International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance

Jonas Yamson Ortigueras
Laguna State Polytechnic University Sta. Cruz Laguna 4009 PHILIPPINES
Email address: julierosemendoza002@gmail.com

***Abstract*—** *This study aims to investigate the effectiveness of InTeLEQuest, an interactive workbook in developing the cognitive function and performance of grade 7 learners. It specifically sought assess the level of the interactive workbook's content and characteristics are. It also finds the level of the learners' cognitive function and the learner's performance. Additionally, the significant effect of the interactive workbook towards the learners' cognitive function and performance were tested. The study utilized experimental research design to determine the effect of the interactive workbook to the learners' cognitive function and performance. The respondents of this study were one hundred and ten (110) grade 7 learners of Lowland Integrated National High School, Nagcarlan, Laguna. Survey Questionnaires, Written test, and performance tasks are used as data for analysis. The findings show that the level of interactive workbook contents in terms of Objective, Introduction, Development, Engagement, and Assimilation was high. Also, the level of interactive workbook's characteristics as described by the data was high. Then, the level of the leaner's cognitive function was high and the level of the learner's performance was interpreted as good in written test and very satisfactory in performance task. A significant effect was found between the interactive workbook and the learner's cognitive function. And on the learners' performance, there is a significant effect between the interactive workbook's content towards the learner's performance, on the other hand the interactive workbook's characteristics do not have a significant effect on the learners' performance. Based on the findings, it was concluded that the interactive workbook has a significant effect on the learner's cognitive function, while on learners; performance results show that not all variables have significant effect leading to rejection of the first hypothesis and partially rejected on the latter. This implies that an interactive workbook can affect the development of cognitive function, but not all of its contents and characteristics can affect learner's performance. Based on the conclusion, several recommendations were made. The interactive workbook significantly enhances learners' cognitive function and performance. Technology teachers should use it and explore diverse strategies to improve student outcomes. School heads, coordinators, and students are encouraged to incorporate this engaging material into lessons, while future researchers should investigate its impact further.*

***Keywords*—** *Intelequest, Interactive Workbook, Cognitive Function, Performance, Critical Thinking*.

I. INTRODUCTION

A class full of engaged students, sharpened cognitive functions, and performance on a roll is what "Intelequest: An Interactive Workbook in Developing Learner's Cognitive Function and Learner's Performance" seeks to achieve. With today's education, the use of interactive learning tools is becoming necessary. Research indicate that an interactive workbook enhances the cognitive ability of memory, problem-solving, and critical thinking significantly. These tools change the ways in which the student engages with the educational content. (Dong et al., 2024)

Cognitive function is crucial in education. It entails mental processes like attention, memory, critical thinking, decision making, and problem-solving (Kang, 2024). Research has established that students achieve better academically when they are involved in activities that stimulate these cognitive processes (Noemy et al., 2017). Intelequest is meant to stimulate such cognitive processes, hence making learning both effective and enjoyable.

The workbook takes into account the need for a systematized but adaptive learning environment. As per the Structure of Intellect model, it works towards building a series of fundamental intellectual capabilities, thus enabling them to enhance cognitive processes and perform much better on academic fronts. This approach turns a student into an active learner.

The usability, design, and appropriateness of an interactive workbook make it effective. Content must be appropriate to the learner's age and developmental level, instructed clearly, laid out attractively, and interesting in its activities. This usability makes the workbook easy and intuitive to use, improving learning outcomes.(Asrowi et al., 2019)

Intelequest is distinct from workbooks in that it possesses an interactive nature. It consists of exercises that require critical thinking and creative problem-solving. The students are, thus, challenged to think critically. The mechanism of error feedback ensures that the students learn from their errors and develop through this process. The interactive nature of the content is essential to develop higher-order thinking abilities required for 21st-century success.

Not only at the intellectual level does Intelequest affect learning. It is an approach to transforming learning into a fascinating and enjoyable process and enhancing students' attitudes toward learning, therefore improved attendance, increased participation, and greater achievement. This would be accomplished through creating learning an interesting experience in an environment that challenges students to be successful.

Jonas Yamson Ortigueras, "InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 400-408, 2025.

The study focuses on implementing an interactive, analyzing its effect on students' learning cognitive function and performance. The diverse student population provides a suitable ground for testing the workbook's flexibility and efficiency. Observing and measuring students' progress helps improve future workbook iterations to meet all learners' needs. The study aims to show the power of Intelequest in transforming educational practices, thus making education richer and more dynamic. Findings at Lowland Integrated National High School may be used in other schools, which would make a significant impact on education nationwide. Intelequest envisions a future where every child is empowered to succeed in school and life.

1.1 Statement of the Problem

Problem/s which were addressed by the research

The goal of this study is to determine the relationship between InTeLEQuest to the cognitive function and performance of learners of Lowland Integrated National High School.

