

Influence Of Spiral Progression Approach And Use of Instructional Media in Teaching Science on the 21st Century Learning Skills Amid Covid-19

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Abstract

This study aimed to determine the influence of Spiral Progression Approach and Use of Instructional Media on the 21st century learning skills amid covid 19 of Grade 10 students in Braulio E. Dujali District. The statistical tools used were Mean, Pearson-r, and Regression Analysis. Quantitative non-experimental research utilizing correlational technique with regression analysis was the research design of this paper. The respondents were 180 students from secondary schools of Braulio E. Dujali District. Results revealed that the level of Spiral Progression Approach (SPA) in teaching science in terms of discussion, peer collaboration and problem solving was high or much observed. The level of Use of Instructional Media got a rating of high or much observed in terms of perceived use of library, perceived use of audiovisual, perceived use of multipurpose areas and perceived use of instructional materials. For the level of the 21st century learning skills amid covid-19 of the students, it yielded a high or much manifested result in terms of critical thinking, collaboration, communication, and creativity. There was a positive significant relationship between Spiral Progression Approach and Use of Instructional Media (SPA) and 21st century learning skills amid covid-19. It was also found out that domains peer collaboration and problem-solving activities of Spiral Progression Approach (SPA) and perceived use of library and perceived use of instructional materials was only the predictors of 21st century learning skills.

Keywords: MAED- Teaching Science, Spiral Progression Approach (SPA), instructional media, 21st century learning skills, Philippines

1. INTRODUCTION

Learners in the 21st Century are moving beyond the basics. Since March 2020, the operations of schools have been severely affected by the Covid-19 coronavirus. Students were extremely concerned as the years progressed. Similarly, the swiftly changing industry, the skills gap in the labor force, and learner disengagement all place pressure on the education and learning system to address 21st-century skills (Lin, 2021).

One of the goals of education is to equip our youth with the 21st Century Learning Skills so they can thrive in a technologically globally interconnected world. To be deemed globally competitive, proficiency in critical thinking, communication, collaboration, and creativity is essential. These abilities are now more critical than ever for youngsters. It ensures not only classroom achievement but also success in the 21st Century world where change is continuous, and learning never ends (Naidoo et al.,2020)

The implementation of the Spiral Progression Approach (SPA) is to facilitate effective student learning of a concept through repeated exposure. We design content to explore topics and abilities at each school level with

increasing depth. The understanding spirals as someone learns additional facts and principles about each area. Complexity and applications increase horizontally and vertically. Several studies have found that spiral progression is strongly related to students' learning skills (de Ramos-Samala, 2018; Orbeta & Decano, 2019).

Moreover, incorporating teaching resources that align with the students' 21st-century interests and the teacher's understanding of the subject matter has proven beneficial in fostering students' understanding of the subject matter has proven beneficial in fostering students' retention of scientific concepts, thereby nurturing their creativity and critical thinking abilities (de Ramos-Samala, 2018). The involvement of studies in a spiral progression approach further enhances their problem-solving skills by promoting effective communication and collaboration (Orbeta & Decano, 2019; Zheng & Warshauer, 2015).

Science educators have observed that students struggle with developing skills in all 4Cs. (Landon, 2019). Numerous variables may have contributed to this phenomenon, but learners' participation with SPA in discussion, peer collaboration, and problem-solving is considered a factor (Hazel et al., 2019). Even though the science curriculum was not modified to accommodate the current situation, the current teaching and learning environment has become more difficult due to the pandemic. The implementation of classes departs from the conventional face-to-face transmission. The global pandemic has presented significant challenges in effectively addressing learners' 21st Century Learning Skills within the Spiral Progression Approach framework.

Hence, implementing the Spiral Progression Approach (SPA) within the K-12 Curriculum holds significant importance in addressing the challenges mentioned above faced by the students. Considering the viewpoints mentioned, it is essential to undertake this study to explore the context and specific difficulties associated with the relationship between the SPA, the utilization of instructional media in teaching science, and the development of 21st-century learning skills during the COVID-19 pandemic. This research investigates the interplay between various variables of SPA and the use of instructional media and the impact of SPA variables on the latter amidst the ongoing pandemic.

1.1 Research Objectives

The objective of the study was to investigate the influence of the Spiral Progression Approach (SPA) and the Utilization of Instructional Media in Teaching Science on developing 21st Century Learning Skills amid Covid-19.

Specifically, it aims to obtain answers to the following objectives:

1. To describe the level of Spiral Progression Approach (SPA) in Teaching Science in terms of:
 - 1.1 discussion.
 - 1.2 peer collaboration; and
 - 1.3 problem-solving.
2. To assess the level of use of Instructional Media in Teaching Science in terms of:
 - 2.1 perceived use of the school library.
 - 2.2 perceived use of the audiovisual.
 - 2.3 perceived use of the multipurpose areas; and
 - 2.4 perceived use of instructional materials.
3. To identify the level of the 21st Century Learning Skills in terms of:

- 3.1 critical thinking.
- 3.2 collaboration.
- 3.3 communication; and
- 3.4 Creativity.
4. To determine the significant relationship between:
 - 4.1 Spiral Progression Approach (SPA) in teaching Science and 21st-century learning skills amid Covid-19.
 - 4.2 Use of Instructional Media and 21st century learning skills amid Covid-19.
5. To determine which domains in spiral progression in teaching science significantly influence 21st-century learning skills amid Covid-19.
6. To determine which domains in using instructional media in teaching science significantly influence 21st-century learning skills amid Covid-19.

