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Development and validation of a research education booklet for high school students of Divine Word College of San Jose

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Abstract

Despite increasing emphasis on research competence among secondary learners in the Philippines, many high school students still struggle to acquire the necessary knowledge and abilities in science investigatory research. Through this research and development study, a science investigatory research booklet was developed and subjected to validation by student respondents from Divine Word College of San Jose. The primary goal of this study is to improve and assist the teaching and learning process in research subjects by creating a structured, learner-centered supplementary instructional material. The analysis-design-development-implementation-evaluation (ADDIE) model served as the framework for the developmental process of the booklet. Findings revealed a number of least learned competencies in research, especially in formulating research methods and design, proposing data gathering procedures, and selecting statistical tools. This suggested the necessity of developing a specialized booklet designed to strengthen these areas. Students evaluated the developed booklet and judged it to be very satisfactory in terms of appropriateness, coherence, usefulness, and adequacy. The student-validated material, as an output of the study, may serve as a potential supplementary resource for improving student understanding of essential research competencies. Wider implementation and further review of the booklet are recommended to strengthen its effectiveness across varied learning contexts.

Keywords: content validity, secondary education, high school students, research and development, science investigatory research

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1. Introduction

The catalyst for developing and validating a booklet on research education for high school students, specifically at the Divine Word College of San Jose (DWCSJ), stems from several critical educational needs and the significant benefits of well-designed learning materials within the Philippine educational context. Despite the emphasis on research in the high school curriculum, students continue to struggle to engage meaningfully with the research process. Studies reveal that high school students frequently encounter challenges related to data management, topic selection, and other aspects of the research process (Ejoc & Paglinawan, 2025). Moreover, research writing presents myriad obstacles for new researchers, such as literature searching, resource limitations, and time management difficulties (Galdonez, 2024). The materials integrated into the curriculum may also be part of the problem. Several studies elaborate that instructional materials are sometimes too complex or written at levels beyond the comprehension of the intended learners (Bansiong & Wan, 2019). These materials often overlook the actual needs of high school learners at the beginning of their research writing journey

A primary driver for the development of learning materials was the insufficiency of effective learning resources and the growing need to address low proficiency in various subjects. For instance, Altares (2024) developed a supplemental science learning resource written in conversational Filipino to address the low proficiency of Senior High School students in the subject. In the same vein, Orine et al. (2024) emphasized low scores on international science assessments. They therefore developed a Strategic Intervention Material (SIM) to enhance the learning of 6th-grade science students, particularly in 'Transformation of Energy.' The constant evolution of educational programs, including the revitalization of teacher education programs and the implementation of outcome-based education, necessitated the development of new supplementary learning materials, such as a booklet on teacher education research (Tolentino et al., 2023). Despite these advancements, deficiencies remain. A great deal of existing research education material remains broad in scope, focusing on general academic writing rather than being tailored to students' needs. Some lack credibility, and others have not been validated to ensure their reliability and effectiveness for High School learners. As a result, students often encounter vague and inaccessible guidance, making the process of conceptualizing, developing, and completing their research more stressful than formative.

Statement of the Problem **-** This study aimed to develop and validate a supplementary research education booklet for high school students of Divine Word College of San Jose. Specifically, the researchers aimed to answer the following questions: (1) What are the least mastered concepts of the grade 10 special science class program of the Junior High School Department of DWCSJ? (2) What is the organization of topics in The Divine Green Book based on the least mastered concepts? (3) What is the level of validity of the developed booklet as assessed by students in terms of adequacy, coherence, appropriateness, and usefulness? (4) What is the level of student evaluation of The Divine Green Book? (5) Is the level of student evaluation significantly affected by the acceptable level of the developed booklet?

Statement of Hypothesis **-** This study aimed to test the hypothesis: H01: The level of student evaluation does not significantly affect the level of validity of the developed booklet.

