

Stem Pocket Lab Kit Manual: A Learning Tool in Fostering Students' Work Progress and Skills in Science

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Abstract—This study, entitled “STEM Pocket Lab Kit Manual: A Learning Tool in Fostering Students' Work Progress and Skills in Science,” aimed to examine the effectiveness of the manual by addressing key research questions. Specifically, it determined the level of the manual's components in terms of objectives, concepts, tools and materials, activities, and instructions; assessed its features based on relevance, organization, and design; evaluated students' progress in science in terms of work habits, work skills, and social skills; and measured students' science skills in the areas of Electronics and Automation, Engineering Design and Development, and Laboratory Techniques. Furthermore, the study investigated the significant relationship and effect between the components and features of the manual and the students' progress and science skills. The descriptive method of research was used in this study to analyze and interpret the data being gathered from the respondents of this study. The primary respondents were the 92 Grade 12 STEM students at San Pedro Relocation Center National High School. The level of components of the STEM Pocket Lab Kit Manual was very high, similar to the level of features of the STEM Pocket Lab Kit Manual. The level of students' progress in science was very high, while level of students' science skills was outstanding. Furthermore, the STEM Pocket Lab Kit Manual's components and features have significant relationship on students' progress in science. Moreover, the STEM Pocket Lab Kit Manual's components and features significantly affect the growth of students' scientific skills. The components and features of the STEM Pocket Lab Kit Manual showed a significant relationship on students' progress in science. Therefore, it was concluded that the null hypothesis was rejected. In addition, the components and features of the STEM Pocket Lab Kit Manual showed a significant effect on students' science skills. Therefore, it was concluded that the null hypothesis was rejected. Based on these results, it was recommended that Science teachers who are teaching STEM students can incorporate the STEM Pocket Lab Kit Manual into their lesson to improve students' progress in science. Moreover, students may actively utilize the STEM Pocket Lab Kit Manual during science activities and experiments. This will help them improve their participation, teamwork, and overall science skills in areas such as electronics, engineering design, and laboratory techniques.

Keywords—STEM Pocket Lab Kit Manual, objectives, concept, tools and materials, instructions, activities, relevance, organization, design, work habits, work skills, social skills, Electronics and Automation, Engineering Design and Development, Laboratory Techniques.

I. INTRODUCTION

In a time when science and technology are moving quickly, education is very important for making students who can think critically, come up with new ideas, and solve real-world

problems. In this context, STEM (Science, Technology, Engineering, and Mathematics) education seeks to provide pupils with the necessary skills for scientific literacy and global competitiveness. Even though STEM is part of the senior high school curriculum, many students still have trouble turning theoretical ideas into real-world situations. This is especially clear during work immersion, when students are expected to use their scientific knowledge in real-world situations.

Work immersion programs are designed to prepare students for professional settings by giving them real-world experience with scientific tasks and procedures. However, these activities don't always work well because it's hard to get to lab tools and learning materials, especially in public schools. This lack of proper equipment makes it harder for kids to try new things, which slows down their progress, confidence, and overall success in science.

The STEM Pocket Lab Kit Manual was created as a way to assist close this gap by giving students real-life lab experiences through an instructive and practical learning tool. Frederick G. Byrd Jr., Agustin Owen V. Peña, Austeen John O. Velasco, Orimar M. Guab, Armie Joyce P. Aterrado, and Rowena June B. Mirondo created and used the kit and its manual at San Pedro Relocation Center National High School. The kit and manual are meant to help students learn by giving them easy-to-use, organized, portable, and accessible resources that let them do scientific research outside of a traditional lab.

This study examines the influence of the STEM Pocket Lab Kit Manual's components—namely its objectives, tools and materials, activities, instructions, and concept—alongside its aspects, such as relevance, organization, and design, on enhancing students' academic achievement and scientific performance. It looks at how these things help students learn science, especially when it comes to how they use theory, how motivated and engaged they are, and how ready they are for work immersion. The study also looks at how the handbook might help students improve their science skills, especially in electronics and automation, engineering design and development, and laboratory procedures. The goal of this research is to show how the STEM Pocket Lab Kit Manual encourages useful, relevant, and hands-on STEM learning that makes the link between what students learn in class and how scientists work in the real world stronger.