This research is sought to answer the following questions:

1. What is the level of the InTeLEQuest contents in terms of:
   1.1 Objectives;
   1.2 Introduction;
   1.3 Development;
   1.4 Engagement; and
   1.5 Assimilation?
2. What is the level of the InTeLEQuest characteristics in terms of:
   2.1 Usability;
   2.2 Appropriateness; and
   2.3 Design?
3. What is the Level of Learner's Cognitive Function in terms of:
   3.1 Critical Thinking;
   3.2 Problem Solving; and
   3.3 Decision Making?
4. What is the Level of Learner's Performance in in terms of:
   4.1 Written Test; and
   4.2 Performance Tasks?
5. Is there a significant effect between the use of interactive workbook and learners' cognitive function?
6. Is there a significant effect on the use of interactive workbook in learners' performance?

II. Methodology

The study utilized experimental research design to determine the effect of the interactive workbook to the learners' cognitive function and performance. The respondents of this study were one hundred and ten (110) grade 7 learners of Lowland Integrated National High School, Nagcarlan, Laguna. Survey Questionnaires, Written test, and performance tasks are used as data for analysis.

III. Results and Discussion

This chapter deals with the presentation, analysis and interpretation of the gathered data based on research questions in relation to the statement of the problem and the hypotheses mentioned in the first chapter. It enumerates different results yielded from the treatment of the data gathered in this study.

Level of Interactive Workbook Content

In this study, the Interactive Workbook content was described in terms of objectives, introduction, development, engagement and assimilation and was determined by the mean and standard deviation.

Level of Interactive Workbook Content in terms of Objectives

Table 1 exhibits that the objectives of the interactive workbook are at *high* level attaining the grand (M=4.01, SD=1.00). This indicates that learners perceived that the interactive workbook gives focus on achieving its' learning goals.

Learners are in agreement that the objectives are stated clearly and in line with its aim of developing advanced cognitive functions and overall learning performance by engaging learners in deeper processing of information. This suggests that by achieving these goals, using the interactive workbook develops a deeper engagement with the subject matter while simultaneously improving students' cognitive function and performance. Through the integration of interactive components, the workbook fosters critical thinking, problem-solving, and decision-making abilities, ultimately resulting in a more thorough and efficient educational process.

TABLE 1. *Level of Interactive Workbook Content in terms of Objectives*

STATEMENT	Mean	SD	Remarks
The objectives…			
…are clearly stated in the interactive workbook.	4.06	0.94	Agree
…align with the overall goals of developing cognitive function and performance.	4.04	0.94	Agree
…are presented in a logical sequence.	3.95	1.04	Agree
…are comprehensive and cover all necessary aspects of the workbook.	4.00	1.02	Agree
…are achievable within the scope of the workbook.	3.99	1.06	Agree
Grand Mean	*4.01*		
SD	*1.00*		
Verbal Interpretation	*High*		

This result is supported by Orr et al. (2022), stating that Learning objectives (LOs) communicate instructional goals, clarify expectations, improve student comprehension of course activities, and boost performance. They also influence course design, shape classroom practices, and establish assessment priorities, making them critical for effective teaching and learning.

Level of Interactive Workbook Content in terms of Introduction

As seen in table 2, the Interactive workbook's debut was met with a strong verbal interpretation that reached the grand level (M=4.05, SD=0.97). This indicates that the interactive workbook provides effective introduction as perceived by the learners.

The result shows that the learners are willing to proceed to the activities by going through the introduction of the workbook. This also shows the learners agreed that the introduction provides an overview of the topics to be covered

Jonas Yamson Ortigueras, "InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 400-408, 2025.

in the workbook. This indicates that the introduction can contribute to the willingness of the learner to continue working through the lesson.

TABLE 2. *Level of Interactive Workbook Content in terms of Introduction*

STATEMENT	Mean	SD	Remarks
The introduction…			
…provides a comprehensive overview of the topics covered in the workbook.	4.12	0.95	Agree
…effectively engages the learner's interest.	4.05	0.91	Agree
…motivates learners to proceed with the workbook activities.	4.21	0.89	Strongly Agree
…includes clear instructions on how to use the workbook.	4.03	1.00	Agree
…effectively engages the learner's interest.	3.85	1.07	Agree
Grand Mean	*4.05*		
SD	*0.97*		
Verbal Interpretation	*High*		

This is supported by (Kambara & Lin, 2024), both emphasize that a well-written introduction in a workbook or worksheet encourages students to interact with the material. They emphasize that the introduction provides an overview of the topics and establishes the context and goals, making the tasks more obvious and achievable. This helps students comprehend what they would be studying, which increases their willingness to participate in the activities.

Level of Interactive Workbook Content in terms of Development

Table 3 shows that the level of Development part of the interactive workbook is High with the grand (M=3.97, SD=1.06). This indicates that the learners perceived that the interactive workbook contents in this part is arranged accordingly and tackled the learning goals.