2. METHODOLOGY

2.1. Research Design

This study employs a quantitative non-experimental research design using the causal effect to describe the possible existing relationship between two identified variables and determine the direction and magnitude of such relationship if it exists. The researcher considered the descriptive correlation suitable when depicting the situation during a situation to examine the causes of a particular phenomenon. Correlational research focuses on establishing relationships between two or more variables within the same population and measures the statistical relationship between them without trying to control for secondary variables. Correlational research measures two variables without manipulating whether they are quantitative or categorical (Gravetter & Wallnau, 2004; Leedy, Ormrod 2010; Schmitz, 2012).

This quantitative, non-experimental research utilizes a causal-effect technique with regression analysis. We are gathering relevant data using the modified and adopted questionnaires as the primary tools for data collection. The focus of this study was to describe the spiral progression approach, examine the use of instructional media in teaching science, and assess the 21st-century learning skills of junior high school students.

2.2. Respondents of the Study

In this study, the respondents were Grade 10 Braulio E. Dujali District students currently enrolled in the SY 2021-2022. The selection of respondents will utilize stratified random sampling. The researcher employed sampling techniques in determining the participants and in gathering data. The study involved 584 Grade 10 students from all High Schools in the Municipality of Braulio E. Dujali. The distribution of respondents shows the actual numbers of respondents in every school. The total sample size is 180; mainly, the sample size in School A is 80, School B is 60, and School C is 40. The researcher only considered Grade 10 students currently enrolled in the identified schools and permitted by their parents to be part of the study as respondents when determining the research subject and using inclusion criteria.

Furthermore, the study excludes those junior high school students from Grades 7 to 9 of the identified schools whose parents do not permit them to be part of the study as respondents. These students are considered ineligible for the research and, therefore, cannot participate. The respondents were free to withdraw anytime if ever they felt threatened by the conduct of the study. Their voluntary and willing participation will be valued.

2.3. Research Instrument

The researcher used an adapted questionnaire for the independent and dependent variables to fit the study context. The collected data from the discourse will be correlated with the relevant literature to aid in developing the questionnaire, which an internal and external panel of validators will validate. Respondents will receive a questionnaire with demographic information and three sets of questions related to the independent and dependent variables.

The first set of questionnaires addressed the level of spiral progression based on discussion, peer collaboration, and problem-solving activities. The instrument used in the present investigation was implemented and modified from the study of Alegre (2019) entitled “The Level of Impact on Spiral Progression Approach in Mathematics to the Academic Performance of the Grade 10 Students”.

The original questionnaire was modified to contextualize the science-learning experiences of students. The actual topics were simplified or reworded to improve respondents' comprehension. The panel of experts validated the content. It passed the validity and reliability tests. The researcher asked the participants to rate the level of the spiral progression approach for each item using the five-point Likert Scale anchored at (5) Very High, (4) High, (3) Moderate, (2) Low, and (1) Very Low.

The researcher considered the Range of Means and descriptions for the five orderable gradations in evaluating the spiral progression approach level.

2.4. Statistical Treatment

The researcher tallied and recorded the responses to the items in the questionnaire correspondingly. The results were analyzed and interpreted in light of the purpose of this study using the appropriate statistical treatment as follows:

Mean. It was used to determine the level of the spiral progression approach, the use of instructional media in teaching science, and 21st-century learning skills among students.

Pearson-r. This statistical tool was employed to determine the significance of the relationship between the spiral progression approach, the use of instructional media in teaching science, and 21st-century learning skills among students.

Linear Regression Analysis. This statistical tool was used to determine if the spiral progression approach and use of instructional media in teaching science influence 21st-century learning skills among students.

3. RESULTS AND DISCUSSION

This chapter provides an overview of the findings and analysis derived from the collected data. Highlighting the order of discussions by the following subheadings: level of spiral progression, level of use of Instructional Materials in teaching science, level of 21st-century learning skills, and causal effect of the study among Grade 10 students.

The researcher noted that the standard deviation was less than 1.0, the typical standard deviation for a 5-point scale. It means that the rating obtained in the study were close to the mean, indicating consistency of the responses according to Wittlink and Bayer (2003).

Level of Spiral Progression Approach

The study's first objective is to determine the level of the Spiral Progression Approach (SPA) in teaching science in terms of discussion, peer collaboration, and problem-solving.

Table 1 shows each variable's mean and standard deviation included in the analysis. Three indicators were employed to determine the level of spiral progression approach in teaching science as independent variable 1. Data showed a high overall mean of 3.67, with a standard deviation of 0.54. It indicated a significant focus on spiral progression in teaching science.

Among the three indicators of the level of spiral progression, peer collaboration gained the highest mean score of 3.78 or high, with a standard deviation of 0.67 or high. Second, the discussion earned a mean score of 3.74 or high, with a standard deviation of 0.64 or high. And lastly, problem-solving with a mean score of 3.50 or high with a standard deviation of 0.60 or high means that it is much observed.