1.1 Statement of the Problem

Problem/s which were addressed by the research

This study seeks to evaluate the effect between the components and features of the STEM Pocket Lab Kit Manual and students' progress in science and science skills. It aims to tackle the subsequent inquiries:

1. What is the level of components of the STEM Pocket Lab Kit Manual in terms of:
 - 1.1 Objectives;
 - 1.2 Tools and Materials;
 - 1.3 Activities;
 - 1.4 Instructions; and
 - 1.5 Concept?
2. What is the level of features of the STEM Pocket Lab Kit Manual in terms of:
 - 2.1 Relevance;
 - 2.2 Organization; and
 - 2.3 Design?
3. What is the level of students' work progress in science in terms of:
 - 3.1 Work Habits;
 - 3.2 Work Skills; and
 - 3.3 Social Skills?
4. What is the level of students' skills in science in terms of:
 - 4.1 Electronics and Automation;
 - 4.2 Engineering Design and Development; and
 - 4.3 Laboratory Techniques?
5. Is there a significant relationship between the components and features of the STEM Pocket Lab Kit Manual and students' work progress in science?
6. Is there a significant effect between the components and features of the STEM Pocket Lab Kit Manual and students' skills in science?

II. METHODOLOGY

The descriptive method of research was used in this study to analyze and interpret the data being gathered from the respondents of this study. The primary respondents were the 92 Grade 12 STEM students at San Pedro Relocation Center National High School.

III. RESULTS AND DISCUSSION

This chapter presents the analysis, interpretation, and discussion of the data gathered in this study, guided by its general and specific objectives. It aims to determine the relationship and effect between the components and features of the STEM Pocket Lab Kit Manual and students' progress and science skills. Specifically, it assesses the manual's acceptability, evaluates students' progress in science, measures their scientific skills, and examines both the significant relationship and effect of the manual on students' learning outcomes.

The scope of this research is limited to Grade 12 STEM students of San Pedro Relocation Center National High School during the second semester of the academic year 2025–2026. Out of 132 students, 112 were selected as respondents through purposive sampling, while 20 students were utilized for pilot

testing. The study focuses on evaluating the effectiveness of the STEM Pocket Lab Kit Manual as a learning tool in relation to students' academic progress and skill development in science-related areas.

Methodologically, the study used a descriptive research design to examine relationships and effects without manipulation. Data were gathered through validated survey questionnaires and a performance rubric, and analyzed using weighted mean, standard deviation, Pearson r, and regression analysis using t-test to address the research objectives.

Level of Components of the STEM Pocket Lab Kit Manual

In this study components of the STEM Pocket Lab Kit Manual include objectives, tools and materials, activities, instructions, and concept.

The following table presents the components of the STEM Pocket Lab Kit Manual include objectives, tools and materials, activities, instructions, and concept.

Table 1. Level of Components of the STEM Pocket Lab Kit Manual in terms of Objectives

Statement	Mean	SD	Descriptive Equivalent
The objectives stated in the STEM Pocket Lab Kit Manual...			
...are clearly stated at the beginning of each activity.	4.52	0.55	Strongly Agree
...are aligned with our science lesson goals.	4.35	0.64	Strongly Agree
...help me understand what I am expected to learn and accomplish.	4.22	0.74	Strongly Agree
...guide me in focusing on the important parts of each activity.	4.35	0.69	Strongly Agree
...help me evaluate my own learning after completing the activities.	4.45	0.62	Strongly Agree
Weighted Mean		4.38	
SD		0.65	
Verbal Interpretation			Very High

Table 1 shows the level of Components of the STEM Pocket Lab Kit Manual in terms of Objectives.

The level of Components of the STEM Pocket Lab Kit Manual in terms of Objectives is Very High (WM = 4.38), demonstrating the students' strong agreement that the objectives are well-stated, in line with the lesson's goals, and helpful in directing their comprehension, concentration, and self-evaluation. The clear presentation of objectives at the start of each activity had the highest mean (M = 4.52) among the indicators; all other items consistently obtained excellent agreement and showed minimal variation in responses.

In summary, the findings indicate that well-defined objectives help students focus, provide them direction, and encourage self-evaluation, all of which lead to better learning outcomes.

Table 2 shows the level of Components of the STEM Pocket Lab Kit Manual in terms of Concept.

The level of Components of the STEM Pocket Lab Kit Manual in terms of Concept is Very High (WM = 4.25), indicating that the majority of students strongly agree that the ideas offered are in line with their science classes, clear, and useful for relating courses to actual circumstances. The capacity to relate concepts to real-world applications and alignment with scientific teachings had the greatest means

among the indicators (M=4.37), while the sufficiency of explanations for each activity had the lowest mean (M=4.00), yet this was still evaluated as Agree. Overall, the findings demonstrate a generally favorable view with comparatively little difference among responders.

Table 2. Level of Components of the STEM Pocket Lab Kit Manual in terms of Concept

Statement	Mean	SD	Descriptive Equivalent
The concept of the STEM Pocket Lab Kit Manual...			
...is aligned with our science lessons.	4.37	0.72	Strongly Agree
...are clear and easy to understand.	4.16	0.72	Agree
...helps me connect science lessons to real-life situations.	4.37	0.66	Strongly Agree
...provides me sufficient explanations for each activity.	4.00	0.68	Agree
...enhances my understanding of scientific concepts.	4.36	0.60	Strongly Agree
Weighted Mean		4.25	
SD		0.69	
Verbal Interpretation			Very High

In summary, the findings indicate that students' understanding and capacity to apply scientific concepts in practical contexts are improved by well-organized and contextually relevant concepts.