TABLE 3. *Level of Interactive Workbook Content in terms of Development*

STATEMENT	Mean	SD	Remarks
The development…			
…of the interactive workbook was well-planned and organized.	4.19	0.88	Agree
…phase ensured that the workbook is user-friendly and accessible.	3.98	1.03	Agree
…ensured that the workbook aligns with educational standards and objectives.	4.22	0.89	Strongly Agree
…involved collaboration among the students.	3.74	1.10	Agree
…includes activities that triggers critical thinking.	3.72	1.23	Agree
Grand Mean	*3.97*		
SD	*1.06*		
Verbal Interpretation	*High*		

Learners decisively acknowledged that the content created for the interactive workbook effectively aligns with both educational objectives and standards. This favorable response demonstrates that the workbook is not only well-planned and organized but also customized to match the learners' individual needs. The students' replies show that the workbook's rigorous planning and smart design contribute greatly to its efficacy as an instructional tool. Furthermore, these development activities indicate that the workbook has the potential to significantly improve students' cognitive processes and overall academic performance. By offering structured, relevant, and interesting content, the workbook helps students develop critical thinking skills and achieve their learning objectives.

This result is supported by (Rahayu et al., 2022) both account stresses how crucial it is to match workbook content to standards and educational goals. They emphasize that a workbook's efficacy as a teaching tool is increased when its content is well-planned, ordered, and suited to the needs of the students. It also emphasizes that by offering a full understanding and a variety of viewpoints, well-structured content aids students in achieving their learning goals and honing their critical thinking abilities.

TABLE 4. *Level of Interactive Workbook Content in terms of Engagement*

STATEMENT	Mean	SD	Remarks
The engagement…			
…uses varied activities and cater to different learning styles.	4.13	0.97	Agree
…is appropriately challenging for the learners' level.	4.21	0.89	Strongly Agree
…promote critical thinking and problem-solving skills.	4.17	0.84	Agree
…provides activities in the workbook which are interactive and engaging.	3.84	1.07	Agree
…effectively capture and maintain learners' interest.	3.91	1.03	Agree
Grand Mean	*4.05*		
SD	*0.97*		
Verbal Interpretation	*High*		

Table 4 shows that the Engagement of the interactive workbook is at high level attaining the grand (M=4.05, SD=0.97). This indicates that the learners perceived the interactive workbook initiate students and engage them throughout the topic.

Learners agree that the engagement component of this study is appropriately difficult for their level, effectively boosting critical thinking and problem-solving abilities. This favorable feedback implies that implementing engaging activities customized to their skill level can considerably improve their academic achievement. By assigning tasks that are both interesting and appropriate for their level, the study assists students in developing critical cognitive skills, so promoting their overall educational growth and achievement.

This result supports Marcy Baughman (2022), that states how these kinds of activities foster critical thinking and problem-solving skills, both of which are essential for academic success. Furthermore, both the results and the supporting account imply that challenging and engaging assignments support students' successful application of their information and foster their general academic development.

Table 5 shows that the assimilation of the interactive workbook is at high level attaining the grand (M=4.08, SD=0.89). This indicates that the learners perceived the interactive workbook can practice the learned concepts based on the topic.

Learners agreed that the interactive workbook's assimilation part effectively reinforces concepts learnt. Its well-structured and simple design ensures that pupils learn and

Jonas Yamson Ortigueras, "InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 400-408, 2025.

retain the material effectively. This favorable feedback reinforces the study's core goal of improving learners' performance. The workbook improves students' cognitive skills and overall academic success by effectively reinforcing learnt topics and allowing them to apply their knowledge in real-life circumstances. The workbook's systematic approach and clarity play an important part in enhancing students' capacity to integrate and apply their learning in real circumstances.

TABLE 5. *Level of Interactive Workbook Content in terms of Assimilation*

STATEMENT	Mean	SD	Remarks
The assimilation…			
…effectively reinforce the concepts learned.	4.14	0.83	Agree
…help learners integrate new knowledge with existing knowledge.	4.07	0.93	Agree
…is well-structured and easy to follow.	4.10	0.83	Agree
…encourage learners to apply concepts in new contexts.	4.06	0.80	Agree
…helps develop decision making skills of the learner.	4.02	1.03	Agree
Grand Mean	*4.08*		
SD	*0.89*		
Verbal Interpretation	*High*		

This result is supported by (Lash, 2018) both accounts stress how well the interactive workbook's assimilation section reinforces principles that have been mastered. They point out that the workbook's organized and understandable layout aids in students' efficient learning and retention of the content, enhancing their cognitive abilities and general academic performance. Additionally, the reference and the result emphasize how the absorption phase helps students develop their critical thinking and problem-solving skills by motivating them to actively interact with the content and draw connections between new and preexisting knowledge.

Level of Interactive Workbook Characteristics

In this study, Interactive Workbook Characteristics was described in terms of usability, appropriateness, and design and was determined by the mean and standard deviation.

Level of Interactive Workbook Characteristics in terms of Usability

Table 6 shows that the interactive workbook's usability is at a high level, with the grand (M=3.95, SD=1.00). This shows that the learners evaluated the interactive workbook as emphasizing the clarity of instruction, which helps to its usefulness.

Learners unanimously agreed that the interactive workbook's usability is partly due to its clear and simple instructions and ease of navigation. This good response indicates that the workbook's user-friendly design has a substantial impact on students' ability to understand the instructions and effectively navigate the many parts contained inside the workbook. The workbook improves the learning experience by giving clear advice and an intuitive layout, allowing students to better connect with the subject and apply their knowledge. This means that the workbook's usability is critical in helping pupils understand and do well in school.

