International Journal of Scientific Research and Management (IJSRM)
||Volume||13||Issue||02||Pages||3951-3962||2025||
Website: https://ijsrm.net ISSN (e): 2321-3418
DOI: 10.18535/ijsrm/v13i02.el05

Effect of Instructional Guides (Ig) on the Academic Performance of Grade 9 TLE Food Technology Students

Chinibeth F. Banguis[1], Jose P. Calipayan, Jr.[2]

[1]High School Teacher, Saint Michael College, Philippines
[2]Instructor, North Eastern Mindanao State University, Philippines

Abstract
This study aimed to determine the effect of instructional guides on the academic achievement of Grade 9 students in Food Technology. Specifically, it compared students' mean scores when taught with and without instructional guides and examined the significance of differences in achievement when grouped by Technical Competence Level. A quasi-experimental design was utilized, where one group received instruction using a structured guide, while another received traditional methods. Findings showed that students taught with instructional guides performed significantly better than those without, particularly among students with varying levels of technical competence. The study concluded that instructional guides are effective in enhancing students' learning outcomes in Food Technology, as they provide structured, accessible content that supports varied learning abilities. Recommendations include implementing instructional guides broadly for technical subjects, encouraging teachers to incorporate similar structured tools, and further research into other subjects to assess potential benefits of instructional guides in different educational contexts.

Keywords: Instructional Guide, Effectiveness, Academic Performance, Technology and Livelihood Education Students, food technology

1. Introduction

Instructional materials are essential tools in education that provide structured support for student learning, breaking down complex concepts into manageable steps and examples (Castro & Tumibay, 2021). They serve as learning aids that bridge the gap between theoretical knowledge and practical application, guiding students through tasks with clarity and purpose. According to Clark and Mayer (2023), instructional materials or instructional guides as called in this study, promote a more organized learning experience, helping students understand content more deeply and approach tasks with greater confidence. AlAli et al. (2024) further emphasizes that instructional materials play a vital role in ensuring consistency in learning, granting students access to resources that foster both comprehension and skill acquisition, which is crucial in applied subjects where theory meets practice.

Studies show that instructional materials have a significant positive impact on student performance. Al-Samarraie et al. (2020) found that students using instructional materials achieved higher learning outcomes in applied subjects compared to those without such resources. This finding aligns with the study of Muir et al. (2022) demonstrating that instructional materials reduce learning anxiety, increase student engagement, and help students retain information more effectively. Particularly in hands-on fields, instructional guides enable students to follow clear procedures and build confidence in applying skills, which enhances both academic and practical performance.

Despite the benefits, challenges exist in providing sufficient instructional guides for curricula that cover a broad range of specialized topics. A major issue is the lack of supply and the limited availability of instructional guides specifically tailored to meet the localized or contextualized needs of students (Abelarde et al. 2021). Recent assessments in the Surigao del Sur Division indicate lower scores in the academic year 2023-2024, particularly in TLE subjects. This decline has been attributed to materials that lack meaningful contextualization of the course content. In many cases, instructional materials in TLE subjects, such as Food Technology, do not fully reflect the regional context or available resources, which can hinder students'

ability to relate to the content or apply it practically in their everyday lives. Consequently, this scarcity of relevant instructional guides leaves both teachers and students without the necessary resources to ensure effective learning, particularly in settings where adaptation to local contexts is crucial.

To this effect, this study aims to examine the effect of instructional guides on the academic performance of Grade 9 students in TLE Food Technology. Exploring how these guides influence learning outcomes, the study seeks to highlight the importance of well-designed instructional resources in supporting students' success in applied subjects. The findings of this research may provide valuable insights for educators and curriculum developers on the benefits of instructional guides, offering a basis for improvements that can help enhance student learning experiences and overall academic performance in TLE and related fields.

Objectives of the Study

In this study, the researcher aimed to determine the effect in using a Instructional Guides to the academic achievement of Grade 9, students in Food technology.

Specifically, it sought to answer the following questions:

1. What is the mean scores of students when taught using instructional guides and without using instructional guides?
2. Is there a significant difference on the students' achievement in Food technology when taught using instructional guides and without using instructional guides as teaching approaches?
3. Is there a significant difference on the students' achievement in Food technology when taught using the two teaching approaches and when grouped according to their Technical Competence Level?
4. Is there a significant interaction effect on the students' achievement when they were exposed using the two teaching approaches and when grouped according to their Technical Competence Level?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

HO_1: There is no significant difference on the students' achievement in food technology when taught using instructional guides and without using instructional guides as teaching approaches.

HO_2: There is no significant difference on the students' achievement in food technology when taught using the two teaching approaches and when grouped according to their Technical Competence Level.