Significance of the Study **-** This research aimed to support the academic growth and competencies of high school students in science investigatory research. The findings and outputs of this study are expected to benefit the following: First, for students, The Divine Green Book will serve as a reliable, accessible reference offering comprehensible explanations and relevant examples tailored to the context of science investigatory research. By conveying both theoretical and practical aspects of scientific research, The Divine Green Book promotes

self-reliant learning, enhances the comprehensibility of complex research concepts, and builds students' confidence and competence in conducting investigations. Second, for teachers, the validated booklet simplifies teaching by providing a structured, ready-to-use resource. With a reliable guide, teachers may dedicate more time to thoroughly discussing topics, refocus on students' individual needs, and deliver well-thought-out feedback. This enables effective teaching by maintaining consistent guidance throughout the lessons. Third, for parents, this study provides relevant insights into the research processes their children are currently undertaking. The booklet serves as open educational material that supports collaborative learning at home, allowing parents to guide and better understand their children's academic development, particularly in research. Fourth, for educational institutions facing limitations in research instruction, especially within the high school curriculum, this booklet may serve as a supplementary resource to fill learning gaps. This booklet offers a standardized approach to teaching concepts from basic to advanced, making it particularly useful for institutions that lack up-to-date, student-aligned instructional materials. The study also emphasizes the importance of validating educational resources to improve the quality of secondary education. Lastly, for future researchers, this study contributes to the existing body of knowledge in instructional material and educational resource development. The next generation of researchers may use this research as a foundation for further exploration of subject-specific guides, evaluation of learning effectiveness, or enhancement of research education in secondary education. This study also provides relevant insight into effective design and implementation strategies for educational materials.

Scope and Delimitation of the Study **-** This study focused on the primary goal of the development and validation of a science investigatory research booklet titled "The Divine Green Book" that will assist high school students of Divine Word College of San Jose in enhancing their understanding and application of research concepts and processes. The booklet is designed to provide comprehensive yet simplified explanations, activities, and guides to address common difficulties in learning research. The scope of this study was limited to the development and validation of the booklet's content, design, and usability as supplementary material in research education. The validation process included evaluation by faculty members and selected high school students to determine its adequacy, coherence, and appropriateness. The study also aimed to provide accessible, student-friendly content that would support the institution's goal of improving research literacy and academic performance. "The Divine Green Book" is intended for high school students at Divine Word College of San Jose. It was not designed to replace prescribed textbooks, syllabi, or other standard references but to serve as a supplementary guide that complements formal instruction. The coverage of the material was limited to general research concepts, methodologies, and applications aligned with the current curriculum and students' needs. The study excluded the full integration of the booklet into the curriculum, the long-term assessment of student performance following consistent use, and the booklet's applicability to other schools or higher education institutions. Additionally, the booklet does not cover highly technical or discipline-specific research methodologies beyond high school-level requirements. This study was conducted during S.Y. 2025–2026.

2. Methodology

Research Design **-** The descriptive-educational research and development (R&D) design served as the framework for this study. As defined by Borg and Gall, as cited in Tolentino et al. (2020), the design is a systematic framework often employed to create, develop, and assess instructional materials, programs, or products through a structured research methodology. This design was most adept for the present study, as it focuses on the development and validation of a science investigatory research booklet intended to serve as supplementary material for high school students in Divine Word College of San Jose. This study was anchored in the results of a needs assessment that identified the research concepts least well mastered by students.

Participants of the Study **-** For this study, four (4) sets of respondents were involved. The first included a complete enumeration of the grade 10 special science class of the junior high school department of DWCSJ. These students underwent a diagnostic test to identify the research concepts they had mastered least. The second set of respondents included twenty-nine (29) completers of the special science class who evaluated the proposed

booklet on science investigatory research. To establish the content validity of the proposed booklet, the student validators evaluated the material on content and format. Moreover, their comments and suggestions for improvement contributed to the material's face validity and were integrated during the enhancement phase. The third group of participants was the sixteen (16) students who completed the student evaluation checklist for the booklet. These students were the same set of respondents as in the first set.

Data Gathering Procedure

As shown in Figure 1, a cyclical Analysis, Design, Development, and Evaluation (ADDIE) model served as the basis for developing The Divine Green Book. The first phase involved determining the feasibility of developing the booklet by identifying the least mastered concepts of high school students in research writing. Guided by these findings, the design phase used a direct instruction model, ensuring the content aligned with students' needs and learning levels. Based on the results of the analysis and design phases, the booklet was developed, organized, and formatted into a comprehensive supplementary resource.