TABLE 6. *Level of Interactive Workbook Characteristics in terms of Usability*

STATEMENT	Mean	SD	Remarks
The interactive workbook…			
…is easy to navigate.	3.98	1.01	Agree
…provides clear and concise instructions.	4.15	0.83	Agree
…allows easy progress tracking.	3.89	0.96	Agree
…is free of technical issues.	3.71	1.15	Agree
…elements function smoothly.	3.99	1.00	Agree
Grand Mean	*3.95*		
SD	*1.00*		
Verbal Interpretation	*High*		

This supports the study conducted by Estrada-Molina et al. (2022) on their study The assessment of the usability of digital educational resources: An interdisciplinary analysis from two systematic reviews, emphasizes the importance of usability in the design and application of digital educational tools. Ensuring usability is critical to establishing good pedagogical and technological standards. Their study finds a gap in the integration of usability criteria from both educational and computational viewpoints, implying the need for multidisciplinary approaches to improve the usability assessment of digital educational resources.

TABLE 7. *Level of Interactive Workbook Characteristics in terms of Appropriateness*

STATEMENT	Mean	SD	Remarks
The interactive workbook…			
…is appropriate for the target age group.	4.10	0.91	Agree
…uses language that is appropriate for the learner's comprehension.	4.01	0.98	Agree
…provides activities with appropriate difficulty level.	3.93	0.93	Agree
…gives appropriate content for achieving the intended learning outcome.	4.02	0.90	Agree
…addresses the specific learning needs of the target audience.	3.96	0.82	Agree
Grand Mean	*4.00*		
SD	*0.91*		
Verbal Interpretation	*High*		

Table 7 shows that the appropriateness of the interactive workbook are at a *high* level attaining the grand (M=4.00, SD=0.91). This indicates that the interactive workbook is appropriate for the level of the learners that utilize it.

Learners agreed that the appropriateness of the interactive workbook is proper for the target age group and gives appropriate content that leans towards achieving the learning outcomes. This implies that the appropriateness of the interactive workbook can further develop learning outcomes following the appropriate activities for their age group.

This supports Çer (2016) stating that in order to improve learning results, it is crucial to adapt educational content to the relevant age group in both situations. Age-appropriate content, whether in interactive workbooks or children's novels, greatly increases efficacy by matching learning objectives and developmental needs, they emphasize. Furthermore, according to both the result and the supporting account, this kind of customized information promotes greater engagement and a stronger passion for learning, which aids in the advancement of education overall.

Jonas Yamson Ortigueras, "InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 400-408, 2025.

TABLE 8. *Level of Interactive Workbook Characteristics in terms of Design*

STATEMENT	Mean	SD	Remarks
The interactive workbook…			
…provides a consistent design throughout the lessons.	3.99	0.88	Agree
…uses colors and fonts that are easy to read.	4.27	0.79	Strongly Agree
…includes visual aids (e.g., images, diagrams) that support the content.	4.01	0.94	Agree
…lay out design that contributes to its usability and effectiveness.	3.98	0.90	Agree
…contains design elements that enhance the learning experience.	4.09	0.85	Agree
Grand Mean	*4.07*		
SD	*0.88*		
Verbal Interpretation	*High*		

Table 8 shows the level of interactive workbook characteristics in terms of design, and it has a verbal interpretation of *high* with the grand (M=4.07, SD=0.88). This indicates that the learners perceived that the visuals of the interactive workbook are impactful in their learning.

Learners agreed that the design of the interactive workbook provides colors and context that are easy to read. It also shows that learners noticed that the workbook contains design elements that enhance their learning experience. This implies that the design of the interactive workbook helps the learners in maintaining focus through its colors and visual appealing elements.

Colliot et al. (2022) discussed the significance of design components in raising the efficacy of instructional workbooks which was also brought about by the results of the data regarding the level of design. They point out that by making the material more interesting and simpler to comprehend, well-designed elements like colors and graphic organizers greatly enhance learning results. Furthermore, it is suggested from both supporting reference and the result, that careful design promotes deeper processing of material and helps learners stay focused, which eventually improves academic achievement and fosters good attitudes.

Level of Learners' Cognitive Function

In this study, the level of the Learners' cognitive function was described in terms of Critical Thinking, Problem Solving, and Decision Making and was determined by the mean and standard deviation.

Level of Learners' Cognitive Function in terms of Critical Thinking

Table 9 exhibits the Level of Learners' Cognitive Function in terms of Critical Thinking, the result shows the attainment of high level with the grand (M=4.07, SD= 0.88). This indicates that the learners' critical thinking is improving, and they are able to reflect in their own thoughts.

One of the primary factors influencing students' critical thinking skills was their capacity to examine their own cognitive processes in order to better comprehend them. In order to learn, pupils must be able to recognize and distinguish between pertinent and irrelevant information, which is made possible by this self-reflection. It additionally shows that students' interdisciplinary thinking abilities are demonstrated by their ability to integrate ideas from many domains. This shows that the students' capacity to reflect on their actions and ideas in order to acquire new information and understandings was a sign of their critical thinking skills. By encouraging a more thorough and holistic approach to learning, these reflective techniques not only improve student comprehension but also enable them to apply what they have learned in a variety of settings and fields.