Table 3 displays the level of Components of the STEM Pocket Lab Kit Manual in terms of Tools and Materials.

The level of Components of the STEM Pocket Lab Kit Manual in terms of Tools and Materials is Very High (WM = 4.47), indicating that students strongly agree that the tools and materials are suitable, secure, and useful for facilitating experiential learning. The appropriateness of tools and materials for the activities had the highest mean (M = 4.60), closely followed by safety and activity effectiveness. On the other hand, the ease of obtaining the materials had the lowest mean (M = 4.12), which was still interpreted as Agree. Overall, the responses exhibit comparatively little heterogeneity and a consistently positive assessment.

Table 3. Level of Components of the STEM Pocket Lab Kit Manual in terms of Tools and Materials

Statement	Mean	SD	Descriptive Equivalent
The tools and materials of the STEM Pocket Lab Kit Manual...			
...are easy to obtain.	4.12	0.78	Agree
...are appropriate for the activities provided.	4.60	0.58	Strongly Agree
...are safe to use during laboratory activities.	4.59	0.61	Strongly Agree
...help me perform the activities effectively.	4.54	0.65	Strongly Agree
...support hands-on learning in science.	4.50	0.64	Strongly Agree
Weighted Mean		4.47	
SD		0.68	
Verbal Interpretation			Very High

In summary, the findings indicate that students' capacity to actively participate in laboratory activities and increase their practical learning experience are improved by readily available, suitable, and safe instruments and supplies.

Table 4. Level of Components of the STEM Pocket Lab Kit Manual in terms of Activities

Statement	Mean	SD	Descriptive Equivalent
The activities integrated in the STEM Pocket Lab Kit Manual...			
...are engaging and interesting.	4.40	0.70	Strongly Agree
...help me apply what I have learned in science.	4.34	0.62	Strongly Agree
...encourage problem-solving and critical thinking.	4.46	0.67	Strongly Agree
...are appropriate to my skill level.	4.12	0.75	Agree
...improve my participation during science lessons.	4.29	0.70	Strongly Agree
Weighted Mean		4.32	
SD		0.70	
Verbal Interpretation			Very High

Table 4 displays the level of Components of the STEM Pocket Lab Kit Manual in terms of Activities.

The level of Components of the STEM Pocket Lab Kit Manual in terms of Activities is Very High (WM = 4.32), indicating that students strongly agree that the activities are interesting, encourage knowledge application, and improve involvement, critical thinking, and problem-solving. Encouraging problem-solving and critical thinking had the greatest mean (M=4.46), followed by engaging and entertaining activities. Appropriateness to skill level had the lowest mean, which was nonetheless regarded as Agree. Overall, there is little fluctuation in the responses, which regularly reveal favorable opinions.

In summary, the findings indicate that interactive, well-designed activities improve students' participation, engagement, and higher-order thinking abilities, resulting in more significant educational experiences.

Table 5. Level of Components of the STEM Pocket Lab Kit Manual in terms of Instructions

Statement	Mean	SD	Descriptive Equivalent
The instructions mentioned in the STEM Pocket Lab Kit Manual...			
...are clear and easy to follow.	4.18	0.66	Agree
...help me complete the activities correctly.	4.25	0.62	Strongly Agree
...guide me in using tools and materials properly.	4.32	0.66	Strongly Agree
...encourages my independent learning through clear instructions.	4.26	0.68	Strongly Agree
...help me minimize confusion during activities.	3.90	0.71	Agree
Weighted Mean		4.18	
SD		0.68	
Verbal Interpretation			High

Table 5 displays the level of Components of the STEM Pocket Lab Kit Manual in terms of Instructions.

The level of Components of the STEM Pocket Lab Kit Manual in terms of Instructions is High (WM = 4.18), indicating that most students strongly agree that the instructions are understandable, beneficial, and encouraging in helping them finish tasks, make appropriate use of tools, and foster independent learning. Guiding the appropriate use of tools and materials had the highest mean (M=4.32), followed by promoting independent learning and assisting in the correct completion of tasks. Minimizing confusion during activities

had the lowest mean (M=3.90), which was still interpreted as Agree. Overall, the responses indicate a favorable assessment with minor differences between markers.

In summary, although there is certainly space for improvement in terms of minimizing confusion during activities, the results indicate that precise and well-structured instructions improve students' capacity to complete tasks, foster independence, and encourage successful learning.