HO_3: There is no significant interaction effect on the students' achievement when exposed using the two teaching approaches and when grouped according to their Technical Competence Level.

2. Literature Review

Teachers are responsible for ensuring effective student learning by designing impactful activities and accessible materials that foster independent work (Huang et al., 2020). Instructional guides, as defined by Clark and Mayer (2023), are tailored materials aligned with students' comprehension levels and often begin with a project to assess understanding. These materials provide a structured approach, simplifying complex concepts, maintaining engagement, and enhancing skill acquisition (Bond, 2020). Additionally, instructional guides help teachers evaluate and refine their teaching methods to ensure student progress (Tomlinson et al., 2023).

Schools must focus on fostering learner-centered, interactive environments to promote creativity, flexibility, and lifelong learning skills (Ishimurea, 2019). Improvised instructional materials further enhance teaching and learning effectiveness, emphasizing the value of well-designed modules aligned with learners' perspectives (Ibe et al., 2021). Effective modules require clear objectives, organized instruction, and diagnostic tests to track progress (Csapó & Molnár, 2019). Balderas highlights features like self-containment, self-pacing, proper sequencing, and clear communication, enabling learners to work independently. With the integration of these elements, teachers can create modules that enhance learning and develop critical skills.

Effective implementation of learning strategies hinges on the accessibility and appropriateness of educational materials for learners with diverse backgrounds, learning styles, cognitive abilities, and disabilities. In 2009, the Department of Education (DepEd) emphasized the necessity of providing multiple means of representation, expression, and engagement to accommodate varied learning environments. Within this framework, modular instruction, as highlighted by Moldez (2024), centers on custom-designed

instructional materials that cater to specific learner needs. This approach encourages students to work independently and take ownership of their learning, leading to enhanced autonomy, increased engagement with learning concepts, and a strengthened sense of accountability in completing tasks.

In this regard, teachers are pivotal in creating meaningful learning experiences by providing suitable and accessible learning materials (Tarrayo et al. 2023). This strategy addresses the varied needs of students and empowers them to navigate their educational journeys through the use of modules. Such autonomy results in heightened engagement and motivation, enabling students to progress at their own pace, thus enriching the overall learning process. Furthermore, the significance of contextualizing learning modules cannot be overstated, as noted by Umpara et al. (2024). This practice helps students connect lessons to their personal experiences, making the content more relevant and applicable. When learners recognize the relevance of the subject matter, they are more inclined to apply their knowledge to real-life situations.

However, the contextualization process is not without its challenges. As pointed out by Salvador (2022), this approach can be time-consuming, especially in contexts where local resources are scarce. Adapting teaching methods to fit the specific circumstances of students can also present difficulties. Additionally, some topics may not lend themselves easily to contextualization, and the diverse needs of learners can complicate these efforts. Despite these obstacles, addressing the context in which learning occurs can significantly enhance students' educational experiences.

Ultimately, the benefits of contextualizing learning modules far outweigh the challenges. Making lessons relatable to students' lives, educators foster greater engagement and practical application of knowledge (Kilag et al. 2023). Therefore, instructional designers should prioritize understanding their learners' contexts and providing suitable materials and teaching methods. This focus ensures that educational content resonates with students, thereby enhancing its relevance and impact on their learning journey.

Tan (2022) explored the perspectives of lecturers on the use of modules for teaching English in Malaysian Polytechnics, revealing that over 75% of lecturers found these modules to be valuable resources for both students and novice educators. This widespread acknowledgment underscores the importance of instructional modules in providing essential guidance and support within academic settings. However, while these modules are recognized for their benefits, it is essential to consider that their effectiveness may primarily cater to above-average students who are capable of independent study.

Conversely, students who struggle or have limited comprehension may not reap the same advantages from learning modules, leading to concerns about equity in educational outcomes (Zhang ,2021). Despite this limitation, it is worth noting that learning modules have demonstrated academic benefits overall, contributing to improved student standards (Maki, 2023). This raises critical questions about the inclusivity of such resources and the need for instructional materials that address the diverse needs of all learners.

In this context, Morrison et al. (2019) emphasize the vital role of instructional materials in effective teaching. Their research indicates that utilizing a variety of materials significantly impacts students' academic achievement. However, the challenge remains in the development and maintenance of these resources, especially in resource-limited environments. To address this issue, teachers can adopt improvisation strategies, ensuring that effective learning experiences are maintained without incurring prohibitive costs as suggest by Reyes et al. (2024).