TABLE 9. *Level of Learners' Cognitive Function in terms of Critical Thinking*

STATEMENT	Mean	SD	Remarks
The learners can…			
…analyze and interpret data accurately.	3.99	0.88	Agree
…reflect on their own thinking processes to improve their understanding. Students can distinguish between relevant and irrelevant information.	4.27	0.79	Strongly Agree
…make well-reasoned decisions based on evidence.	4.01	0.94	Agree
…apply critical thinking skills across different subjects and contexts.	3.98	0.90	Agree
…integrate different concepts across different disciplines.	4.09	0.85	Agree
Grand Mean	*4.07*		
SD	*0.88*		
Verbal Interpretation	*High*		

Similarly, Raj et al. (2022) highlighted the need of self-reflection and critical thinking in improving students' learning experiences. They emphasize that the ability to assess one's own cognitive processes assists students in distinguishing between relevant and irrelevant material, integrating ideas from multiple disciplines, and applying their knowledge in diverse circumstances. Furthermore, both settings imply that critical thinking entails questioning assumptions, evaluating opposing ideas, and cultivating a greater understanding of the issue. This holistic approach not only increases student comprehension, but it also prepares them to deal with complicated real-world challenges.

TABLE 10. *Level of Learners' Cognitive Function in terms of Problem Solving*

STATEMENT	Mean	SD	Remarks
The learners can…			
…identify the root cause of a problem effectively.	3.99	0.88	Agree
…generate multiple solutions to a given problem.	4.27	0.79	Strongly Agree
…evaluate the pros and cons of different solutions.	4.01	0.94	Agree
…work collaboratively with others to solve problems.	3.98	0.90	Agree
…use logical reasoning to solve problems.	4.09	0.85	Agree
Grand Mean	*4.07*		
SD	*0.88*		
Verbal Interpretation	*High*		

Table 10 exhibits the Level of Learners' Cognitive Function in terms of Problem Solving, it is verbally interpreted as *High* with the grand (M=4.07, SD=0.88). This indicates that that the learners can solve problems efficiently and creatively.

Learners are in agree that they can generate multiple solutions to a given problem as well as they are able to use

Jonas Yamson Ortigueras, "InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 400-408, 2025.

logical reasoning to solve problems. This implies that the students utilize their problem-solving ability to answer their activities and retain the information they attained.

Based on Mehadi Rahman (2019), The process of problem-solving entails methodical observation and critical thought in order to identify a suitable solution or path to the intended outcome. The two main components of the problem-solving framework were critical thinking and observational abilities. Both scenarios highlight the significance of problem-solving abilities and logical thinking in students' learning processes. They emphasize that pupils' capacity to produce multiple answers and employ logical thinking allows them to better manage tasks and remember information. This complete approach to problem-solving develops students' critical thinking and observational skills, creating a solid basis for their general learning and academic achievement.

TABLE 11. *Level of Learners' Cognitive Function in terms of Decision Making*

STATEMENT	Mean	SD	Remarks
The learners can…			
…gather relevant information to inform their decisions.	3.99	0.88	Agree
…evaluate different options and alternatives.	4.27	0.79	Strongly Agree
…anticipate the consequences of their decisions.	4.01	0.94	Agree
…remain objective and unbiased when making decisions.	3.98	0.90	Agree
…adapt their decisions based on new information or changing circumstances.	4.09	0.85	Agree
Grand Mean	*4.07*		
SD	*0.88*		
Verbal Interpretation	*High*		

Table 11 shows that the Level of Learners' Cognitive Function in terms of Decision Making was verbally interpreted as high having the grand (M=4.07, SD=0.88). This indicates that the learners' cognitive function in decision-making is seen through their evaluation of different options.

The learners agreed that they can assess different options and alternatives as ell as adapt their decision based on new information or changing circumstances. This implies that the learners are utilizing their decision to access the best path as possible in approaching their activities.

Students in the 21st century must possess the ability to make decisions, which is a critical skill (Putri et al., 2023). Critical thinking and decision-making are closely related concepts. It entails assessing data, considering different viewpoints, and making well-informed decisions. This ability facilitates successful problem-solving and helps people handle challenging circumstances. In like manner, both accounts highlight the significance of capacities for decision-making in students' learning processes. The results and the supporting reference emphasize that students' ability to evaluate many possibilities and adjust their decisions in response to new knowledge or changing circumstances allows them to approach activities more efficiently. Furthermore, both scenarios imply that critical thinking and decision-making are inextricably linked, involving data analysis, consideration of opposing ideas, and making well-informed conclusions. This holistic approach to decision-making encourages successful problem-solving and supports learners in dealing with difficult situations.

Level of Learners' Performance

In this study, Learners' Performance was described in terms of written test and performance tasks and was determined by frequency, percentage, mean and standard deviation.