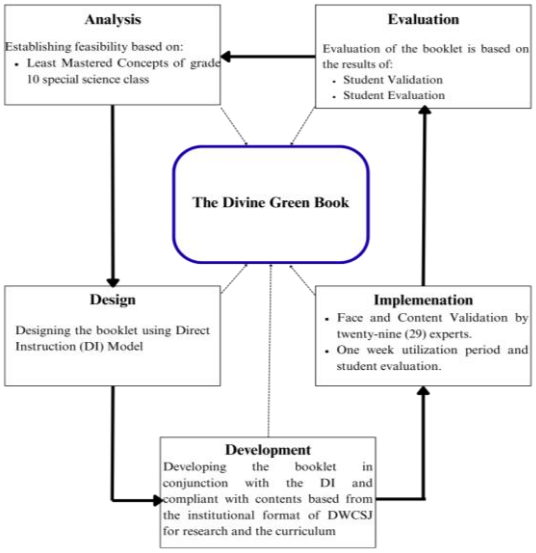

Figure 1. Cyclical ADDIE model.

The implementation involved distributing the booklet to selected completers of the special science class program for validation and feedback. Their evaluations, together with diagnostic assessments, provided bases for analyzing the booklet's readability, content validity, and overall usefulness. Finally, in the evaluation phase, the effectiveness and efficiency of The Divine Green Book as supplementary instructional material were assessed. Each phase of the ADDIE model served as a foundation for the development process, and as a cyclical model, it allowed for continuous refinement and improvement of the booklet.

Research Process

- Phase 1. Analysis

A diagnostic was conducted among sixteen (16) grade 10 students enrolled in the special science class (SSC) of the junior high school department of DWCSJ during Academic Year (AY) 2025-2026 to determine the least-mastered competencies in research. The result of said diagnostic served as the primary basis for selecting and identifying lessons included in the booklet. In addition, the researchers reviewed selected research instructional materials published in the Philippines during the analysis phase to identify content gaps and deficiencies.

- Phase 2. Design of the Booklet

In this phase, the researchers deliberated and agreed upon the selection of learning objectives, assessment instruments, and content components for each chapter of the booklet. Each chapter contains the following sections: an introductory statement, learning objectives, and the main content. These components are structured to ensure logical progression of learning and alignment with identified competencies.

Figure 2. Design of the Divine Green Book

- Phase 3. Development of the Booklet

The researchers undertook formal writing and assembly of the content to be included in the workbook. The activities were designed to be student-centered, reflective, and consistent with the principles of active learning. This phase culminated in the completion of an initial validation version of the booklet.

- Phase 4. Implementation of the Divine Green Book

Before the official use of the developed booklet, the material was preliminarily validated by twenty-nine (29) duly qualified completers of the special science class program of the Junior High School Department of DWCSJ. The evaluation covered the criteria of adequacy, coherence, appropriateness, and usefulness, in accordance with established standards of instructional material validation. The validators' written and verbal feedback was formally solicited to help identify areas for improvement and to serve as the basis for subsequent revisions and enhancements to the proposed material. Following validation, a pilot implementation of the booklet was facilitated with students enrolled in the grade 10 special science class program. An electronic copy of the booklet was provided to all participating students, ensuring accessibility and uniform exposure to the instructional material. Upon the conclusion of a one-week utilization period, sixteen (16) student participants completed the prescribed evaluation checklist for each unit of the booklet. The data gathered from these checklists constituted an essential component in determining the overall acceptability, functionality, and instructional effectiveness of the developed booklet.

- Phase 5. Evaluation of the Divine Green Book

The verbal suggestions, recommendations, and comments from both student validators and student participants were carefully considered and served as the basis for revising and refining the booklet.

Statistical Treatment of the Data - The researchers used weighted mean and standard deviation to statistically analyze data from the validation and evaluation of The Divine Green Book. These statistical tools helped determine the adequacy, coherence, appropriateness, and usefulness of the developed research booklet, as well as the consistency and reliability of its content. The weighted mean was also used to determine the average student responses on the diagnostic test, which served as the basis for the booklet's content. This computation reflects the collective judgment of respondents and minimizes random variation in ratings, ensuring reliable interpretation. The standard deviation was used to determine the degree of variation or dispersion among the responses of validators and evaluators. A smaller standard deviation indicates greater consistency in evaluation. This computation helped determine how closely the evaluators' ratings cluster around the mean, reflecting agreement in their assessment. The Pearson Product–Moment Correlation Coefficient was used to assess the degree and direction of the linear relationship between the validity level of the developed booklet and students' evaluation levels. To determine statistical significance, the computed t-value was compared against the critical value at a 0.05 level of significance. Additionally, the p-value was examined. A p-value less than 0.05 indicated

a statistically significant relationship, leading to rejection of the null hypothesis. The coefficient of determination (r^2) was also computed to determine the proportion of variance in the dependent variable that the independent variable can explain. Descriptive analysis was conducted at the $\alpha = 0.05$ significance level. The results were tabulated and interpreted using both numerical and qualitative descriptions. All statistical computations were conducted using Microsoft Excel®, ensuring accurate data computation and presentation through tabular and graphical representations. Using these statistical tools, the researchers quantitatively assessed the validity, reliability, and overall acceptability of The Divine Green Book as a specialized instructional material for high school students.