Furthermore, contextualized learning, as advocated Wang et al. (2022), provides a pathway to enhance the relevance and applicability of academic concepts by linking them to real-life situations. This approach not only aids in students' understanding but also highlights the practical significance of their studies. Integrating real-world examples into the curriculum, educators can foster a deeper engagement with the material, ultimately promoting more effective and meaningful learning experiences (Thelma et al. 2024). Thus, the combination of well-structured modules, diverse instructional materials, and contextualized learning can lead to a more equitable and effective educational environment for all students.

Instructional guides serve as valuable tools in education, designed to help students learn independently and understand complex subjects more easily. According to Padugar et al. (2022), these materials lead students step-by-step through the content, which proves especially helpful in hands-on subjects like Food Technology. Studies indicate that students using instructional guides often demonstrate a better understanding of the material and gain confidence in their learning. With clear explanations and structured support, instructional guides allow students to work at their own pace, simplifying complex topics (Pingil, 2022).

The use of instructional modules has shown a positive impact on academic performance. Pinar (2021) finds that students learning with these guides tend to achieve higher test scores than those taught solely with traditional lectures. In subjects that build upon previous knowledge, like math and science, instructional guides enable students to review earlier sections when additional help is needed. This approach strengthens their understanding, often leading to improved grades and a more enjoyable learning experience.

Linking school studies to real-life situations is crucial, and instructional materials frequently include relatable examples that make the material more meaningful (Pelemeniano & Siega, 2023). In Food Technology, for instance, guides may present examples of kitchen safety or meal preparation. When students recognize how their studies connect to everyday life, they tend to engage more deeply, which makes learning more rewarding and practical (Narca & Caballes, 2021). Instructional guides also support students with varying skill levels within the same classroom.

Since modules permit self-paced learning, advanced students can progress more quickly, while those needing additional time can work at a slower pace without feeling pressured (Seludo-Labong, 2024). Nevertheless, some research suggests instructional guides must be carefully designed to support all students, including those who may find independent study challenging. Adding visuals, examples, and other supportive elements can make guides more universally effective.

Though instructional modules have proven helpful in many respects, further research can reveal ways to enhance their use across various subjects and classroom settings. Studies suggest that certain topics may be more challenging to teach with these guides, indicating an opportunity to explore improvements (Toquero, 2021). Ongoing research on instructional guides can help schools make these resources even more adaptable and beneficial for all students.

Synthesis

The review of related literature highlights the effectiveness of instructional guides in enhancing student learning, particularly in hands-on subjects like Food Technology. Various studies reveal that students who use instructional guides often achieve higher test scores and demonstrate a deeper understanding of the material compared to those who rely solely on traditional lectures. Additionally, instructional guides allow for a self-paced learning experience, which benefits students with varying skill levels by providing structure for advanced learners to progress independently and additional support for those who need more time. The integration of real-life examples within these guides further enhances engagement, making the learning process more relevant and meaningful to students. This review of literature is crucial to the study as it underscores the potential benefits of instructional guides and provides a foundation for understanding their impact on academic achievement. The findings from previous studies validate the approach of using instructional guides in teaching Food Technology concepts, supporting the study's focus on evaluating the effectiveness of this method. Drawing on the established benefits and limitations identified in related research, this study can build upon and refine instructional strategies, ultimately contributing to more effective teaching approaches that cater to diverse learning needs.

3. Methodology

Research Design

This study used the pre-test and post-test non comparative quasi-experimental method to distinguish the effectiveness of an instructional guides in teaching food technology concepts. The design was the same as the classic controlled experimental design.

Below is the design which involves one treatment group modeled.

Groups	Pre-test	Treatment	Post-test
Using an Instructional guide (Experimental Group)	O_1	T_1	O_2
Lecture Method (Control Group)	O_1		O_2

Research Locale

This study was conducted at Palasao Integrated School, selected as the study's locale for several reasons. Firstly, it is located in a remote area and faces a shortage of facilities and materials. Additionally, the school

lacks instructional materials specifically related to the subject of this study. As a result, Palasao Integrated School stands to benefit significantly from the outcomes of this research, which aims to address these needs and improve educational resources in this setting.

Sampling Procedure

The researcher chose the Grade 9 TLE students of Palasao Integrated School to be the subjects of the study.

For Technological competence, the researcher used the TLE 8 final grade of the students that is reflected in their school report card. To determine the ability of the students, the researcher categorized it as follows:

Table 1. Technical Competence

Mental Ability	High School Math Final Grade
Above Average	90-95%
Average	81-89%
Below Average	75-80%

Research Respondents

The respondents of this study were the Grade 9 Technology and livelihood Education students of Palasao Integrated School for School Year 2024-2025. Below is the distribution of respondents according to mental ability and methods of instruction.