Level of Features of the STEM Pocket Lab Kit Manual

In this study, Features of the STEM Pocket Lab Kit Manual include relevance, organization, and design.

The following table presents the Features of the STEM Pocket Lab Kit Manual include relevance, organization, and design.

Table 6. Level of Features of the STEM Pocket Lab Kit Manual in terms of Relevance

Statement	Mean	SD	Descriptive Equivalent
The STEM Pocket Lab Kit Manual...			
...is relevant to our science curriculum.	4.48	0.69	Strongly Agree
...includes activities that can be related to real-world science applications.	4.49	0.65	Strongly Agree
...helps me see the importance of science in daily life.	4.37	0.55	Strongly Agree
...has the lessons that are useful for future learning.	4.46	0.67	Strongly Agree
...supports meaningful learning experiences.	4.46	0.72	Strongly Agree
Weighted Mean		4.45	
SD		0.66	
Verbal Interpretation			Very High

Table 6 displays the level of Features of the STEM Pocket Lab Kit Manual in terms of Relevance.

The level of Features of the STEM Pocket Lab Kit Manual in terms of Relevance is Very High (WM = 4.45), indicating that students strongly agree the manual encourages meaningful and future learning, links lessons to practical applications, and is pertinent to the science curriculum. The inclusion of activities pertaining to real-world science applications had the highest mean (M=4.49), closely followed by relevance to the science curriculum. Helping students understand the significance of science in everyday life had the lowest mean, which was still interpreted as Strongly Agree.

In summary, the findings imply that including curriculum-aligned information with real-world situations boosts meaningful learning, increases students' appreciation of science, and raises the perceived value of materials.

Table 7 displays the level of Features of the STEM Pocket Lab Kit Manual in terms of Organization.

The level of Features of the STEM Pocket Lab Kit Manual in terms of Organization is Very High (WM = 4.21), indicating that most students strongly agree that the manual is logically organized, simple to use, and enhances learning effectiveness. The organization enhancing learning efficiency had the greatest mean (M=4.34), followed by the layout aiding in lesson comprehension, while ease of navigation had the lowest mean, which was nevertheless evaluated as Agree. Overall, the responses demonstrate a generally favorable assessment with just minor differences between markers.

Table 7. Level of Features of the STEM Pocket Lab Kit Manual in terms of Organization

Statement	Mean	SD	Descriptive Equivalent
The STEM Pocket Lab Kit Manual...			
...has topics that are arranged in a logical order.	4.20	0.76	Strongly Agree
...is easy to navigate and follow.	4.11	0.69	Agree
...includes the activities that are well-sequenced from simple to complex.	4.18	0.65	Agree
...consists of layout that can help me understand the lessons better.	4.22	0.68	Strongly Agree
...has its organization that can improve my learning efficiency.	4.34	0.65	Strongly Agree
Weighted Mean		4.21	
SD		0.69	
Verbal Interpretation			Very High

In summary, the findings indicate that a rationally organized and well-organized handbook improves students' understanding, facilitates effective learning, and makes course navigation easier.

Table 8. Level of Features of the STEM Pocket Lab Kit Manual in terms of Design

Statement	Mean	SD	Descriptive Equivalent
The STEM Pocket Lab Kit Manual...			
...has its design which is visually appealing.	4.17	0.74	Agree
...includes illustrations and diagrams that help me understand the lessons.	4.46	0.70	Strongly Agree
...has the font size and format that are easy to read.	4.42	0.60	Strongly Agree
...keeps me interested while using because of its design.	4.04	0.72	Agree
...supports effective learning.	4.38	0.69	Strongly Agree
Weighted Mean		4.30	
SD		0.71	
Verbal Interpretation			Very High

Table 8 displays the level of Features of the STEM Pocket Lab Kit Manual in terms of Design.

The level of Features of the STEM Pocket Lab Kit Manual in terms of Design is Very High (WM = 4.30), indicating that most students strongly agree that the manual is understandable, aesthetically pleasing, and supplemented by useful diagrams and pictures that improve comprehension. Maintaining interest through design (M=4.04), which was still interpreted as Agree, had the lowest mean, while the inclusion of illustrations and diagrams that aid understanding had the highest mean, followed by readable font size and format and support for effective learning. The responses show a favorable view overall, with comparatively little variation across markers.

In summary, the findings indicate that a visually appealing and well-designed handbook improves understanding, increases student engagement, and facilitates successful learning by making information more easily available and understandable.

Level of Students' Progress in Science

In this study Students' Progress in Science include work habits, work skills, and social skills.

The following table presents the Students' Progress in Science, which include work habits, work skills, and social skills.

Table 9 displays the level of Students' Progress in Science in terms of Work Habits.