Ethical Considerations - In the conduct of this study, due consideration was accorded to all relevant factors to preclude the occurrence of any form of disparity or bias. The researchers strictly adhered to the established ethical guidelines governing academic research. All participants were treated with utmost dignity, and their right to privacy and the confidentiality of any information disclosed were fully protected at all times. Before participant recruitment, participants were apprised of the purpose, scope, and procedures of the research. If any participant elected not to disclose certain personal information, the researchers fully respected this preference in accordance with ethical standards for voluntary participation and confidentiality. All data and information were collected solely for academic purposes and were used exclusively within the parameters of this study. Access to said data was restricted to the researchers and the authorized research adviser. Upon completion of the study, all electronic and printed records were securely stored for documentation and audit purposes, then disposed of or deleted in accordance with institutional data protection policies to prevent unauthorized use or disclosure.

3. Results and Discussions

As shown in Table 1, the respondents are generally competent in research conceptualization (WM = 2.97), formulation of research methods and design (WM = 2.95), and data gathering, processing, and analyzing (WM = 2.99), with an overall grand mean of 2.97. This suggests that the respondents possess adequate research skills across all phases of the research process.

Table 1

The least mastered concepts of the grade 10 special science class in research

Research Competency	Mean (SD)	VD
Research Conceptualization		
Identify research topic	2.95 ± 0.76	C
Select research topic	3.00 ± 0.74	C
Construct research titles	2.92 ± 0.65	C
Describe the background of the research	2.88 ± 0.68	C
Formulate research questions that can be investigated	3.00 ± 0.76	C
Cite the target beneficiaries with the specific benefits	2.98 ± 0.73	C
Indicate the scope and boundaries of the study	2.88 ± 0.61	C
Select relevant literature that is related to the present study	2.96 ± 0.80	C
Draw out and manage information from different literature	2.88 ± 0.74	C
Cite literature and studies	3.28 ± 0.77	HC
Construct a theoretical and/or conceptual framework	2.88 ± 0.67	C
Define the terms in the study	2.97 ± 0.69	C
Composite Mean	2.97	C
Formulation of Research Methods and Design		
Choose the most appropriate research design	3.00 ± 0.74	C
Select study sites appropriately	3.00 ± 0.76	C
Describe and choose the sample of the study	2.95 ± 0.69	C
Construct research instruments	2.97 ± 0.71	C

Propose proper data gathering procedures	*3.88 ± 0.72*	C
Select the appropriate statistical tool in analyzing data based on the posted objectives	2.94 ± 0.79	C
Impose appropriate ethics in research	2.95 ± 0.79	C
Composite Mean	2.95	C
Data Gathering, Processing, and Analyzing		
Gather data	3.25 ± 0.70	HC
Present data	2.90 ± 0.78	C
Infer and explain qualitative data	2.94 ± 0.80	C
Process statistical techniques to analyze quantitative data	2.94 ± 0.77	C
Present results	2.94 ± 0.71	C
Create a coherent summary	3.03 ± 0.74	C
Conclude research findings	2.98 ± 0.73	C
Formulate recommendations	2.92 ± 0.71	C
Composite Mean	2.99	C
OVERALL MEAN	2.97	C

Legend: Highly Competent (3.25-4.00); Competent (2.50-3.24); Somewhat competent (1.75-2.49); Not Competent (1.00-1.74)

Among the three domains, Formulation of Research Methods and Design obtained the lowest weighted mean, suggesting that methodological components remain the least mastered area. Although still interpreted as competent, indicators such as proposing data gathering procedures (M = 2.88) and selecting appropriate statistical tools (M = 2.94) reflect comparatively lower confidence. This finding aligns with the study by Qasem and Zayid (2019), which identified research design, tool selection, and data analysis as common challenges among student-researchers. In contrast, the highest-rated competencies are citing literature and studies (M = 3.28) and gathering data (M = 3.25), both of which are interpreted as Highly Competent. This suggests that students have more confidence in executing procedural and documentation tasks than in designing methodological structures. Comparable findings were reported by Bocar (2013) as cited in Casquejo (2025), who noted that students perform better in literature citation and data collection than in research design and analytical reasoning.