TABLE 12. *Level of Students' Performance in terms of Written Test*

Score	Frequency	Percentage	Descriptive Value
41 – 50	29	26%	Excellent
31 – 40	42	38%	Good
21 – 30	37	34%	Satisfactory
11 – 20	2	2%	Needs Improvement
1 – 10	0	0	Poor
Mean Score	*34.00*		
SD	*7.87*		
Descriptive Value	***Good***		

Table 12 shows the Level of Students' Performance in terms of Written Test; it shows the descriptive value of good having the mean score of 34.00 and a standard deviation of 7.87. This also presents the frequency distribution that the learners fall into. Forty-two (42) or thirty-eight percent (38%) of students scored between 31 and 40, thirty-seven (37) or thirty-four percent (34%) of the leaners scored between 21 and 30 which are classified as satisfactory, twenty-nine (29) or twenty-six percent (26%) of the leaners scored between 41 and 50 which is described as excellent, while two (2) or two percent (2%) of the students scored between 11 and 20 classifying as needs improvement.

It proves that the Interactive workbook helps in developing the learner's performance in terms of written test as evidenced by having *Good* as the descriptive value.

Content accuracy in written tests guarantees that students are scored using reliable and trustworthy material that reflects their true understanding of the subject. It stresses well-supported answers, preparing students to think critically and be information literate. The removal of false material from the answer teaches students to distinguish between sources of information and offer accurate information to society in order to foster informed thinking.(Vamanu & Zak, 2022)

TABLE 13. *Level of Students' Performance in terms of Performance Task*

Performance Task	Mean Grade	SD	Descriptive Value
Performance Task 1	82.42	10.28	Satisfactory
Performance Task 2	91.62	3.27	Outstanding
Performance Task 3	78.42	13.90	Fairly Satisfactory
Performance Task 4	92.58	4.82	Outstanding
Grand Mean Grade	*86.26*		
SD	*10.93*		
Descriptive Value	*Very Satisfactory*		

Table 13 shows the Level of Students' Performance in terms of Performance Task, the descriptive value obtained from the gathered data is Very Satisfactory with a grand mean of 86.26 and Standard Deviation of 10.93. This indicates that the students performed well in their performance tasks. Performance task 2 and 4 got the descriptive value of

outstanding, this show that practical application of the learned concepts is effective. However, on the Performance task 3, the descriptive value gained was satisfactory due to the unexpected movement of schedule and time constraints.

Practical tests including performance tasks are designed to examine real life skills and abilities through direct observation and performance-based exercises, offering a more accurate assessment of an individual's capabilities in real-world settings (Steadman, 2018). This also emphasizes the importance of practical tests in measuring a set of competencies aligned to the abilities being taught which are beneficial for the learner's individual development In terms of academic performance.

TABLE 14. *Significant effect of the Use of Interactive Workbook and Learners' Cognitive Function*

Interactive Workbook (IV)	Learners' Cognitive Function (DV)	t-value	p-value
Content			
Objectives	Critical Thinking	4.24	0.000*
	Problem Solving	4.01	0.000*
	Decision Making	2.97	0.004*
Introduction	Critical Thinking	4.89	0.000*
	Problem Solving	5.17	0.000*
	Decision Making	3.51	0.000*
Development	Critical Thinking	4.93	0.000*
	Problem Solving	4.82	0.000*
	Decision Making	4.50	0.000*
Engagement	Critical Thinking	5.98	0.000*
	Problem Solving	5.84	0.000*
	Decision Making	5.23	0.000*
Assimilation	Critical Thinking	4.95	0.000*
	Problem Solving	6.05	0.000*
	Decision Making	5.31	0.000*
Characteristics			
Usability	Critical Thinking	7.66	0.000*
	Problem Solving	7.76	0.000*
	Decision Making	7.01	0.000*
Appropriateness	Critical Thinking	6.18	0.000*
	Problem Solving	6.42	0.000*
	Decision Making	7.77	0.000*
Design	Critical Thinking	7.56	0.000*
	Problem Solving	5.35	0.000*
	Decision Making	7.36	0.000*

*Note: * p < .05*

To test the significant effect of the use of Interactive Workbook and Learners' Cognitive Function data were treated statistically using t-test and corresponding p-values.

Shown in table 14 is the significant effect of Interactive Workbook and Learners' Cognitive Function. The results include t-test (t-values), p-values, and sample size (N=110) for each relationship.

A *significant positive* relationship was seen in the Use of Interactive Workbook's content in terms of Objectives, Introduction, Development, Engagement and Assimilation, and its Characteristics in terms of Usability, Appropriateness and Design was seen towards the Learners' Cognitive Function in terms of Critical Thinking, Problem Solving and Decision making.

This shows that the different parts of the interactive workbook were proven effective towards the learner's cognitive function. It enables learners to think beyond context and helps them attain better understanding of the shown concepts. It also implies that the interactive workbook influenced the learners through the phases of the workbook. Different learning activities can help the learners form meaningful learning experiences and practice reflection.