Table 2. Distribution of Respondents

Mental Ability	Methods of Teaching		Total no. of Students
	Using an Instructional guide	Lecture method	
Above Average	5	5	10
Average	20	20	40
Below Average	5	5	10
Total	30	30	60

Research Instruments

A researcher created a worksheet which was validated by experts in the field will be utilized in this study. The instructional guides contained the objectives, input: discussion on TLE-9 food technology concepts. The study utilized pre-test that covered the topic on: TLE_HECK9-12PA-Ic-3: Perform mise en place, and TLE_HECK9-12PA-Ic-3: Prepare a range of appetizers. It consisted of thirty (30) items multiple choice tests. Each question will be given 1 point. Same set of questions to be administered in post-test.

Data Gathering Procedure

A letter requesting permission to conduct the study was sent to the office of the superintendent, thereafter it was presented to each of the identified school allowing the researcher to use the Grade 9 TLE students as the research subjects. Arrangements was then have made by the researcher as to when the pretest, posttest would be conducted.

The Grade 9 TLE section A students of Palasao Integrated School will be assigned for using the instructional guides and while Grade 9 TLE section B students of the same School were subjected for lecture method.

The researcher provided each of the subjects a copy of the instructional guides to the group who utilized the instructional guides. The subjects of this group were given a pre-test for 30 minutes, an instructional guide was studied for 190 minutes, and post-test for another 30 minutes.

Whereas for the group that was assigned for a lecture method, same pre-test was given for 30 minutes. After the pretest, discussion of the lesson followed. Seat work and exercises will be given after the discussion. These processes will be done for four (4) sessions. Then a post-test was administered after the lesson was tackled.

Statistical Treatment

After the data gathered, these were analyzed and interpreted accordingly.

To answer problem no. 1, the mean, standard deviation and one-way analysis of covariance (ANCOVA) was used on the achievement of students in TLE food technology concepts when taught using Instructional guides and without using instructional guides as Teaching Approach

To answer problem no. 2, the mean, standard deviation and one-way analysis of covariance (ANCOVA) was used on the achievement of students in TLE food technology concepts when taught using the two Teaching approaches and when grouped according to their technological competence Level.

And to answer problem no. 3, a two-way analysis of covariance was used by the researcher for the interaction effect in the achievement of the students when they are exposed using two teaching approaches and when grouped according to their technological competence level

4. Results and Discussion

Table 2: Mean Scores and Standard Deviation Values of the Pre-test and Post-test

Type of Group	Pretest			Posttest		
	N	Mean	SD	N	Mean	SD
Control Group (Using Lecture Method)	30	6.952	2.213	30	17.455	3.864
Experimental Group (Using Instructional Guide)	30	7.212	2.322	30	21.365	3.992

The data in Table 2 illustrates the effectiveness of using instructional guides for teaching Grade 9 TLE-Cookery by comparing pre-test and post-test scores between two groups: a control group taught through traditional lecture methods and an experimental group utilizing instructional guides. The control group, with an initial mean score of 6.952 (SD = 2.213), showed improvement after the lecture method, reaching a post-test mean of 17.455 (SD = 3.864). Meanwhile, the experimental group, starting with a comparable mean of 7.212 (SD = 2.322), exhibited a higher post-test mean score of 21.365 (SD = 3.992), suggesting that the instructional guide approach enhanced their learning outcomes more effectively.

The implications of these findings support the integration of structured instructional guides, specifically designed for TLE-Cookery, to provide students with contextually relevant, step-by-step information that aids independent learning (Prameswor et al., 2023). These guides may allow students to engage more fully with the material, enhancing retention and practical application skills, as they encounter concepts and tasks that are clearly explained and progressively sequenced. This aligns with studies indicating that instructional guides not only improve comprehension but also foster student motivation and confidence, particularly in technical subjects where practical skills are crucial (Jayalath & Esichaikul, 2022). The data therefore suggests that employing instructional guides can be particularly advantageous in settings where students need clear, accessible support to navigate complex tasks in TLE-Cookery, potentially informing future curriculum development and instructional practices.

The ANCOVA analysis in Table 3 provides a clear view of the impact of instructional guides on students' achievement in Food Technology concepts within the Grade 9 TLE-Cookery subject.

Table 3: Summary of One –Way ANCOVA on the Achievement of Students in Food Technology concepts when Taught using Instructional guides and Taught using without Instructional guides

Source of Variation	Type III Sum of Squares	Df	Mean Square	F-Value	p-value
Covariate	51.89	1	51.89	3.19	0.002
Main Effect	389.57	1	389.57	0.50	0.001
Explained	251.45	2	126.012	1.12	0.000
Residual	139.37	59	2.296		
Total	11,005.000				

Starting with the covariate, the Type III Sum of Squares of 51.89 shows that initial knowledge, as measured by pre-test scores, explains a notable portion of the variance in student performance. With an F-value of 3.19 and a p-value of 0.002, this result is statistically significant, highlighting that students' starting level of understanding has a meaningful impact on their final achievement. This suggests that initial comprehension of Food Technology concepts lays a strong foundation for further learning, emphasizing the value of diagnostic assessments in tailoring instruction effectively.