Table 1

Level of Spiral Progression Approach

Level of Use of Instructional Media in Teaching Science

Shown in Table 2 is the overall mean score of 3.49 in the use of instructional media in teaching science coming from the students with a standard deviation of 0.58 and described as high. It means that the use of instructional media in teaching science is much observed.

Table 2: Level of Use of Instructional Media

Indicators	Mean	SD	Description
Discussion	3.74	0.64	High
Peer Collaboration	3.78	0.67	High
Problem Solving	3.50	0.60	High
Overall	3.67	0.54	High

Indicators	Mean	SD	Description
Perceived use of the school library	3.43	0.71	High
Perceived the use of the audiovisual	3.20	0.72	Moderate
Perceived the use of multipurpose areas	3.59	0.79	High
Perceived the use of instructional materials	3.72	0.83	High
Overall	3.49	0.58	High

Level of the 21st Century Learning Skills in Science

The mean scores for the indicators of 21st-century learning skills in teaching science, with an overall mean of 3.70, described as high with a standard deviation of 0.67, are presented in Table 3. The respondent rated highly on all indicators regarding critical thinking, communication, collaboration, and creativity. The overall mean scores cited an overall mean score from the following computed mean scores from highest to lowest. The highest mean score was 3.77, or high for critical thinking. Followed by the second to the highest was 3.74 or high for communication. The third mean score was 3.72, or high for communication. And the lowest mean score was 3.55, or high for creativity.

Table 3: *Level of 21st-Century Learning Skills*

Significance of the Relationship between Spiral Progression Approach (SPA) in Teaching Science and 21st Century Learning Skills in Teaching Science

This researcher aimed to investigate the correlation between the spiral progression approach and 21st-century learning skills. The findings in Table 4 were analyzed using the Pearson-r method and sought to establish whether there is a statistically significant relationship.

Table 4 discusses the component of the Spiral Progression Approach (SPA). These components include discussion, peer collaboration, and problem-solving. The discussion activity yielded an r-value of 0.416* with a p-value of 0.001. Similarly, the peer collaboration activity produced an r-value of 0.39 with a p-value of 0.001. The findings indicate a significant correlation between the indicators and 21st-century learning skills, as evidenced

INDICATORS	Mean	SD	Description
Communication	3.74	0.81	High
Collaboration	3.72	0.89	High
Critical Thinking	3.77	0.79	High
Creativity	3.55	0.74	High
Overall	3.70	0.67	High

by an overall r-value of 0.492* and a p-value of 0.001. Furthermore, the analysis reveals a moderately positive association between the two variables.

The Spiral Progression Approach (SPA) indicators showed a significant relationship with 21st-century skills in the context of the COVID-19 pandemic, as evidenced by a calculated p-value of 0.001. Consequently, the null hypothesis, which suggested no significant relationship between the spiral progression approach and discussion, peer collaboration, and problem-solving, was rejected at a significant level of 0.05.

Thus, when the levels of spiral progression approach (spa) in teaching science will increase, the levels of 21st-century learning skills amid covid 19 also will be increased.

Tables 4 Relationships between spiral progression and 21st-Century Learning Skills Amidst Covid 19

Independent Variable	Dependent Variable	r-value	r- squared	P-value	Decision @ a= 0.05
Discussion	21 st Century Learning Skills amid covid 19	0.416*	0.1731	0.001	Ho is rejected
Peers Collaboration		0.434*	0.1884	0.001	Ho is rejected
Problem Solving		0.397*	0.1576	0.001	Ho is rejected

Significances in the Relationship Between Use of Instructional Media on Teaching Science and 21st Century Learning Skills amid Covid 19

This study aims to determine whether or not the use of instructional media in teaching science significantly relates to 21st-century learning skills. The results of the computations are shown in Table 5 using the Pearson-r.

The components of the use of instructional medicine are presented in Table 5. These components include the perceived benefit of the school library, the use of the audiovisual, the use of the multipurpose area, and the use of instructional materials. Perceived use of the school library registered an r-value equal to 0.380* with a p-value of 0.001; Perceived use of the audiovisual registered an r-value equal to 0.398* with a p-value of 0.001; Perceived use of the multipurpose area registered an r-value equal to 0.361* with a p-value of 0.001, and Perceived used of instructional materials registered an r-value to 0.445* with a p-value of 0.001. This means the indicators are significantly related to 21st-century learning skills with an overall r-value of 0.525* with a p-value of 0.001. Furthermore, this correlation suggests a moderately positive relationship.

Tables 5 Relationships Between Use of Instructional Media in Teaching Science and 21st-Century Learning Skills Amidst Covid 19

Independent Variable	Dependent Variable		r-value	r- squared	P-value	Decision @ a= 0.05
Perceived use of the school library			0.380*	0.1444	0.001	Ho is rejected
Perceived use of the audiovisual	21 st Century		0.398*	0.1584	0.001	Ho is rejected
Perceived use of the multipurpose area	Learning Skills amidst covid 19		0.361*	0.1303	0.001	Ho is rejected
Perceived use of the instructional materials			0.445*	0.1980	0.001	Ho is rejected

Additionally, the p-value from each indicator was calculated to be 0.001, indicating a significant relationship between all indicators of the spiral progression approach and 21st-century learning skills in the context of the COVID-19 pandemic. Consequently, the null hypothesis, which suggested no significant relationship between the spiral progression approach and discussion, peer collaboration, and problem-solving, was rejected at a significance level of 0.05.