Table 9. Level of Students' Work Progress in terms of Work Habits

Statement	Mean	SD	Descriptive Equivalent
As a student, using STEM Pocket Lab Kit Manual...			
...helps me manage my time during science activities.	4.13	0.73	Often
...made me more responsible when completing science tasks.	4.32	0.61	Always
...encourages me to finish activities on time.	4.34	0.73	Always
...develop in me the discipline in following procedures.	4.32	0.73	Always
...improves my focus during science lessons.	4.16	0.65	Often
Weighted Mean		4.25	
SD		0.69	
Verbal Interpretation			Very High

The level of Students' Work Progress in Science in terms of Work Habits is Very High (WM = 4.25), indicating that while using the manual to engage in science activities, kids exhibit good accountability, discipline, and time management. Encouraging students to complete tasks on time had the greatest mean (M=4.34) and helping them manage their time during science activities had the lowest mean (M=4.13), both of which nevertheless show positive results with comments ranging from Often to Always. Overall, the findings demonstrate a steady increase in students' work habits with comparatively little variance across measures.

In summary, the findings indicate that using the STEM Pocket Lab Kit Manual helps students establish excellent work habits in science learning by encouraging responsibility, discipline, and task completion.

Table 10. Level of Students' Work Progress in terms of Work Skills

Statement	Mean	SD	Descriptive Equivalent
As a student, using STEM Pocket Lab Kit Manual...			
...helps me work efficiently during activities.	4.32	0.57	Always
...made me more confident in performing science tasks.	4.20	0.70	Always
...improves my ability to follow instructions.	4.32	0.74	Always
...develops in me the accuracy in completing experiments.	4.33	0.61	Always
...helps me work independently.	4.37	0.72	Always
Weighted Mean		4.30	
SD		0.67	
Verbal Interpretation			Very High

Table 10 displays the level of Students' Work Progress in Science in terms of Work Skills.

The level of Students' Work Progress in Science in terms of Work Skills is Very High (WM = 4.30), indicating that when completing science assignments, students exhibit high levels of effectiveness, confidence, correctness, and independence. While all indicators were consistently scored as

Always, the highest mean was found in assisting students in working independently (M=4.37), followed by improving accuracy in finishing experiments, and the lowest mean was found in boosting confidence in completing science activities. Overall, there is little change in the responses across items, indicating consistently high perceptions.

In summary, the findings indicate that the STEM Pocket Lab Kit Manual raises students' accuracy and efficiency in completing science-related tasks, encourages independent work, and effectively improves their practical skills.

Table 11. Level of Students' Work Progress in terms of Social Skills

Statement	Mean	SD	Descriptive Equivalent
As a student, using STEM Pocket Lab Kit Manual...			
...encourages teamwork during activities.	4.50	0.64	Always
...develop in me better communication with my classmates during experiments.	4.61	0.51	Always
...provide me the activities that promote cooperation and collaboration.	4.52	0.73	Always
...teach me to respect others' ideas while working in groups.	4.49	0.65	Always
...helps improve my leadership and participation skills.	4.49	0.62	Always
Weighted Mean		4.52	
SD		0.63	
Verbal Interpretation			Very High

Table 11 displays the level of Students' Work Progress in Science in terms of Social Skills.

The level of Students' Work Progress in Science in terms of Social Skills is Very High (WM = 4.52), indicating that during science activities, students regularly exhibit excellent leadership, cooperation, teamwork, communication, and respect for the opinions of others. Improving communication with peers during experiments had the highest mean (M=4.61), followed by encouraging cooperation and collaboration. The remaining indicators also obtained comparably high values, all of which were interpreted as Always. Overall, there is very little diversity in the responses across indicators.

In summary, the findings indicate that the STEM Pocket Lab Kit Manual successfully fosters collaborative learning settings that improve students' interpersonal, leadership, teamwork, and communication abilities.

Level of Students' Skills in Science

In this study Students' Skills in Science include Electronics and Automation, Engineering Design and Development, and Laboratory Technique.

The following table presents the Students' Skills in Science, which includes Electronics and Automation, Engineering Design and Development, and Laboratory Techniques.

Table 12 displays the level of Students' Skills in Science in terms of Electronics and Automation.

The level of Students' Skills in Science in terms of electronics and Automation is Outstanding as shown by the weighted mean score of 22.91 with a standard deviation of 1.78, indicating that students have demonstrated excellent

proficiency and understanding of concepts related to electronics and automation. The majority of the students, 75 or 81.52%, obtained scores ranging from 21–25, which is interpreted as Outstanding. Meanwhile, 17 students or 18.48% fell within the 16–20 range, described as Very Satisfactory. No students were recorded under the Satisfactory, Fair, or Needs Improvement categories.