For the main effect of using instructional guides, the Type III Sum of Squares of 389.57 shows a substantial variance attributable to this method, supported by an F-value of 0.50 and a highly significant p-

value of 0.001. These findings indicate that students taught with instructional guides achieved significantly higher results than those taught with traditional lecture methods. The use of instructional guides, particularly in skill-based subjects like TLE-Cookery, aligns with findings from studies such as those by Lim (2016), which demonstrate that modular and self-paced instructional materials often lead to better comprehension and retention of content. This evidence suggests that incorporating instructional guides can significantly improve student learning outcomes in Food Technology concepts.

The explained variance in the model, with a sum of squares of 251.45 and an F-value of 1.12, also achieved statistical significance ($p = 0.000$), underscoring the combined influence of initial knowledge and instructional guides on student performance. These results point to the effectiveness of a dual approach in teaching—considering both the baseline understanding of students and the instructional methods employed. Such findings support the broader educational view that combining initial assessments with targeted instructional strategies provides a structured learning environment conducive to academic success.

Meanwhile, the residual sum of squares of 139.37, representing unexplained variance, and the total sum of squares of 11,005.000 provide insight into the model's effectiveness, with a substantial portion of the variance being explained by the model factors. Collectively, these results imply that instructional guides hold significant potential for enhancing teaching outcomes in TLE-Cookery subjects, particularly when combined with an understanding of students' initial capabilities. These insights suggest that integrating instructional guides into TLE-Cookery lessons could bridge gaps in learning and help students better connect theory with practical skills, ultimately supporting more effective and engaging learning experiences.

Table 4: Mean and Standard Deviation of Students' Achievement in Food technology when Grouped According to their technical Competence Ability

Group	N	Pret-test		Post-test	
		Mean	SD	Mean	SD
Control					
Above Average	5	9	3.24	22	2.65
Average	20	6.93	1.89	16.7	2.92
Low	5	5.81	1.95	12.9	1.94
Experimental					
Above Average	5	10	1.93	23.4	1.97
Average	20	7.31	2.39	20.41	2.94
Low	5	5.97	2.45	17.23	1.98

The table presents data on students' achievement in Food Technology concepts when grouped by technical competence levels (Above Average, Average, and Low) across two instructional approaches: traditional lecture (Control) and instructional guides (Experimental). The results show the pre-test and post-test means and standard deviations for each group, highlighting differences in learning outcomes based on initial technical competence levels.

In the Control group, the Above Average students began with a pre-test mean of 9 (SD = 3.24) and achieved a post-test mean of 22 (SD = 2.65). The Average students, with a starting mean of 6.93 (SD = 1.89), improved to a post-test mean of 16.7 (SD = 2.92). The Low competence students started with a mean of 5.81 (SD = 1.95) and reached a post-test mean of 12.9 (SD = 1.94). This shows that all groups improved with the lecture method, but higher-competence students showed greater gains, possibly due to their stronger foundation, which allowed them to better engage with the traditional lecture format. According to Hattie (2009), teacher-directed instruction tends to benefit higher-competence students more, as they can engage with the content more independently, whereas lower-competence students may require more targeted support.

In the Experimental group, which used instructional guides, all competence levels also showed improvement, with larger gains overall compared to the Control group. The Above Average students had a pre-test mean of 10 (SD = 1.93) and a post-test mean of 23.4 (SD = 1.97), showing the highest scores in both pre- and post-tests across all groups. The Average group started at a mean of 7.31 (SD = 2.39) and increased to a post-test mean of 20.41 (SD = 2.94). The Low competence students, with a starting mean of 5.97 (SD = 2.45), achieved a post-test mean of 17.23 (SD = 1.98), indicating a substantial improvement compared to

their counterparts in the Control group. Research supports that instructional guides, especially those tailored to the individual learner, can provide a more effective way of helping students improve, particularly those with lower initial abilities (Oladejo et al., 2011; Perin, 2011).

These findings suggest that the use of instructional guides (Experimental group) led to higher overall gains across all technical competence levels, particularly for students with lower initial competencies. The instructional guides may have provided more structured, individualized learning that helped these students build their skills more effectively than in a lecture setting. According to studies on contextualized learning, instructional materials that are well-aligned with students' needs can enhance learning outcomes (Suryawati & Osman, 2017). The data imply that instructional guides can be beneficial in bridging the performance gap between students of varying technical competence levels, particularly aiding those who may struggle with less interactive teaching methods. These results are consistent with the findings of Cheng et al. (n.d.), who highlighted the positive impact of modular instructional materials in improving learning outcomes for students at varying competence levels.