Thus, if the instructional media are used, the 21st-century learning skills of the students are increased.

Regression Analysis on the Influence of the Domains of Spiral Progression Approach (SPA) in Teaching Science on the 21st Century Learning Skills amid covid 19

Table 6 displays the regression analysis results on the influence of the Spiral Progression Approach (SPA) on 21st-century learning skills during the COVID-19 pandemic. According to the data presented in Table 6, the computed F-value is 18.857, and the p-value is 0.001. These results indicate that the indicators have a significant predictive relationship with 21st-century learning skills comprehensively. The calculated R-value of 0.439 suggests a positive correlation between the utilization of the SPA on 21st-century learning skills. The R² value for SPA is 0.243, indicating that approximately 24.3% of the variance in 21st-century learning skills can be attributed to this approach.

Additionally, the SPA indicators, specifically discussion, exhibit a beta coefficient of 0.151 and a p-value of 0.105. Similarly, peer collaboration demonstrates a beta coefficient of 0.238 and a p-value of 0.008*. Lastly, problem-solving activities display a beta coefficient of 0.194* and a p-value of 0.018.

Consequently, the acquisition of 21st-century learning skills among students during the COVID-19 pandemic is primarily influenced by peer collaboration and problem-solving. However, it is worth noting that discussions do not hold substantial predictive power over developing these skills in the same context.

Table 6

Regression Analysis on the Influence of the Domains of Spiral Progression Approach (SPA) in Teaching Science on the 21st Century Learning Skills

Independent Variable	Unstandardized Coefficients B	Standard Error	Standardized Coefficient Beta	t-value	P-value	Decision
(constant)	1.448	0.304				
Discussion	0.158	0.097	0.151	1.630	0.105	Ho is not rejected.
Peer Collaboration	0.238	0.089	0.238*	2.683	0.008	Ho is rejected
Problem Solving	0.217	0.091	0.194*	2.394	0.018	Ho is rejected
Dependent Variable: 21st Century Learning Skills amid Covid 19						
R= 0.439		F= value= 18.857				
R ² = 0.243		p-value= 0.001				

As a result, the variable discussion exhibits a relatively significant relationship on the 21st Century Learning Skills. Still, it does not influence the development of these skills among students during the COVID-19 pandemic.

Overall, the data show that the spiral progression approach significantly influences the development of 21st-century learning skills among students during COVID-19.

Regression Analysis on the Influence of the Domains of Use of Instructional Media in Teaching Science on the 21st Century Learning Skills amid covid 19

Table 7 presents the regression analysis to assess the influence of using instructional media in teaching science on 21st-century learning skills during the covid 19. The data revealed the computed F-value of 17.818 and a p-value of 0.001, indicating that the indicators can significantly predict 21st-century learning skills when considered together. The R-value is 0.538, showing a positive relationship between using instructional media in teaching science and 21st-century learning skills. The overall R² is 0.289, which suggests that using instructional media can explain 28.9% of 21st-century learning skills.

Table 7

Regression Analysis on the Influence of the Domain the Use of Instructional Media in Teaching Science on the 21st Century Learning Skills

Independent Variable	Unstandardized Coefficients B	Standard Error	Standardized Coefficient Beta	t=value	P-value	Decision
(constant)	1.535	0.263				
Perceived use of the school library	0.215	0.072*	0.229	3.004	0.003	Ho is rejected
Perceived use of the audiovisual	0.118	0.073	0.129	1.617	0.108	Ho is not rejected
Perceived use of the multipurpose areas	0.042	0.069	0.050	0.612	0.541	Ho is not rejected
Perceived use of instructional materials	0.240	0.065*	0.065	3.726	0.001	Ho is rejected

Dependent Variable: 21st Century Learning Skills

R-value= 0.538

F-value=17.818

R²=0.289

p-value= 0.001

Moreover, the indicators of the use of instructional media are; perceived use of the school library, which displays a beta of 0.229 with a p-value of 0.01; perceived use of the audiovisual, which shows a beta of 0.129 with a p-value of 0.103; perceived use of the multipurpose area, which shows a beta of 0.050 with a p-value of 0.541 and perceived use of instructional materials, which displays a beta of 0.065* with a p-value of 0.001.

Therefore, the perceived use of school libraries and perceived use of instructional materials can significantly predict the 21st-century learning skills of the students amid covid 19. Furthermore, the perceived use of audiovisual and perceived use of multipurpose areas does not signify 21st-century learning skills among students amid covid 19.

The data gathered on the Influence of the Spiral Progression Approach (SPA) and the Use of Instructional Media on the 21st Century Learning Skills amid covid 19. The preceding section presents findings that form the basis for the ensuing discussion.

Level of Spiral Progression Approach (SPA)

Spiral Progression Approach (SPA) in teaching science high-level results is appropriate to its rating given by the respondents on discussion, peer collaboration, and problem-solving. It means that the SPA in teaching science was much observed. It implies that students' exposure to different learning environments may develop their capabilities and skills that enable them to work together, thus, gauging them to seek solutions to various scientific problems.