This result is backed up by Johann & Karbach (2021) on their study which evaluated the impact of cognitive training on children's academic performance, focusing on Working Memory training, their findings show that Working Memory training alone can improve academic skills just as much as specific reading or math training. Furthermore, integrating Working Memory training with subject-specific instruction produced even higher outcomes. This is consistent with the success of the interactive workbook, which improves learners' cognitive capabilities and allows them to grasp things more fully. The workbook's many learning exercises promote meaningful learning experiences and reflection, confirming its positive impact on students.

TABLE 15. *Significant Effect of the Use of Interactive Workbook on Learners' Performance*

Interactive Workbook (IV)	Learners' Performance (DV)	t-value	p-value
Content			
Objectives	Written Test	2.21	0.029*
	Performance Tasks	1.91	0.059
Introduction	Written Test	2.77	0.007*
	Performance Tasks	2.70	0.008*
Development	Written Test	2.34	0.021*
	Performance Tasks	2.54	0.012*
Engagement	Written Test	1.81	0.073
	Performance Tasks	1.89	0.061
Assimilation	Written Test	1.86	0.076
	Performance Tasks	2.13	0.036*
Characteristics			
Usability	Written Test	1.38	0.172
	Performance Tasks	1.24	0.217
Appropriateness	Written Test	0.82	0.413
	Performance Tasks	0.61	0.540
Design	Written Test	2.17	0.032*
	Performance Tasks	2.03	0.045*

*Note: * p < .05*

To test the significant effect of the use of Interactive Workbook on Learners' Performance data were treated statistically using the t-test, and associated p-values. The major findings were presented in the following table.

Shown in table 15 is the test on the Significant Effect of the Use of Interactive Workbook and Learners' Cognitive Function. The results include t-test (t-values), p-values, and sample size (N=110) for each relationship.

The results show that there are both significant and not significant effects towards the variables in question. There is a significant effect of the interactive workbook's content in terms of objectives towards the learners' performance in written test ($p<0.029$), in terms of introduction towards learners' performance in written test and performance task ($p<0.007$, $p<0.008$), in terms of development towards learners' performance in written test and performance task ($p< 0.021$, $p<0.012$) and in terms of assimilation towards learners'

Jonas Yamson Ortigueras, "InTeLEQuest: An Interactive Workbook in Developing Learners' Cognitive Function and Performance," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 400-408, 2025.

performance in performance tasks ($p<0.036$). The results also show significant effect on the interactive workbook characteristics in terms of design towards the learners' performance in both written test and performance task ($p<0.032$, $p<0.045$).

This result also exhibits the variables having not significant effect. The interactive workbook's content in terms of objective towards the learners' performance in performance tasks ($p<0.059$), in terms of engagement towards learners' performance in both written test and performance task ($p<0.073$, $p<0.061$), and in terms of assimilation towards learners' performance in written test ($p<0.076$). Overall, the interactive workbook's content has a significant effect towards learner's performance. On the other hand, the interactive workbook's characteristics poses not significant towards learners' performance.

Guo et al. (2020) investigated how visual display tasks support K-12 students' content-area learning, discovering that, while visual displays alone do not guarantee positive learning outcomes, they have the potential to improve higher-level learning skills such as analyzing, evaluating, applying, and producing. This is consistent with the results, which reveal that the content and design of the interactive workbook have a considerable impact on learners' performance. The workbook's objectives, introduction, development, and assimilation phases all significantly enhanced learners' performance on written examinations and performance tasks. The workbook's design also had a significant favorable impact on learners' performance, illustrating the value of well-structured and interactive learning materials in creating meaningful learning experiences.

Ultimately, this all these data shown and analyzed demonstrates how important the design and utility are in enhancing the learner's performance, as well as considering factors in developing learning materials.

IV. Conclusion and Recommendations

Drawn from the results of the study, the following conclusions were set forth:

The findings shows that the interactive workbook's content and characteristics has a significant relationship towards the learner's cognitive function. It also shows that the content and characteristics are some of the primary factors to be considered in developing a learning material for cognitive enhancement. This concludes that the hypothesis is rejected. This means that the content and characteristics of the interactive material plays an important role in enhancing cognitive function. A significant relationship between the mentioned variables suggests that a well-thought content and characteristics are essential in the development of effective learning materials.

There is a significant effect of interactive workbook's content towards the learning performance in written test in terms of objectives, introduction, and development as well as its characteristics in terms of design. On the other hand, the content's engagement, and assimilation, as well as the characteristics, the usability, and appropriateness deemed as not significant in connection with the learners' performance in written test. These indicates that the workbook's objective, introduction, development, and design can affect the learners' written test while engagement, assimilation, usability, and appropriateness show minimal effect or no effect when it comes in written test. Additionally, in terms of the workbook's content and characteristics significant relationship towards learners' performance in performance tasks shows that there is a significant relationship between the workbook's content in terms of introduction, development, assimilation, and design, while not significant in terms of its objectives, engagement, usability, and appropriateness. This implies that the hypothesis was partially rejected. This indicates that the introduction, development and assimilation, as well as the design are crucial factors to consider in times when educators are developing learning materials.

In light of the conclusion about the significant effects of the interactive workbook towards the learners' cognitive function and performance, the following recommendations were made:

Technology teachers may utilize the interactive workbook and recommend the innovation of diverse strategies in improving learner's performance.