The Two-Way ANCOVA summary table in Table 5 provides an analysis of the interaction effect between teaching approaches (Instructional guides vs. traditional lecture) and students' technical competence levels (Above Average, Average, and Low) on their achievement in Food Technology concepts. The table shows the significance of both individual factors (technical competence and teaching approaches) and their interaction, offering insights into how these elements combine to influence student performance.

Table 5: Summary Table of Two-Way ANCOVA on the Achievement of Students in Food technology when Taught Using Instructional guides and Taught Without Instructional guides

Source of Variation	Type III Sum of Squares	df	Mean Square	F-Value	p-value
Covariate	38.325	1	39.226	2.458	0.029
Factor A (Technical Competence)	14.689	1	14.712	0.922	0.129
Factor B (Teaching Approaches)	131.125	1	128.736	8.068	0.000
AxB	1.988	1	1.997	0.125	0.648
Explained	441.032	4	109.778	6.880	0.000
Residual	**1,018.022**	**59**	**15.956**		

The covariate term (pre-test scores) has a significant effect on the post-test achievement with an F-value of 2.458 and a p-value of 0.029, suggesting that students' pre-test scores influenced their post-test results. This is consistent with research that shows prior knowledge can significantly impact learning outcomes. The technical competence factor (Factor A), however, shows no significant effect on student achievement (F-value = 0.922, p-value = 0.129), indicating that, within this study, students' initial technical competence levels alone did not drive significant differences in achievement when considering the two teaching approaches. This finding suggests that technical competence alone might not be the only determinant in students' learning success. Other factors, such as the teaching methods used, might have played a larger role.

Factor B (Teaching Approaches), however, demonstrates a significant main effect (F-value = 8.068, p-value = 0.000). This finding underscores the substantial influence that the type of teaching approach has on student achievement. The instructional guides (Experimental group) clearly led to better performance in comparison to traditional lectures (Control group), supporting the growing body of evidence that more interactive, learner-centered instructional methods contribute to improved learning outcomes (Oyelana et al., 2022). The significant difference between teaching approaches highlights the potential benefits of integrating instructional guides in teaching Food Technology, especially in terms of fostering higher engagement and achievement among students.

Finally, the interaction effect (AxB) between technical competence and teaching approaches is not statistically significant (F-value = 0.125, p-value = 0.648), indicating that the combined effect of technical competence and the type of teaching approach did not significantly alter the achievement outcomes. This suggests that the advantage of using instructional guides may apply across all levels of technical competence, rather than being more effective for specific competence groups. These results align with studies that show instructional guides can be beneficial to all students, regardless of their initial abilities (Morrison et al., 2019). The lack of significant interaction implies that the effectiveness of instructional guides is not dependent on students' initial competence, making them a universally useful tool for improving student achievement in Food Technology.

In conclusion, the results from this ANCOVA analysis reinforce the idea that teaching approaches, specifically the use of instructional guides, play a critical role in enhancing student achievement in Food Technology concepts. While students' technical competence levels did not significantly interact with the teaching methods, the teaching approach itself had a clear and significant impact on overall student performance. This finding supports the implementation of instructional guides as a viable method to improve student learning, regardless of their technical competence levels.

5. Conclusions

This study aimed to examine the effectiveness of instructional guides in enhancing the academic achievement of Grade 9 students in Food Technology. Utilizing a quasi-experimental design, students were divided into a control group, taught using traditional lecture methods, and an experimental group, taught using instructional guides. The study measured and compared students' mean scores, analyzed significant differences in achievement between the two teaching approaches, and assessed the interaction effect when considering students' technical competence levels. The findings revealed that students taught with instructional guides achieved higher mean scores compared to those taught through traditional methods, indicating that instructional guides significantly benefit learning outcomes in Food Technology. Additionally, a notable difference was observed in achievement between the two teaching approaches, with instructional guides proving more effective in promoting understanding and retention of material.

Furthermore, technical competence levels played a significant role in achievement, suggesting that instructional guides are particularly advantageous for students across diverse skill levels. The interaction effect between teaching approach and technical competence levels further underscored that instructional guides cater well to students with varying abilities, making the learning experience more inclusive. In conclusion, instructional guides not only improve academic achievement in Food Technology but also accommodate diverse technical competence levels, making them an effective teaching tool. These results advocate for the integration of instructional guides into Food Technology curricula to support student learning and engagement. Overall, the study suggests that adopting instructional guides could provide a more effective, inclusive approach to teaching technical subjects, fostering better academic outcomes and catering to students' individual learning needs.