Among the three indicators of the Spiral Progression Approach (SPA), respondents from the junior high schools of Braulio E. Dujali, peer collaboration was much observed. Students are more likely to pay attention

during group/diad activities, share their understanding of the lesson with the class, and feel comfortable learning science lessons when being taught or guided by their peers. The results also show that peer collaboration is essential in determining how well the SPA works when teaching Science in junior high schools from Braulio E. Dujali, Davao del Norte.

Various authors support the high descriptive equivalent in the Spiral Progression Approach (SPA). The result is in congruence with the study (Angeles, 2016) that the spiral progression approach consists of a variety of activities such as peer collaboration, problem-solving, peer tutoring, and collaborative learning in which the students engage in conversation, brainstorming, or other forms of social interaction that students will expose their many bits of intelligence, talents, and abilities. Suppose students participate and collaborate with their peers during the teacher's activities. In that case, they will have a more excellent knowledge of the principles of the subject. Thus, they will be successful in their future endeavors.

Nevertheless, on the other side of the result, though it was posted to have a high level, investigating the actual value with an overall mean of 3.67, the level of the spiral progression approach has dropped almost to moderate.

The first indicator which was much observed was peer collaboration. It refers to the kind of group work situation wherein students cooperate, in one-on-one interaction, in a classroom to discuss concepts to find solutions to a problem. The result is a similar view (Surmarni, 2016) that students are motivated to listen when there are groups and activities. Students can explain what has been learned to the rest of the group. Straightforwardly ask questions of group mates, not timid to solve some problems within the group, compare answers with the group to determine if the answer is correct, and learn some simple techniques like learning science lessons with the class, cooperating with others in group activities, working cooperatively with any group member in seeking solutions to the problems. Moreover, the high level of peer collaboration among students is also similar to the study of Alegre (2019) that. Students agreed that they were motivated to listen and learn during activities and when being taught or guided by their classmates; enjoyed sharing their understanding of the lesson; they could easily ask questions to find solutions; worked cooperatively with their group; could compare and share their answers and learned some simple techniques for problem-solving from their classmates' ideas.

Second, which also high level was discussion. This concept pertains to an ongoing exchange of ideas and thoughts between teachers and students. It aims to foster the development of students' skills and abilities while expanding their comprehension, both individually and collectively, of a particular concept or instructional objective. This parallels various authors' studies (Chukwurah et al., 2020) that discussion is a pedagogical approach wherein teachers and learners exchange ideas about a specific subject matter, aiming to attain the primary learning goals. The teacher facilitates open and unrestricted communication with students, providing ample opportunities for a more comprehensive comprehension of activities and lessons.

Lastly, an indicator that was much observed was problem-solving activities. This refers to the activities and tasks created by the teacher to assess the process of problem identification, cause of the problem, alternative solution and prioritization, and solution implementation. Moreover, it is similar to the study of Sheikh & Siti (2016) that solutions to the given challenges must require analytical thinking that apply skills like analyzing and evaluating data, claims, beliefs, and others in authentic learning environments and the actual world are needed to solve the difficulties. This indicator of SPA had the lowest mean due to the covid-19 pandemic; most learners lack fundamental concepts and problem-solving activities.

Level of Use of Instructional Media in Teaching Science

The findings indicated a high level of instructional media utilization in science teaching across the three secondary schools in the Braulio E. Dujali District. The respondents' high rating for the perceived use of instructional media in the school library, audiovisual, multipurpose room, and instructional materials indicates a high degree of observed use. It implies that today's educators can better equip themselves to help their students grasp abstract scientific concepts, engage them in engaging and fun activities, and benefit from a blend of time-tested techniques and cutting-edge innovations in education. Additionally, it is necessary for both the teaching and learning of science concepts because it impacts what is taught and helps students learn more.

Various authors support the high equivalent of Instructional Media. This was parallel to the study of Samala (2017), who believed that the utilization of instructional media in science education had been found to enhance students' abilities and skills. This improvement is particularly evident when models such as DNA models, organ system models, and earth-moon-sun models, as well as pictures and drawings, mind maps, concept maps, and flowcharts, are incorporated into the teaching process. Additionally, this method fosters the development of students' imagination, thereby facilitating a deeper understanding of comprehension of scientific concepts. Certain students also expressed a preference for incorporating interactive games into science lessons. This approach has been found to enhance motivation, particularly when tackling challenging scientific concepts. It contributes to the effectiveness of the Spiral Progression Approach (SPA) in science education.

The high level of perceived use of Instructional Material under the Use of Instructional media is much observed. In terms of perceived use of *Instructional Materials*, the level is high. It means that the use of instructional media in teaching Science in terms of instructional materials is much observed. The result is in congruence with the findings of various authors Olejade et al., (2020) that the utilization of instructional materials by the teachers evaluates more learning experiences as the students can see and touch the resources. Thus, learning becomes natural, practical, effective, meaningful, and lasting and promotes retention, which improves decision-making, discovery, technique, and theory.