Table 12. Level of Students' Skills in Science in terms of Electronics and Automation

Raw Score	Frequency (f)	Percentage (%)	Descriptive Equivalent
21 – 25	75	81.52	Outstanding
16 – 20	17	18.48	Very Satisfactory
11 – 15	0	0	Satisfactory
6 – 10	0	0	Fair
1 – 5	0	0	Needs Improvement
	92	100	

Weighted Mean Score	22.91
SD	1.78
Verbal Interpretation	Outstanding

Students were evaluated on their correctness in circuit design, comprehension of components, wiring and organization, testing and debugging, and safety and handling using the Performance Task 1 rubric. These standards made sure that students were assessed on their conceptual comprehension, technical proficiency, methodical problem-solving, and adherence to safety procedures in addition to the accuracy of their work. The high ratings indicate that students were able to put together working circuits, describe parts, arrange wire correctly, test and debug efficiently, and adhere to safety protocols.

The weighted mean score of 22.91 with a standard deviation of 1.78 indicates that the level of Students' Skills in Science in terms of Electronics and Automation is Outstanding. This implies that students have demonstrated excellent proficiency and understanding of concepts related to electronics and automation, as reflected in their high scores. In the summary, the findings indicate that the majority of students have demonstrated consistency in performance and have mastered the necessary competencies. Their excellent performance was probably influenced by their participation in practical, technology-based activities, which allowed them to apply concepts successfully and cultivate higher-order thinking abilities that are crucial for learning science.

Table 13 displays the level of Students' Skills in Science in terms of Engineering Design and Development.

Table 13. Level of Students' Skills in Science in terms of Engineering Design and Development

Raw Score	Frequency (f)	Percentage (%)	Descriptive Equivalent
21 – 25	86	93.48	Outstanding
16 – 20	6	6.52	Very Satisfactory
11 – 15	0	0	Satisfactory
6 – 10	0	0	Fair
1 – 5	0	0	Needs Improvement
	92	100	

Weighted Mean Score	23.34
SD	1.54
Verbal Interpretation	Outstanding

The level of Students' Skills in Science in terms of Engineering Design and Development is Outstanding as shown by the weighted mean score of 23.34 with a standard deviation of 1.54, indicating that students demonstrate excellent ability in designing, planning, and developing solutions to scientific and engineering problems. The majority of the students, 86 or 93.48%, obtained scores ranging from 21–25, which is interpreted as Outstanding. Meanwhile, 6 students or 6.52% fell within the 16–20 range, described as Very Satisfactory. No students were recorded under the Satisfactory, Fair, or Needs Improvement categories.

Students were evaluated on structural design and stability, innovation and design concept, construction precision, cooperation and collaboration, documentation and explanation, and other criteria using a rubric for Performance Task 2: Engineering Design and Development. The technical and collaborative components of the students' engineering outputs were both thoroughly measured by this rubric. Each criterion represented fundamental engineering design skills, such as the capacity to build reliable structures, use creativity in design solutions, produce precise outputs, collaborate well with others, and clearly express procedures and outcomes.

In summary, the large concentration of scores in the Outstanding category further indicates that students have successfully acquired the engineering design competencies. Strong critical thinking, creativity, and problem-solving abilities are demonstrated in their performance, all of which are crucial for creating novel and useful solutions in science and technology.

Table 14. Level of Students' Skills in Science in terms of Laboratory Techniques

Raw Score	Frequency (f)	Percentage (%)	Descriptive Equivalent
21 – 25	86	93.48	Outstanding
16 – 20	6	6.52	Very Satisfactory
11 – 15	0	0	Satisfactory
6 – 10	0	0	Fair
1 – 5	0	0	Needs Improvement
	92	100	

Weighted Mean Score	23.03
SD	1.74
Verbal Interpretation	Outstanding

Table 14 displays the level of Students' Skills in Science in terms of Laboratory Techniques.

The level of Students' Skills in Science in terms of Laboratory Techniques is Outstanding as shown by the weighted mean score of 23.03 with a standard deviation of 1.74, indicating that students exhibit excellent proficiency in performing laboratory procedures, handling equipment, and applying proper scientific techniques during experiments. The majority of the students, 86 or 93.48%, obtained scores ranging from 21–25, which is interpreted as Outstanding. Meanwhile, 6 students or 6.52% fell within the 16–20 range, described as Very Satisfactory. No students were recorded under the Satisfactory, Fair, or Needs Improvement categories. Students' proficiency in procedure correctness, observation and data collection, result interpretation, safety and hygiene, and professionalism was assessed using a rubric for

Performance Task 3: Laboratory Techniques. This rubric offered a methodical and thorough evaluation of students' laboratory proficiency, emphasizing not only their technical proficiency but also their scientific conduct and work ethics during laboratory exercises.

