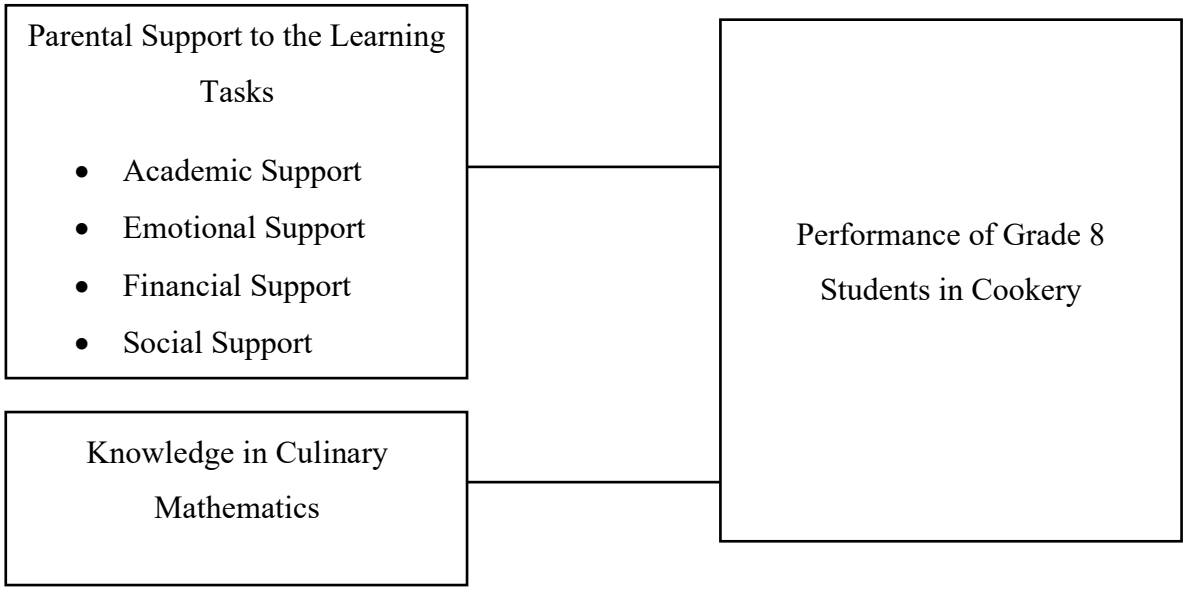

Figure 1: Schematic Presentation of the Variables in the Study

Results and Discussion

Problem 1: What is the participants' assessment of the parental support they received in completing learning tasks in terms of:

1.1. Academic Support;

1.2. Emotional Support;

1.3. Financial Support; and

1.4. Social Support?

Table 1. Summary Table of Parental Support

Dimensions	Mean	Interpretation	SD
Academic Support	4.08	High	0.77
Emotional Support	4.09	High	0.73
Financial Support	4.11	High	0.78
Social Support	4.08	High	0.73
Parental Support	4.09	**High**	0.70

The summary table presents the summary of the support received by the participants from their parents in terms of academic, emotional, financial and social support. The data revealed that the participants are highly supported with an overall mean of 4.09 interpreted as high. Looking into the different dimensions of support, it is financial support that got the highest mean of 4.11. This trend is in line with the study of

Xu et al. (2024) that highlights the importance of different parental participation. It further suggests that the combination of financial, emotional, and social assistance positively improves students' academic motivation, skill development, and general well-being. Furthermore, by offering chances for support, resource supply, and meaningful communication, family-based interventions—particularly in experiential learning environments like cooking—improve parent-child relationships (Liu et al., 2024; Tørslev et al., 2021; Lavelle et al., 2023).

Problem 2. What is the level of the participants' knowledge in Culinary Mathematics?