The booklet was designed using the Direct Instruction Model, which follows a structured, teacher-guided approach to presenting and practicing research concepts. This model emphasizes clarity, sequencing, and active learner engagement through explanation, demonstration, and guided practice, making it suitable for teaching complex technical skills such as research methodology. The booklet follows a structured instructional sequence. First, research concepts are explicitly defined and explained in detail. Core principles, classifications, and procedural steps are presented systematically to establish foundational understanding. Examples are then provided to model the correct application of concepts. Following the modeling phase, guided practice activities are included to help students apply the concepts learned in a structured setting. These activities require learners to differentiate between hypotheses and operational and conceptual definitions. The organization of content flow and its description are shown in Table 2.

Table 2

Direct Instruction Model content flow

Content Flow	Description
Explicit Explanation of Concepts	Research terms and principles are clearly defined and explained to establish a basic understanding.
Modeling and Examples	Examples are provided to demonstrate the correct application of concepts and illustrate how ideas are used in an actual research context.
Guided Practice Activities	After the concept is explained, learners are given structured tasks that allow them to practice and apply the concepts under guided conditions.
Reinforcement and Mastery Checks	Activities and exercises are designed to ensure learners have internalized both definitions and procedures before advancing.

In terms of physical structure, the final version was titled “The Divine Green Book” and has a dimension of 148 mm x 210 mm. The booklet consists of 50 pages, including a table of contents and main topics. The authors designed the front cover. The Divine Green Book is composed of four (4) modules: the first and second modules comprise three (3) lessons each, the third comprises thirteen (13), and the fourth comprises a single lesson. The topics in the booklet are shown in Table 3.

Table 3

Arrangement of topics in the Divine Green Book

Module/Lesson Number		Topic Title
Module 1		What is Research
	Lesson 1	Introduction to Research
	Lesson 2	Research in DWCSJ
	Lesson 3	Research Competencies
Module 2		Science Investigatory Research
	Lesson 1	Importance of SIPs
	Lesson 2	Types of Science Investigatory Research
	Lesson 3	Characteristics of a Good SIP
Module 3		The DWCSJ Institutional Format for Science Investigatory Research
	Lesson 1	Introduction
	Lesson 2	Responsibility of the Student-Researcher
	Lesson 3	Title Page Guidelines
	Lesson 4	Order of Preliminary Pages
	Lesson 5	The Approval Sheet
	Lesson 6	Acknowledgement
	Lesson 7	Dedication
	Lesson 8	Abstract
	Lesson 9	Table of Contents
	Lesson 10	List of Tables
	Lesson 11	List of Figures
	Lesson 12	Chapters I-V
	Lesson 13	General Formatting Guidelines
Module 4		Research Publication Process

The validators, composed of completers of the grade 10 special science class program, examined and evaluated the booklet in accordance with the criteria of adequacy, coherence, appropriateness, and usefulness, such evaluation being grounded upon and governed by the same standards adopted from Rogayan and Dollete (2019), as reflected in Table 4. With respect to adequacy, all stated indicators were unanimously and unequivocally affirmed by the validators, as substantiated by an aggregate mean of 3.75. Such a rating constitutes sufficient and competent evidence that the booklet has satisfactorily complied with the prescribed requisites and minimum standards applicable to instructional materials, particularly in the provision of instructions and activities designed to support independent learning. Furthermore, said evaluation establishes that the inclusion of images and graphical representations to elucidate complex and abstract concepts, together with their sequential organization within an appropriate instructional design framework, conforms to recognized pedagogical principles and is deemed compliant with accepted academic and evaluative standards.