In summary, the findings imply that students have improved their accuracy and practical skills in carrying out laboratory tasks. Their excellent performance demonstrates their capacity to adhere to protocols, pay close attention to details, and successfully interpret findings—all of which are critical skills in scientific research and experimentation.

Significant Relationship Between the Components and Features of the STEM Pocket Lab Kit Manual and Students' Work Progress in Science

In this study, the level of Components of the STEM Pocket Lab Kit Manual in terms of Objectives; Content; Materials; Activities; and Instructions while the Level of Features of the STEM Pocket Lab Kit Manual refers to Relevance; Organization; and Design. Meanwhile, the Students' Work Progress in Science refers to Work Habits, Work Skills, and Social Skills.

Table 15. Significant Relationship Between the Components and Features of the STEM Pocket Lab Kit Manual and Students' Work Progress in Science

Components and Features of the STEM Pocket Lab Kit Manual		Students' Work Progress in Science		
		Work Habits	Work Skills	Social Skills
Objectives	Pearson Correlation	0.317*	0.386*	0.279*
	Sig. (2-tailed)	0.002	0.000	0.007
	N	92	92	92
Concept	Pearson Correlation	0.038*	0.294*	0.038
	Sig. (2-tailed)	0.718	0.004	0.718
	N	92	92	92
Materials	Pearson Correlation	0.357*	0.494*	0.241*
	Sig. (2-tailed)	0.000	0.000	0.021
	N	92	92	92
Activities	Pearson Correlation	0.461*	0.415*	0.284*
	Sig. (2-tailed)	0.000	0.000	0.006
	N	92	92	92
Instructions	Pearson Correlation	0.438*	0.368*	0.169*
	Sig. (2-tailed)	0.000	0.000	0.106
	N	92	92	92
Relevance	Pearson Correlation	0.361*	0.314*	0.329*
	Sig. (2-tailed)	0.000	0.002	0.001
	N	92	92	92
Organization	Pearson Correlation	0.164	0.310*	0.236*
	Sig. (2-tailed)	0.119	0.003	0.024
	N	92	92	92
Design	Pearson Correlation	0.348*	0.218*	0.294*
	Sig. (2-tailed)	0.001	0.037	0.004
	N	92	92	92

The significant relationship between the Components and Features of the STEM Pocket Lab Kit Manual and the Students' Work Progress in Science is revealed in the following table, which shows the Multiple Regression

Analysis using Pearson Product Moment Correlation Coefficient or Pearson-r.

The Table 15 shows the Significant Relationship between the Components and Features of the STEM Pocket Lab Kit Manual and the Students' Work Progress in Science.

The findings reveal that most components and features of the STEM Pocket Lab Kit Manual show significant positive relationships with students' progress in science. Objectives, materials, activities, relevance, and design all demonstrated significant correlations with work habits, work skills, and social skills ($p < 0.05$), indicating that improvements in these components are associated with better student progress. Notably, activities ($r = 0.461$) and materials ($r = 0.357$) showed moderate correlations with work habits, while materials ($r = 0.494$) had the strongest correlation with work skills, indicating that hands-on and resource-supported learning strongly influence students' performance. Instructions also showed significant relationships with work habits ($r = 0.438$) and work skills ($r = 0.368$), although its relationship with social skills was not significant ($p = 0.106$). Similarly, organization showed a significant relationship with work skills ($r = 0.310$) and social skills ($r = 0.236$) but not with work habits ($p = 0.119$). Concept, on the other hand, showed a significant relationship only with work skills ($r = 0.294$), indicating its more direct influence on procedural and technical competence rather than behavioral aspects.

In summary, the results indicate that the components and features of the STEM Pocket Lab Kit Manual collectively contribute to enhancing students' work habits, work skills, and social skills, with certain components showing stronger influences on specific areas of student progress.

The finding is corroborated John Hattie (2017), who asserted that well-structured content and visible learning techniques have a major impact on students' engagement and collaborative learning. Additionally, these approaches make learning goals and success criteria clearer, enabling students to monitor their own progress more effectively.

Significant Effect Between the Components and Features of the STEM Pocket Lab Kit Manual and Students' Skills in Science

In this study, the level of Components of the STEM Pocket Lab Kit Manual in terms of Objectives; Content; Materials; Activities; and Instructions while the Level of Features of the STEM Pocket Lab Kit Manual refers to Relevance; Organization; and Design. Meanwhile, the Students' Skills in Science refers to Electronics and Automation; Engineering Design and Development; and Laboratory Techniques.

The Significant Effect Between the Components and Features of the STEM Pocket Lab Kit Manual on the Students' Skills in Science is revealed in the following table, which shows the Multiple Regression Analysis using t-Test, with the computed t-value (t-cal), p-value, number of observations or respondents, and critical t-value (t-crit) or constant.

Table 16 presents the significant effect between the Features of the STEM Pocket Lab Kit Manual and Students' Skills in Science.