On the other hand, the perceived *use of multipurpose areas* was also described as high. It means that the use of multipurpose media in teaching Science in terms of multipurpose areas is much observed. The result is under the claim of Nja &Obi (2019) that a favorable and motivating environment with a comfortable setup where students can freely present their scientific skills and information obtained from previous years and expand their understanding have pleasant observations and display experiences. Since science learning is experiment-based, facilities and atmosphere expedite work and make science programs worthwhile. Even though classes were blended, their setting was conducive to learning.

Furthermore, a study conducted by Sadler (2020) affirmed the high level of perceived use of *school libraries*. This means that the use of instructional media in teaching Science in terms of school libraries is much observed. The author said the library helps students attain high literacy by providing complete access to information and resources. Students learn to collect, critically assess, organize, solve, and communicate using resources.

However, on the other side, the result revealed that the perceived use of audiovisuals was described as moderate. This means that the use of instructional media in teaching Science in terms of audiovisual was moderately observed. This finding is under the study of Savchenko (2021), that audiovisual aids boost

comprehension and retention. However, their expensive cost prevented teachers from teaching imaginatively. During the pandemic, all learning was online, so students had to self-study using their available media at home.

In the same vein, students who did not have access to any electronic devices, televisions, or radios in their homes relied entirely on the lessons provided by their schools to maintain their education throughout the year amid covid 19.

21st Century Learning Skills amid Covid-19

The result showed that the degree of 21st-century learning skills amid covid-19 was high because of the high rating given by the respondents in terms of communication, collaboration, critical thinking, and creativity, which means that the level of the 21st-century learning skills of the students was much manifested. This indicates that students enhance their ability to articulate responses clearly and concisely, effectively engage with their team members, grasp the potential transferability of knowledge or insights to different situations or contexts, and demonstrate creativity in presenting ideas and perspectives within their science subject.

Nevertheless, the outcome, though it was revealed to have a high level, looking into the actual value with an overall mean of 3.70, can be meant that the level of 21st-century learning skills showed to almost drop to moderate. This finding is in accord with the study of Sintema (2020) that due to the unforeseen closure of secondary schools due to the Covid-19 pandemic, the government must prioritize protecting school-going children by mitigating potential risks associated with virus transmission. The closure resulted in a loss of regular learning time for school-age children and reduced contact hours for learners. Consequently, they will face significant challenges in seeking guidance from teachers during their study periods. Students' learning skills and abilities can vary significantly, impacting their engagement with science education. It is particularly relevant as science often involves hands-on activities, which may not be accessible to all students who lack the necessary gadgets to access supplementary information online.

Critical thinking conforms to the skills that correspond to a high level of description, confirmed by various authors. It was in parallel to the study of Supardi & Jatmaiko (2021). They said that students' critical thinking skills increased during the pandemic since they were given and bombarded by real-life problems and encouraged to synthesize, analyze, apply, and evaluate information to conclude. Students will use home research to construct and test hypotheses, problems, and facts. It can assist students in developing 21st-century and industrial revolution critical thinking abilities.

Moreover, the student's high level of communication skills is parallel to the study of Gayati & Suryawan (2020), which stressed that communication remains during a pandemic, but social separation forces teachers and students to adopt digital media for home learning—communicating effectively and respectfully with diverse learners with multiple intelligences through visual, written, and nonverbal languages. Harley (2019) found that in the 21st century, knowledge and ideas are crucial. Most students should discuss problems and find solutions to them.

Thirdly, a study by Ilma, Al-Muhdhar, Rohman, and Saptasar (2022) asserted high collaboration skills. They stated that during the COVID-19 pandemic, learning no longer enables collaboration skills. Learning that takes place does not take a significant learning process for students. Student collaboration skills during the pandemic have remained the center of learning since students only do the tasks in the students' worksheets or

modules, and parents help them to learn; sometimes, parents answer the modules. However, collaboration skills were observed when students discussed with their classmates using online platforms their school activities, listening to each other ideas, collecting facts, conveying the obstacles faced, and providing possible solutions to each problem. Thus, blended learning and improved collaboration skills of the students are very much challenging to develop that only emphasize memory, understanding, and analysis.

Lastly, the high level of creativity is consonant with the study of Bahtiar and Ibrahim (2021), who stated that enhancing students' creativity could be achieved by utilizing available information technology to support the learning process amidst the covid 19 pandemic. In order to facilitate effective blended learning, it is crucial to provide students with consistent motivation and engage them in activities such as observation and experimentation. Additionally, scaffolding techniques, such as asking relevant questions about their problems, should be employed to support their learning process. By implementing these strategies, blended learning can potentially enhance students' creative abilities.

Significance of the Relationship between the Spiral Progression Approach and Use of Instructional Media in Teaching Science on the 21st Century Learning Skills amid Covid-19

The study's overall result revealed a significant relationship between the Spiral progression approach (SPA) and the use of instructional media in teaching science 21st-century learning skills amid covid-19. The statistical analysis revealed positive relationships between the variable, as indicated by the computer R-values, all of which had a p-value of less than 0.05. These positive R-values suggest a direct correlation, indicating that an increase in the implementation of SPA in science teaching corresponds to improving students' 21st-century learning skills during the COVID-19 pandemic. Similarly, an increase in the use of instructional media in teaching science is also associated with enhanced 21st-century skills among students during COVID-19.