Table 2. Frequency, Percentage, and Mean Distribution of the Participants' Knowledge in Culinary Mathematics

Range	Interpretation	Frequency	Percentage
17-20	Very High	17	19.32
13-16	High	30	34.09
9-12	Moderate	30	34.09
5-8	Low	9	10.23
0-4	Very Low	2	2.27
	Total	**88**	**100.0**
	Overall Mean	**13**	
	Interpretation	**High**	
	SD	**3.79**	

Table 2 shows the frequency, percentage, and mean distribution of the participants' knowledge in Culinary Mathematics which reveals that the majority of participants have a high degree of understanding, according to the assessment of their expertise in culinary mathematics; an overall mean score of 13 indicates "High" knowledge. This aligns with the understanding that effective kitchen management and food preparation depend on the practical applications of culinary mathematics, which include measuring items, converting units, scaling recipes, and calculating expenses (ICN, 2023). The variety of the scores according to Follong et al. (2022) is an indication of how the students often find learning basic mathematics and its specific use in cooking such as fractions, percentages, and conversions is so challenging. Culinary math skills are used by chefs and cooks in their daily operations, including the costing of ingredients and the conversion of measurement units and changing the size of recipes (Escoffier, 2024). Culinary math skills can be improved as they will assist in accurate preparation of ingredients and productivity and quality in food service setting.

Problem 3. What is the performance level of Grade 8 students in Cookery?

Table 3. Frequency, Percentage, and Mean Distribution of the Participants' Performance in Cookery

Range	Interpretation	Frequency	Percentage
90-100	Outstanding	24	27.27
85-89	Very Good	47	53.41
80-84	Good	17	19.32

75-79	Fair	0	0.00
Below 74	Poor	0	0.00
	Total	**88**	**100.0**
	Overall Mean	**87.17**	
	Interpretation	**Very Good**	
	SD	**3.69**	

The table presents the performance level in Cookery of the participants. The results revealed that the participants demonstrate a "Very Good" performance indicated by the overall mean score of 87.17. This result is aligned with Rara and Cuizon (2023) that contextualized learning modules and useful hands-on activities successfully raise students' academic progress and motivation in Grade 8. As expounded in the Cookery Curriculum of the K–12 Technical-Vocational-Livelihood (TVL), the significant majority of the participants who has obtain "Outstanding" and "Very Good" ratings points to the effective engagement with the curriculum, highlighting the technical-vocational skills, safe food handling practices, and creativeness (DepEd, 2021). According to Mogol (2025), continuous formative evaluations, performance tasks, and reflective exercises also promote skill mastery and performance consistency. According to the results, students are more motivated and achieve better academically when learning is contextualized and linked to actual cooking activities. These findings demonstrate the efficacy of the present curriculum delivery and teaching practices in promoting student achievement and show a favorable trend in Grade 8 Cookery instruction.

Problem 4. Are the participants' parental support and knowledge in Culinary Mathematics significantly associated with their performance in Cookery?

Ho1: The participants' parental support and knowledge in Culinary Mathematics are not significantly associated with their performance in Cookery.

Table 4. Pearson R Correlation of the Participants' Parental Support and Knowledge in Culinary Mathematics and their Performance in Cookery

		Cookery Performance
Parental Support	Pearson Correlation	.462**
	Sig. (2-tailed)	.000
Academic support	Pearson Correlation	.367**
	Sig. (2-tailed)	.000
Emotional Support	Pearson Correlation	.516**
	Sig. (2-tailed)	.000
Financial Support	Pearson Correlation	.401**
	Sig. (2-tailed)	.000
Social Support	Pearson Correlation	.431**

	Sig. (2-tailed)	.000
Mathematical Skills	Pearson Correlation	.937**
	Sig. (2-tailed)	.000
**. Correlation is significant at the 0.01 level (2-tailed).		

Table 4 presents the Pearson Correlation results showing the association between various dimensions of parental support and knowledge in culinary mathematics with students' performance in Cookery. The results revealed that all variables are significantly and positively correlated with cookery performance at the 0.01 level, indicating that both parental and mathematical skills play a crucial role in student success in practical, skills-based subjects such as cooking. Therefore, the null hypothesis that states that parental support and knowledge in Culinary Mathematics are not significantly associated with their performance in Cookery is rejected. Mathematical skills exhibited the strongest positive correlation with cookery performance ($r = .937$, $p < .01$), indicating a very strong relationship. This entails that students will likely do better in cooking activities if they proficient in culinary mathematics. Garcia and Lee (2021) accentuating the crucial role of mathematical skills in cookery, mainly in tasks that includes accuracy like baking, pricing, costing and time management. Students who are mathematically proficient advances in the learning tasks in cookery since they will be able to measure, convert, compute costs and adjust recipes. This achievement comes from the skill in accurately following recipes and mastery of various cooking tasks. This underscores the importance of incorporating applied mathematics in the teaching of cooking for the purpose of improving student performance (Chen, 2021). Parental support in general ($r = .462$, $p < .01$) also demonstrated a moderate positive correlation which suggests that parental involvement like encouragement, monitoring, and interest in school activities enhances student performance. This is supported by Chen and Morales (2020) who argued that parents who take the time to participate actively aid in the reinforcement of learning motivation and skill development especially in the technical and vocational tracks. Arroyo (2025) expound that when students are highly supported by their parents in terms of academic, emotional, financial and social, and also if they have good knowledge in Culinary Mathematics, they perform better in their Cookery.