School heads and Subject coordinators may encourage their teachers to adapt engaging learning material such as this workbook to be included in their lessons.

Students may use this learning material as reference for attaining learning goals and make use of the rubrics indicated for assessment.

Future researchers may conduct deeper research and close investigation of the effect of the interactive workbook's characteristics towards learner's performance.

Reference

[1]. Asrowi, Hadaya, A., & Hanif, M. (2019). The impact of using the interactive e-book on students' learning outcomes. International Journal of Instruction, 12(2), 709–722. https://doi.org/10.29333/iji.2019.12245a

[2]. Çer, E. (2016). Preparing Books for Children from Birth to Age Six: The Approach of Appropriateness for the Child. Journal of Education and Practice, 7(6), 78–99. www.iiste.org

[3]. Colliot, T., Kiewra, K. A., Luo, L., Flanigan, A. E., Lu, J., Kennedy, C., & Black, S. (2022). The effects of graphic organizer completeness and note-taking medium on computer-based learning. Education and Information Technologies, 27(2), 2435–2456. https://doi.org/10.1007/S10639-021-10693-Y/METRICS

[4]. Dong, X., Liang, H., Ding, X., & Zhang, Y. (2024). Enhancing children's cognitive skills: An experimental study on virtual reality-based gamified educational practices. Education and Information Technologies, 29(6), 7569–7594. https://doi.org/10.1007/S10639-023-12075-Y/METRICS

[5]. Estrada-Molina, O., Fuentes-Cancell, D. R., & Morales, A. A. (2022). The assessment of the usability of digital educational resources: An interdisciplinary analysis from two systematic reviews. Education and Information Technologies, 27(3), 4037–4063. https://doi.org/10.1007/S10639-021-10727-5

[6]. Guo, D., McTigue, E. M., Matthews, S. D., & Zimmer, W. (2020). The Impact of Visual Displays on Learning Across the Disciplines: A Systematic Review. Educational Psychology Review, 32(3), 627–656. https://doi.org/10.1007/S10648-020-09523-3/METRICS

[7]. Johann, V. E., & Karbach, J. (2021). Educational Application of Cognitive Training. Cognitive Training: An Overview of Features and Applications: Second Edition, 333–350. https://doi.org/10.1007/978-3-030-39292-5_23

[8]. Kambara, H., & Lin, Y. C. (2024). Investigating reading motivation in Latinx college students: qualitative insights from bilingual readers.

Journal of Multilingual and Multicultural Development, 45(5), 1746–1761. https://doi.org/10.1080/01434632.2021.2021212

[9]. Kang, S. H. K. (2024). Applying Cognitive Psychology to Improve Learning: Current Developments and Future Directions. Journal of Applied Research in Memory and Cognition, 13(3), 315–318. https://doi.org/10.1037/MAC0000196

[10]. Lash, C. L. (2018). Making Americans: Schooling, Diversity, and Assimilation in the Twenty-First Century. RSF: The Russell Sage Foundation Journal of the Social Sciences, 4(5), 99–117. https://doi.org/10.7758/RSF.2018.4.5.05

[11]. Marcy Baughman. (2022). Educators' Guide To Evidence-Based Strategies for Elevating Student Engagement. https://www.chronicle.com/article/a-stunning-level-of-student-disconnection

[12]. Mehadi Rahman. (2019). 21st Century Skill "Problem Solving": Defining the Concept. Asian Journal of Interdisciplinary Research, 64–74. https://doi.org/10.34256/AJIR1917

[13]. Noemy, M. S., Inés G., R., Cristina, I. G., & Patricia, A. P. (2017). Exploring Academic Performance: Looking beyond Numerical Grades. Universal Journal of Educational Research, 5(7), 1105–1112. https://doi.org/10.13189/ujer.2017.050703

[14]. Orr, R. B., Csikari, M. M., Freeman, S., & Rodriguez, M. C. (2022). Writing and Using Learning Objectives. CBE- Life Sciences Education, 21(3). https://doi.org/10.1187/CBE.22-04-0073

[15]. Putri, S. I., Hamidah, I., & Liliawati, W. (2023). The Importance of Improving Students' Decision-Making on Socio-Scientific Issues about Climate Change. International Society for Technology, Education, and Science, 83–90. www.istes.orghttps://orcid.org/0000-0002-4105-3809https://orcid.org/0000-0001-7720-8326https://orcid.org/0000-0002-9938-618X

[16]. Rahayu, A., Ilimu, E., & Adewia, M. (2022). Development of Interactive E-Workbook Based on Peer-Led Team Learning on Collaboration Skills and Critical Thinking in Basic Chemistry Concept. JTK (Jurnal Tadris Kimiya), 7(2), 201–214. https://doi.org/10.15575/JTK.V7I2.19750

[17]. Raj, T., Chauhan, P., Mehrotra, R., & Sharma, M. (2022). Importance of Critical Thinking in the Education. World Journal of English Language, 12(3), 126

[18]. Steadman, S. (2018). Steadman: Defining Practice: Exploring The Meaning Of Practice In The Process Of Learning To Teach.