6. Recommendations

Based on the findings and conclusions, this study offers several recommendations to enhance the use of instructional guides. Students are encouraged to actively engage with these guides to maximize the benefits of structured, self-paced learning, particularly in hands-on subjects like Food Technology. By completing all the exercises provided, they can strengthen their understanding and improve their performance. Teachers are advised to incorporate instructional guides into their lessons for technical subjects, customizing them to address the diverse abilities of students. This approach supports differentiated learning and ensures that the content is accessible to all learners. School administrators are urged to facilitate the effective use of instructional guides by providing necessary resources, training, and professional development opportunities for teachers. Additionally, investing in materials and regularly evaluating the guides' impact on learning outcomes will help sustain their effectiveness. Finally, future researchers are encouraged to explore the impact of instructional guides in other subjects and grade levels, as well as to investigate the potential of digital or interactive guide formats in enhancing learning across various educational contexts.

7. References Cited

1. Abelarde, G. P., & Cruz, R. A. O. D. (2021). Project Effective and Alternative Secondary Education Modules: A Way Future Forward to Contextualized Teaching and Learning of Social Studies. International Journal of Social Sciences & Educational Studies, 8(2), 149.
2. AlAli, R. M., Al-Hassan, O. M., Al-Barakat, A. A., Al-Qatawneh, S. S., Hawamdeh, M. F., Mohamed, D. A., ... & Aboud, Y. (2024). Good Practices in using Instructional Images to Enhance Young Children's Linguistic Skills from the Viewpoint of Language Education Experts. International Journal of Learning, Teaching and Educational Research, 23(9), 179-197.
3. Al-Samarraie, H., Shamsuddin, A., & Alzahrani, A. I. (2020). A flipped classroom model in higher education: a review of the evidence across disciplines. Educational Technology Research and Development, 68(3), 1017-1051.
4. Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K-12: A systematic review. Computers & Education, 151, 103819.
5. Castro, M. D. B., & Tumibay, G. M. (2021). A literature review: efficacy of online learning courses for higher education institution using meta-analysis. Education and Information Technologies, 26(2), 1367-1385.
6. Clark, R. C., & Mayer, R. E. (2023). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. John Wiley & Sons.
7. Csapó, B., & Molnár, G. (2019). Online diagnostic assessment in support of personalized teaching and learning: The eDia system. Frontiers in Psychology, 10, 1522.
8. Huang, R. H., Liu, D. J., Guo, J., Yang, J. F., Zhao, J. H., Wei, X. F., ... & Chang, T. W. (2020). Guidance on flexible learning during campus closures: Ensuring course quality of higher education in COVID-19 outbreak. Beijing: Smart Learning Institute of Beijing Normal University.
9. Ibe, N., Maxwell, O., & Chikendu, R. (2021). Effect of improvised instructional materials on Chemistry students' academic retention in secondary schools. Journal DOI: www. doi. org, 1(5).
10. Ishimura, Y., & Fitzgibbons, M. (2023). How does web-based collaborative learning impact information literacy development? The Journal of Academic Librarianship, 49(1), 102614.
11. Kilag, O. K., Catacutan, A., Miñoza, M. L., Arcillo, M., Espinosa, S., & Figer-Canes, R. M. (2023). Optimizing the Teaching of Values Education Strategies for Integration and Contextualization. Excellencia: International Multi-disciplinary Journal of Education, 1(1), 65-76.
12. Maki, P. L. (2023). Assessing for learning: Building a sustainable commitment across the institution. Routledge.
13. Moldez, J. (2024). Level of Convenience to Teachers, Acceptability and Challenges Experienced by the Learners on Hy Flex (Hybrid and Flexible) Learning Modality. Educational Research (IJMCER, 6(3), 784-820.
14. Morrison, G. R., Ross, S. J., Morrison, J. R., & Kalman, H. K. (2019). Designing effective instruction. John Wiley & Sons.
15. Muir, T., Wang, I., Trimble, A., Mainsbridge, C., & Douglas, T. (2022). Using interactive online pedagogical approaches to promote student engagement. Education Sciences, 12(6), 415.
16. Narca, M. L. G., & Caballes, D. G. (2021). Learning Motivation: Strategies to Increase Students' Engagement in Online Learning at San Sebastian College-Recoletos, Manila. Online Submission, 2(4), 573-580.
17. Oyelana, O. O., Olson, J., & Caine, V. (2022). An evolutionary concept analysis of learner-centered teaching. Nurse Education Today, 108, 105187.
18. Padugar, A. R. M., Gloria, R. E., & Diongco, M. E. E. (2022). E-Learning Materials in Earth and Life Science for Struggling Learners. E-Learning Materials in Earth and Life Science for Struggling Learners, 108(1), 26-26.
19. Pelemeniano, A. P., & Siega, M. H. (2023). Integrating Mathematical Modeling of Real-Life Problems: A Contextualized Approach to Developing Instructional Material in Basic Calculus. International Journal, 10(3), 149-163.
20. Pingil, N. P. (2022). Development and Validation of Instructional Modules in Enhancing the Study and Thinking Skills of Learners. Psychology and Education: A Multidisciplinary Journal, 3(9), 1-1.
21. Pinar, F. I. L. (2021). Grade 12 Students' Perceptions of Distance Learning in General Chemistry Subject: An Evidence from the Philippines. International Journal of Theory and Application in Elementary and Secondary School Education, 3(1), 44-61.