The result is under Kim and Care (2018) and Kim and Scoular (2017). They stated that learning progression recognized and described communication, collaboration, and problem-solving as the focus of education of policymakers worldwide to keep students progressing toward mastery. A study revealed that data collection and analysis about learning progression for literacy, Science, and numeracy benefits our understanding of more complex skills and how students demonstrate 21st-century skills at various levels over time. The researchers concluded that students equipped and exposed to different activities through communication, collaboration, and problem-solving activities progress their learning skills in this 21st-century world.

Regarding the positive relationship between the spiral progression approach and 21st-century learning skills, this is in congruence with various studies conducted by Kinboon (2019), Rico, and Baluyos (2021). They all agreed that the implementation of the spiral progression approach, which encourages students to work together during discussion and problem-solving activities, would provide students with ample opportunities for socialization, sharing of thoughts and ideas, brainstorming, communication, and exposure of their multiple intelligences, abilities, and skills, all of which contribute to the holistic development of 21st-century learners equipped with necessary life skills. Therefore, it is up to the teachers to engage students in the discussion, let them collaborate with their classmates, and have problem-solving activities that will make Science lessons enjoyable and relate to real-life situations.

In the same manner, regards to the instructional media in teaching science and 21st-century skills amid covid 19 is consonant with the various study conducted by Erdem (2019), Pozo, Echeverria, Cabellos, and Sanchez

(2021), Mateer (2022). The authors agreed that incorporating instructional materials in science teaching is crucial in promoting learning and enhancing comprehension, catering to learners' diverse abilities and skills. Educators engage in the process of developing and strategizing methodologies and skills for effectively implementing blended learning techniques. Teaching strategies essential for the environment support the student's learning process. Teachers are responsible for effectively implementing and utilizing diverse, high-quality instructional media to foster a conducive learning environment for students.

Thenceforth, teachers who utilize Computers, TVs, DVD players, projectors, libraries, multipurpose rooms, and other technology are just some of the classroom enhancements that can help students learn more about science through activities like experimenting, analyzing, reasoning, and problem-solving; these activities help students retain information, spark their curiosity, and illustrate the relevance of what they are learning. However, this global incident forced teachers most teachers to use digital technologies for the first time to facilitate students' learning. Thus, it has been necessary to rethink teaching strategies that can still promote and increase the learners' communication, collaboration, critical thinking, and problem-solving skills.

Regression Analysis on the Influence of the Domain Spiral Progression Approach (SPA) Teaching Science to the 21st Century Learning Skills amid Covid 19

The regression analysis of the variables under the study revealed that Spiral Progression Approach (SPA) indicators have a significant influence on the 21st-century learning skills of students amid covid-19. On the other hand, the study showed that indicators under the Spiral Progression Approach (SPA), only peer collaboration and problem-solving activities display a significant influence on the 21st-century learning skills of the students amid covid 19. At the same time, the discussion unveiled that there has been no significant influence on 21st-century learning skills amid covid-19.

The results of the study are in direct contradiction to these authors. Chukwurah, Abbah, Iweama, Oguqua, and Ameh (2020) all agreed that discussion is an activity that encompasses the exchange of written or oral expressions representing various perspectives within a specific context. It is also one instructional strategy that involves teachers and students sharing ideas on a topic. It utilizes the interaction of teachers among students, allowing them to freely interact with the teacher for a clearer understanding of activities and lessons. In this activity under Spiral Progression Approach (SPA), students learn to use their voices attentively and respectfully. Listening to the perspective of fellow students promotes increased participation, self-confidence, and leadership skills. Engaging in meaningful discussions aids learner participants in developing a critically informed comprehension of the topic, self-awareness, the ability to engage in self-critique, appreciation for diversity, and informed decision-making.

The study's findings were corroborated by the findings of Mohammed & Ahmed (2021), in which discussion activities encourage critical thinking and are a great way to prepare for oral tests in science, which look at how well the students can explain and defend their ideas and views. Discussion games can give students many chances to come up with their scientific ideas and be much fun for students. Include some fun discussion activities in the classroom to allow students to share their ideas, talk about what they know, and interact with teachers and each other. It is a great way to help students become more fluent in speaking and reduce Teacher Talking Time (TTT). Moreover, exposure to different discussion strategies improves students' communication, collaboration,

creativity, and critical thinking. In contrast, students engage in discussions and work on expressing their thoughts and receiving ideas from peers.

Regression Analysis on the Influence of the Domain Use of Instructional Media in Teaching Science to the 21st Century Learning Skills amid Covid 19

The regression analysis revealed that the use of instructional media in teaching science indicators has a significant influence on the 21st-century learning skills of the students amid covid-19. On the other hand, the study showed that indicators under the use of instructional media in teaching Science, perceived use of audiovisual, and perceived use of multipurpose areas display a significant influence on the 21st-century learning skills of the students amid covid 19. In contrast, the perceived use of school libraries and perceived use of instructional materials unveil that there has no significant influence on 21st-century learning skills amid covid-19.