The booklet's physical attributes were duly noted and favorably recognized by the student validators, particularly its simple yet systematically organized layout. In substantiation thereof, Student 3 (S3) expressly stated, "The layout of the booklet is nice and simple.” The researchers hereby represent that all such requisites were duly considered and incorporated in the preparation of the science investigatory booklet. It is also evident

that the booklet has user-friendly features, as the concepts, activities, and instructions contained therein are readily comprehensible and can stimulate learners' interest in research. It is on record that multiple student validators proposed expanding the booklet's intended clientele. In particular, Student Validator 7 (SV7) stated that "You should expand the target audience of the booklet," which observation was likewise affirmed by Student Validator 19 (SV19), who indicated that "Add examples relevant to other types of research in Divine." In due consideration of the foregoing recommendations, the researchers incorporated additional examples and supplementary reference materials into the booklet. This position is supported by Khwanchai et al. (2017), who argue that integrating inquiry-based activities enhances students' acquisition of research and analytical competencies. Concerning the recommendation to broaden the intended user base, the researchers resolved, for the present iteration, to retain the originally identified target clientele; provided, however, that such expansion shall be taken under advisement and may be implemented in subsequent revisions of the material.

Table 4

Mean Level of validity of The Divine Green Book in terms of Adequacy, Coherence, Appropriateness, and Usefulness

Criteria	Mean (SD)	VD
Adequacy		
2. Learning activities satisfy the stated objectives.	3.72±0.45	HV
3. Provides independent activities	3.83±0.38	HV
4. Evident graphical and pictorial images	3.79±0.41	HV
5. Concepts presented logically	3.79±0.41	HV
Composite Mean	**3.81**	**HV**
Coherence		
1. Contains relevant activities	3.69±0.47	HV
2. Activities provide practical work	3.69±0.47	HV
3. Activities develop creativity and resourcefulness	3.79±0.41	HV
4. Provides relevant information for better understanding	3.83±0.38	HV
5. Activities conform to the concepts	3.90±0.31	HV
Composite Mean	**3.78**	**HV**
Appropriateness		
1. Adapted to intended learners	3.72±0.45	HV
2. Based on the learning competencies	3.69±0.47	HV
3. Provides immediate needs	3.52±0.51	HV
4. Arranged in the correct sequence	3.69±0.47	HV
5. Provides varied activities to sustain interest	3.72±0.45	HV
Composite Mean	**3.67**	**HV**
Usefulness		
1. Easy to understand	3.72±0.45	HV
2. Provides knowledge and skill	4.00±0.00	HV
3. Encourages creative and critical thinking	3.48±0.51	HV
4. Serves as an instructional tool	3.72±0.45	HV
5. Helps facilitate lesson presentation	3.79±0.41	HV
Composite Mean	**3.74**	**HV**
Overall Mean	**3.75**	**H**

Legend: Highly valid (3.50–4.00); Valid (2.50–3.49); Moderately valid (1.50–2.49); Not valid (1.00–1.49). SD: Standard Deviation

The developed booklet underwent a pilot implementation in a grade 10 special science class (Junior High School Department of DWCSJ). Participants were provided with electronic copies of the booklet and used it concurrently with the actual instructional content in research methodology, in accordance with the prescribed learning competencies. After one (1) week of use, participants were directed to evaluate the instructional

material using a standardized checklist, the results of which are presented in Table 5.

The findings indicate that, overall, participating Grade 10 SSC students rated the booklet's acceptability, as evidenced by a weighted mean score of 3.36. The highest level of agreement was recorded for the indicator "Learning objectives are attainable," which provides a probative indication that the objectives established for each content component are feasible within the prescribed instructional timeframe. This is supported by the findings of Tolentino et al. (2023), who conducted a similar study and developed a research education booklet for teacher education students. Respondents likewise indicated concurrence that the material is readily comprehensible, incorporates differentiated activities, stimulates interest through the use of graphic organizers, and enhances learners' appreciation of and regard for research.

Table 5

Student Evaluation of the Divine Green Book

Items	Mean (sd)	Verbal Description
The instructions are easy to understand.	3.44± 0.51	Much Acceptable
Learning objectives are attainable.	3.75± 0.45	Very much acceptable
Varied activities are evident.	3.31± 0.48	Much Acceptable
Graphic organizers enhanced my interest	3.38± 0.62	Much Acceptable
The activities enhanced my understanding of the lessons	3.38± 0.50	Much Acceptable
The activities increased my interest in educational research	3.31± 0.79	Much Acceptable
COMPOSITE MEAN	3.36	Much Acceptable

Legend: Very much acceptable (3.50–4.00); Much acceptable (2.50–3.49); Not much acceptable (1.50–2.49); not at all acceptable (1.00–1.49). SD: Standard Deviation