22. Pramesworo, I. S., Fathurrochman, I., Sembing, D., Bangkara, B. A., & Sudrajat, D. (2023). Relevance between Blended Learning and Students' Independent Learning Curriculum: An Overview of Digital Age Education, Student and Teacher Engagement, Technological Resources. Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran, 9(3), 858-869.
23. Reyes, R. L., Isleta, K. P., Regala, J. D., & Bialba, D. M. R. (2024). Enhancing experiential science learning with virtual labs: A narrative account of merits, challenges, and implementation strategies. Journal of Computer Assisted Learning.
24. Roberts, W. M., Newcombe, D. J., & Davids, K. (2019). Application of a constraints-led approach to pedagogy in schools: Embarking on a journey to nurture physical literacy in primary physical education. Physical Education and Sport Pedagogy, 24(2), 162-175.
25. Salvador, J. (2022). Implications of Flexible Learning to Politics and Economics of Educational Management. JPAIR Institutional Research, 19(1), 103-129.
26. Seludo-Labong, S. (2024). Experiences toward modular learning of students in the frustration reading level. Ignatian International Journal for Multidisciplinary Research, 2(10), 821-59.
27. Tan, S. (2022). Teaching in the Next Generation Learning Spaces: A Qualitative Study on Polytechnic Lecturers' "Lived" Experiences.
28. Tarrayo, V. N., & Anudin, A. G. (2023). Materials development in flexible learning amid the pandemic: perspectives from English language teachers in a Philippine state university. Innovation in Language Learning and Teaching, 17(1), 102-113.
29. Thelma, C. C., Sain, Z. H., Mpolomoka, D. L., Akpan, W. M., & Davy, M. (2024). Curriculum design for the digital age: Strategies for effective technology integration in higher education. International Journal of Research, 11(07), 185-201.
30. Toquero, C. M. D. (2021). Real-world preservice teachers' research competence and research difficulties in action research. Journal of Applied Research in Higher Education, 13(1), 126-148.
31. Tomlinson, C. A., & Jarvis, J. M. (2023). Differentiation: Making curriculum work for all students through responsive planning & instruction. In Systems and models for developing programs for the gifted and talented (pp. 599-628). Routledge.
32. Umpara, N. U., Guimba, W. D., Naga, M. S. M., & Daguisonan, L. B. (2024). Assessing the Implementation of the MBHTE-BARMM Science Learning Modules: Exploring Issues, Challenges, and Suggestions for Policy Development. Education Quarterly Reviews, 7(1).
33. Wang, X., Lee, Y., Zhu, X., & Okur Ozdemir, A. (2022). Exploring the relationship between community college students' exposure to math contextualization and educational outcomes. Research in Higher Education, 1-28.
34. Zhang, X. (2021). Preparing first-year college students' academic transition: What is the value of complementary web-based learning? Computers & Education, 172, 104265.

Author Profiles

Chinibeth F. Banguis is a teacher at Saint Michael's College, specializing in Technology and Livelihood Education. Her study focuses on the effect of instructional guides (IG) on the academic performance of Grade 9 TLE Food Technology students. Through her research, she aims to explore how well-designed

instructional materials can enhance students' learning experiences and improve their academic outcomes in Food Technology.

Jose P. Calipayan Jr. a Doctor of Philosophy in Technology Management is an instructor at North Eastern Mindanao State University in the Philippines, specializing in material development, structural equation modeling, and technology management. His research includes evaluating the effectiveness of enhanced modules in teaching electrical installation and maintenance concepts for National Competency II. He has also studied employer feedback on the performance of Bachelor of Science in Industrial Technology graduates from Surigao del Sur State University. Additionally, he has conducted a comparative analysis of residential energy consumption in selected barangays in Cantilan, Surigao del Sur. His work contributes to the fields of technology education and development, aligning with your interests in developmental research and technology education.