The result of the study is unparalleled to the study of Patel (2022) on the Role of School Libraries in enhancing the 21st-century learning skills of students is significant, as libraries serve as robust pillars within the educational system. They accomplish this by training students on essential skills such as leadership, responsibility, collaboration, and the significance of discipline in their lives. Thus, good reading habits, constant visitation, and utilizing materials in the library enable students to deal with new learning and skills in this dynamic world. It is an ideal environment for training students in effectively utilizing both print and digital resources, imparting crucial skills. In addition to developing fundamental reading and information skills, the school library creates a nurturing ecosystem for fostering a range of other abilities that contribute to the holistic growth of students.

Second, the findings regarding the perceived use of instructional materials oppose the perspective and research conducted by Bukaye (2018). Instructional materials are crucial in facilitating knowledge acquisition across all subjects within the school curriculum. It enables students to engage with linguistic elements, symbolic representations, and conceptual notions, fostering learning through their proficiencies in reading, listening, problem-solving, creative thinking, oral communication, written expression, and the utilization of media and technology. Nevertheless, the findings of this study were corroborated by Capuno et. Al (2019). According to their study, the researchers noted that teachers consistently utilize instructional materials to engage their students, and these materials play a crucial role within the school curriculum as they encompass the subject matter content.

The result shows the same claim of Spiro, Klautke et al. (2017) that the Spiral Progression Approach (spa) and the use of instructional materials in teaching science are highly interconnected, which promotes 21st-century learning skills, namely communication, collaboration, critical thinking, and creativity, amid covid 19 in learning science. Curricula should follow a spiral progression method, moving from simple to complicated and requiring revisiting earlier knowledge to produce well-equipped learners in the current world. Instructional materials should be oversimplified and support context-dependent knowledge; instruction should be case-based and emphasize knowledge construction, no transmission of information, and knowledge sources should be highly interconnected rather than compartmentalized. These studies are critical since it was recognized that the Spiral Progression Approach (SPA) and instructional media have something to do with 21st-century learning skills amid covid 19.

4. CONCLUSION AND RECOMMENDATION

This section presents the conclusion drawn from the study's findings. The Spiral Progression Approach (SPA) in teaching science was high. Similarly, the use of instructional media in teaching science was high. The level of 21st-century learning skills amid covid 19 was high as well. Moreover, the Spiral Progression Approach (SPA) and the use of instructional media in teaching science have a significant relationship to developing 21st-century learning skills amid covid 19 of the learners. Teachers must employ a series of techniques and strategies that involve discussion, peer collaboration, and problem-solving activities and utilize instructional media as it influences the student's development of learning and skills. As a result, this attribute can significantly impact the building of 21st-century learning skills (Klautke et al., 2017).

After careful review and thorough consideration of the results and conclusions, the researcher came up with several recommendations:

First, since Science teachers significantly apply the spiral progression approach in the K to 12 curricula, the problem-solving activities got the lowest mean among the three indicators. To raise the spiral progression approach (spa) to very high, Officials from the Department of Education should enhance their efforts in implementing educational programs within the Enhanced K to 12 Basic Education Curriculum that specifically focus on fostering scientific inquiry, pedagogical innovations and providing instructional resources to science teachers in rural areas.

The school administrator can assign a specific branch of science to a teacher majoring in biology, integrated Science, physics, and chemistry. Since teacher majoring in physics and chemistry is limited, integrated science major can teach them. Proper alignment of majoring can increase the chance of the teacher to focus on the subject matter she/he is teaching without spending more time studying a topic resulting in few concepts and activities to be given. Moreover, master teachers on the subject matter can have a Learning Action Cell (LAC Session) regarding the intervention to be given to poor students based on the least learned competency. All the indicators can be included as strategies to improve the 21st-century skills of the students.

Second, to significantly increase the utilization of instructional media in teaching science, teachers should consistently incorporate it into various aspects of their lessons, such as motivation, experimentation, hands-on activities, presentation, discussion, and evaluation. By doing so, teachers can create a meaningful learning experience for students. To realize all of these, the school administrators must provide each classroom with a Smart TV set for viewing and speaking, seek more donors of books and references to put in the library, extend the hours of library-in-charge, or must hire a librarian. The educational system can introduce in-person professional development programs encompass teaching methodologies, classroom activities, and assessments. Teachers can be encouraged to attend seminars, workshops, our training sessions to enhance their teaching methods and practices by leveraging digital resources and technology.

Additionally, schools can implement a school-based learning action cell or whole group teaching as an ongoing professional development strategy focusing on cultivating 21st-century learning abilities, expanding teaching approaches, and fostering the integration of multiple methodologies. Schools must provide instructional equipment for demonstrations and additional laboratory apparatus and equipment leveraging modern technologies. The 21st-century and learning skills integration should be prioritized in lesson planning, classroom activities, and evaluations.

Third, to raise the level of 21st-century learning skills amid covid 19 to very high, teachers may conduct a pre/post-assessment survey using the 21st-century skills. Also, for two (2) years of not having face-to-face-

teaching and learning, educational institutions should organize training sessions, seminars, and workshops focused on 21st-century practices applicable to real-world situations. Students must be exposed to genuine challenges and encouraged to think critically to effectively tackle problems arising from the two-year gap caused by the pandemic.

On the other hand, the researcher recommended intensifying the study regarding the spiral progression approach and the learning skills of 21st-century learners after post-covid-19 recovery may be conducted in order to convey the connection between the two variables adequately; it is necessary to furnish an ample amount of data and details.

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