Conclusion

This research focused on the importance of parental support in nurturing Grade 8 students' academic achievement and practical skills in cookery. The result of the study emphasized the importance of including culinary mathematics into the educational context by presenting a strong correlation amongst mathematical proficiency and cooking performance. Moreover, the interest, self-confidence and participation of students are positively associated by the support given by parents which builds a conducive learning environment that stimulates academic achievement and skill improvement. Academic support, even though received the weakest association was still an essential part of complete parental support. Generally, these observation underlined the significance of the various dimensions of parental support which consists of academic, emotional, financial and social aspects, with the development of not just better cooking outcomes but also the complete well-being of the students. To achieve the maximum of educational attainments in the area of culinary arts and even further, this research paper has indicated that educators should work with families, encouraging active participation by parents, and providing special attention that would meet the practical needs of the learners in addition to their emotional needs.

The findings of this study supported the work of Li et al. (2024) about Incremental Theory and Bronfenbrenner's Ecological Systems Theory. The parental support which includes the academic, emotional, financial and social, correlates positively with performance of the cookery students in cooking. When the students are well-supported and encouraged by their parents, they do better in every aspect to develop their full potential. This supported the main principle of Jiang's Incremental Theory which explained that the skills or proficiency and cognitive ability is not a permanent characteristics but rather flexible.

Additionally, the concept was further supported by the strong correlation amongst culinary performance and mathematical proficiency, which showed that students' who have confidence that they can improve their abilities and who were given the tools to do so, succeed more. Thus, the results validated the applicability of the Incremental Theory in this educational context by sustaining the impression that promoting students' beliefs in their capacity to grow—through consistent effort and supportive environments—positively influences their academic and skill-based achievements.

Recommendations

Based on the findings of the study, the following recommendations have been suggested:

1. For School administrators (principals, program coordinators), teachers, parent-teacher associations (PTAs), and parents/families that they may enhance Parental Engagement Programs;
2. For Math and Cookery teachers that they may integrate practical math-based activities in Cookery classes. Using real life situations, calculating recipes and doing practical projects will also enhance the capability of the students to use mathematical concepts in cooking.
3. For Cookery teachers and TLE students that they may maintain and continue to improve the existing teaching and learning exercises on Cookery subject. Also, offering students a chance to participate in cooking contests, workshops or demonstrations in the industry would enhance the practical use of concepts and help to keep the students on the same high level of achievements.
4. For Future Researchers that they may magnify the scope of participants that may take into account the different grade levels and student populations from various geographical locations or the type of school to heighten applicability and integrate qualitative data, such as interviews or focus groups, to gain deeper insights into the experiences and perceptions behind quantitative findings.

Compliance with Ethical Standards

The research goes through the Lourdes College Research and Ethics Committee (LC-REC) for an in-depth review and approval. Once ethical approval was obtained, the researcher proceeded to secure permission from the School Principal of the selected schools that offer Cookery as part of the Grade 8 curriculum. This was done by submitting a formal letter requesting permission to administer the questionnaire as the primary data collection tool. Prior to the questionnaire administration, a letter of assent and consent was presented to the participants. The researcher personally administered the questionnaire to Grade 8 students and collected their responses. To mitigate the risk of participants completing the questionnaire solely for compliance purposes, the researcher provided necessary assistance during the process.

After floating the survey questionnaire, the students cooked three (3) different dishes to measure the cookery performance guided with the rubrics as basis for grading. Students were oriented and guided by the teachers during the cooking process to eliminate the risk during the laboratory. The students also assessed their dishes through a self-assessment as well as the teacher and the researcher. Thirty percent

(30%) of the performance was from the self-assessment done by the students while the 70% of the performance level was from the average points coming from the teacher and the researcher.

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