Table 6 presents a Pearson Product-Moment correlation analysis between acceptance dimensions and student evaluation. Upon examination of the data, it is determined that the extent to which respondents accept the developed booklet varies, with student evaluations depending on the specific dimension of acceptance considered. With respect to adequacy, having a correlation coefficient of (r= 0.456), with a t-value of (2.662) exceeding the critical value of (2.052) and a p-value of (p= 0.013), establishes sufficient statistical evidence to reject the null hypothesis. Accordingly, adequacy is deemed to have a significant effect on student evaluation, accounting for approximately 20.8% of the variance as reflected in the coefficient of determination. Conversely, coherence, having a computed t-value (1.999), does not surpass the critical value (2.052), and the p-value (0.56) exceeds the allowable alpha level. Thus, coherence is determined to have no significant effect on student evaluation, notwithstanding a modest correlation coefficient (0.359). In relation to appropriateness, the correlation coefficient (0.652), coupled with a t-value of (4.468), substantially exceeds the critical value and a p-value of less than (0.001), well below the threshold for significance. Results reject the null hypothesis, establishing a highly significant effect on student evaluations and explaining 42.5% of the observed variability. Finally, regarding usefulness, the correlation coefficient of 0.917 indicates an exceptionally strong association, the t-value (11.945) greatly exceeds the critical value, and the p-value is below 0.001. These findings unequivocally warrant rejection of the null hypothesis and support the conclusion that usefulness has a highly significant and highly substantial effect on student evaluation, accounting for 84.1% of variance. The statistically significant relationships among adequacy, appropriateness, and usefulness in student evaluation align with studies on the effectiveness of instructional design and learning materials. Studies grounded in perceived usefulness reveal that learners are more likely to rate instructional tools more favorably when they believe these materials will enhance their performance and comprehension (Davis, 1989, as cited in Sun et al., 2026). On the other hand, Sweller (1988), as cited in Macedo et al. (2023), states that while coherence plays a role in the structural organization of learning material, cognitive load theory indicates that mere organization may not significantly impact learning outcomes unless learning processes are directly facilitated.

Table 6

Correlational analysis between acceptance dimensions and student evaluation

Variables	Correlation coefficient	effect size	critical value	t-value	*p-value*	interpretation
Acceptance Level (adequacy)→ student evaluation	0.456	0.208	2.052	2.662	0.013	Significant
Acceptance Level (coherence)→student evaluation	0.359	0.129	2.052	1.999	0.056	Not Significant
Acceptance Level (appropriateness)→student evaluation	0.652	0.425	2.052	4.468	<0.001	Highly Significant
Acceptance Level (usefulness)→student evaluation	0.917	0.841	2.052	11.945	<0.001	Highly Significant

legend: p-value<0.001 highly significant p-value<0.05 significant

4. Conclusions

The diagnostic test conducted on the Grade 10 special science class revealed that the least-mastered concepts are research methods and design, proposing data-gathering procedures, and selecting appropriate statistical tools, thereby confirming the feasibility and relevance of developing the booklet. The booklet was developed using the Direct Instructional Model, which ensures a clear, structured, and progressive approach to learning. The booklet includes explanations, models, guided practice, and activities that will provide students with foundational knowledge. The developed booklet underwent student validation and received an overall mean score indicating high validity. The mean scores were divided into areas such as adequacy, coherence, appropriateness, and usefulness, all of which received an overall rating interpreted as highly valid, indicating that students had a positive perception of the material. The level of student evaluation of the booklet was favorable and is within acceptable standards. With a weighted mean of 3.36, indicating much acceptance from the intended users. The level of student validation is significantly influenced by certain dimensions of the booklet's validity. Adequacy, appropriateness, and usefulness were significantly related to student evaluation, with usefulness the strongest determinant. Coherence, however, was not statistically significant. Therefore, the null hypothesis stating that the level of student evaluation statistically affects the validity of the developed booklet is rejected.

Recommendations **-** The results of the study suggest that The Divine Greenbook is feasible, valid, and appropriate for its intended users. The booklet can serve as effective supplementary instructional material to support students' research. The researchers propose the following recommendations to further enhance the utilization and development of The Divine Greenbook: For future developers and researchers, it is recommended that experts validate the Divine Greenbook to further increase its validity. For future researchers, it is recommended that this research be conducted on a larger population to improve generalizability and the application of the findings. It is recommended that future editions of The Divine Greenbook include more comprehensive data on areas that were not discussed. It is recommended that follow-up studies be conducted to assess the long-term impact of students' research skills, critical thinking, and confidence in conducting research.

5. References

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