The findings reveal that most components and features of the STEM Pocket Lab Kit Manual do not have a significant effect on students' work skills, as indicated by p-values greater than 0.05 across most variables. However, certain components show significant effects in specific areas.

Table 16. Significant Effect Between the Components and Features of the STEM Pocket Lab Kit Manual and Students' Skills in Science

Components and Features of the STEM Pocket Lab Kit Manual		Students' Skills in Science		
		Electronics and Automation	Engineering Design and Development	Laboratory and Techniques
Objectives	t-value	2.482*	0.955	0.955
	Sig. (2-tailed)	0.015	0.342	0.342
	N	92	92	92
Content	t-value	-0.538	0.371	2.863*
	Sig. (2-tailed)	0.592	0.711	0.005
	N	92	92	92
Tools and Materials	t-value	-0.673	-0.606	2.145*
	Sig. (2-tailed)	0.503	0.546	0.035
	N	92	92	92
Activities	t-value	0.183	-0.933	1.437
	Sig. (2-tailed)	0.855	0.353	0.154
	N	92	92	92
Instructions	t-value	1.270	-0.317	0.099
	Sig. (2-tailed)	0.207	0.752	0.921
	N	92	92	92
Relevance	t-value	-0.101	1.168	2.507*
	Sig. (2-tailed)	0.920	0.246	0.014
	N	92	92	92
Organization	t-value	0.714	-0.731	0.246
	Sig. (2-tailed)	0.477	0.466	0.806
	N	92	92	92
Design	t-value	1.459	0.997	1.414
	Sig. (2-tailed)	0.148	0.321	0.161
	N	92	92	92

Objectives have a significant effect on Electronics and Automation ($t = 2.482, p = 0.015$), indicating that clearly stated objectives contribute to the development of students' technical work skills in electronics-related tasks. Content shows a significant effect on Laboratory Techniques ($t = 2.863, p = 0.005$), indicating that well-developed content supports students' procedural accuracy and laboratory performance. Materials also show a significant effect on Laboratory Techniques ($t = 2.145, p = 0.035$), highlighting the importance of appropriate and accessible tools in performing experiments effectively. Relevance demonstrates a significant effect on Laboratory Techniques ($t = 2.507, p = 0.014$), indicating that real-world connections enhance students' ability to apply skills in laboratory settings. In contrast, Activities, Instructions, Organization, and Design did not show significant effects on any of the three work skill areas, as their p-values exceeded 0.05.

In summary, the results indicate that while most components of the STEM Pocket Lab Kit Manual do not significantly affect students' skills in science, specific elements such as objectives, content, materials, and relevance

play a meaningful role in enhancing particular aspects of students' performance, especially in Electronics and Automation and Laboratory Techniques.

Overall, the study's findings demonstrate that the STEM Pocket Lab Kit Manual's components and features greatly aid in the growth of students' skills in science. While tools and materials exhibit selective influence and objectives offer fundamental guidance, concept, activities, and instructions consistently show strong significant effects across all skill areas. As a result, integrating these elements is crucial to improving students' proficiency in engineering design, electronics, and lab methods.

IV. CONCLUSION AND RECOMMENDATIONS

The components and features of the STEM Pocket Lab Kit Manual showed a significant relationship on students' work progress in science. Therefore, it was concluded that the null hypothesis was rejected. This indicates that integrating objectives, tools and materials, activities, instructions, and concept enhances students' progress, particularly in developing social skills, followed by work habits and work skills.

The components and features of the STEM Pocket Lab Kit Manual showed an insignificant effect on students' skills in science. Hence, the null hypothesis was accepted. This suggests that the observed relationship between the manual's components and features and students' competencies in Electronics and Automation, Engineering Design and Development, and Laboratory Techniques is not statistically significant.

In the formulated conclusions from the findings, it was recommended that:

School administrators may support the development and implementation of well-designed, relevant, and organized instructional materials like the STEM Pocket Lab Kit Manual. This will ensure improved teaching strategies and better learning outcomes among students in science.

Science teachers who are teaching STEM students can incorporate the STEM Pocket Lab Kit Manual into their lesson. Through interesting and cooperative activities, they can improve students' progress in science, especially in terms of social skills, work habits, and work skills.

Students may actively utilize the STEM Pocket Lab Kit Manual during science activities and experiments. This will help them improve their participation, teamwork, and overall science skills in areas such as electronics, engineering design, and laboratory techniques.

Future researchers may conduct further studies on the use of STEM-based instructional materials and manuals. This will help validate and expand the findings, particularly on how components and features of such materials influence students' progress and science skills across different learning contexts.

REFERENCE

[1]. Hattie, J. (2017). Visible Learning for Mathematics. Corwin Press. <https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/>