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Mechanisms in the Integration of Forestry Education in the Distance Learning Modality amidst the Covid-19 Pandemic

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Abstract*: This study aimed to determine the mechanisms of the integration of forestry education in the distance learning modality amidst the Covid-19 pandemic. This study utilized a quantitative research design wherein the data were gathered from the participants through a survey method using a validated questionnaire. The analysis of data acquired from the survey revealed that the teacher's effort to maximize mechanisms that would help students give more importance to environmental education is high and is given equal attention to other matters. Every mode of integrating the learning of forestry education is high in preparatory activity, lesson proper, module lessons, activities, and assessments. The challenges encountered, we're constantly wrestling with an exemplary implementation of accepting differences and adjustments. The infusion of different forestry literacy approaches is an excellent step in embracing the long years of forestry education, being accepted as a typical subject for colloquial topics, and becoming more known and valued. It also revealed that they don't have differences in implementing the integration of forestry education across the teaching position. In contrast, according to years in teaching and educational attainment, when they are in the group, they differ in the implementation of forestry education.*

Keywords— *Mechanisms, Integration, Forestry Education, Distance Learning*

1. INTRODUCTION

Climate change is a global phenomenon of climate transition characterized by changes in the planet's natural climate (temperature, precipitation, and wind) caused mainly by human activities (Youmatter, 2020). The country has undergone severe weather events recently, including prolonged dry spells, heavy rains, strong typhoons, and floods, such as those caused by Typhoons Ondoy and Pepeng. These concerns are compounded by harmful activities that have resulted in the loss of trees, mangroves, and coral reefs, as well as the general degradation of the environment. Even some parts of Mindanao are affected.

In addition, the Philippines, an archipelago of 7,107 islands, has always been especially vulnerable to the effects of climate change (Alave, 2011; Ranada, 2014). Much of the country is susceptible to more frequent and increasingly intense natural disasters due to its location in the western pacific (Climate Change Commission Philippines, 2010; Hiwasaki et al., 2015).

On average, the Philippines is hit by twenty tropical typhoons each year, and it ranks third in the world in terms of people at risk from seasonal meteorological events (Climate Change Commission Philippines, 2010; Pealba et al., 2012). According to Esipova and Pugliese (2011), in a recent survey by the Social Weather Stations (SWS), 85 percent of Filipinos (or eight out of ten) said they had "personally observed" climate change impacts in the last three years. Fifty-four percent of those surveyed said their experience was "serious" to "moderate," while 31% said it was "minor.

Increasing environmental awareness is a critical priority for schooling (Slattery & Rapp, 2003). Awareness also allows for a shift in viewpoint, which is necessary for significant learning (Miller, 2021). Many people think rapid action is required to stem the tide of biodiversity loss, climate destabilization, resource overuse, and other concerns due to the urgency and interdependence of environmental and socioeconomic challenges (Ehrlich, 2010).

Change is inevitable in education, as it is in all other fields. Education transformation can be defined as a shift of perspective within education and efforts to alter it. The process of adjusting to new ideas and meeting the demands of educational transformation necessitates a significant amount of effort. Depending on our perspective, this educational transformation can be a threat, an opportunity, a problem, or neutral. New curricula can be used to implement educational reforms such as school reform, teaching, and teacher professionalism. When the school system adopts this new curriculum, its actions can provoke severe resistance to the reforms. Student's and teacher's affective, cognitive, and behavioral-specific responses or acts of resisting or struggling with alterations because there is a vested interest in keeping the status quo can be classified as resistance to educational change (Bemmels & Reshef, 1991; Heuval, 2009).

Forestry education must be integrated into any educational program. Environmental studies make us aware of the value of protecting and conserving our mother earth and the devastation caused by pollution released into the environment. The rise in human and animal populations, industries, and other problems make survival difficult. Many environmental concerns have increased in size, complicating the system daily and threatening humanity's survival on Earth (Nordström et. al.,2019).

The story of life on Earth is the story of living creatures interacting with their environment (Carson, 2011). The leading cause of environmental issues is human development. As a result, we may use education to change people and help them achieve their goals. An individual's

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conduct, thoughts, value judgment, knowledge, and skills are essential in solving environmental problems. Environmental education is a learning process that combines information, understanding, awareness raising, stimulation, balancing, and other factors to help people develop positive habits (Vaughan et al., 2003; Guler, 2009; Vaughan et al., 2009).

The researchers are interested in this study to find out the mechanisms that are effective in integrating forestry education in today's distance learning modality. Moreover, the study's results were the basis for developing the intervention material.

2. RESEARCH METHODOLOGY

The researchers utilized the qualitative research design research wherein the data will be gathered from the participants through a validated questionnaire survey method. This design analyzes the mechanisms of effectively integrating forestry education into distance learning.

The researchers used a validated questionnaire to gather the necessary data for the study. The questionnaire is composed of three (3) parts. The first part of the questionnaire was about the teacher's profile, specifically on the position, years in teaching, and educational attainment. The second part was about the extent of integration of forestry education in distance learning modality in terms of modules. The third part was about the challenges in teaching forestry education in today's modality.

3. RESULTS AND DISCUSSIONS

Problem 1: The profile of the participants in terms of position, years in teaching, and educational attainment.

Table 1 presents the frequency and percentage distribution of the profile of the participants by position.

Table 1: Frequency and percentage distribution of the profile of the participants by position

Teaching Position	Frequency	Percentage
Teacher I	14	58.33%
Teacher III	7	29.17%
Teacher II	2	8.33%
Master Teacher	1	4.17%

Based on the table above, the highest number of participants was in the Teacher I category, with 58.33%, while the Master Teacher category had the lowest number of participants, with 4.17%.

Table 2 displays the percentage and frequency distribution of the participant's years in teaching.

Table 2: Frequency and percentage distribution of the participant's teaching position years in teaching

Years in Teaching	Frequency	Percentage
Above 10 years	12	50 %
6 to 10 years	9	37.50%
Below 3 years	2	8.33%
3 to 5 years	1	4.17%

The figure indicates that most participants were teaching above ten (10) years with a frequency of 12 with 50% of the total participants, while the 6 to 10 years has the lowest frequency of the participants with 4.17%.

Table 3 displays the frequency and percentage of the participants in terms of educational attainment.

Table 3: Frequency and percentage distribution of the participant's educational attainment

Educational Attainment	Frequency	Percentage
Bachelor's Degree	17	70.83%
Master's Degree	4	16.67%
Bachelor's degree w/ earned units in Masters	2	8.33%
Master's degree w/ Doctorate earned units	1	4.17%

The table indicates that the Bachelor's Degree category has the highest number of participants, with 70.83%. The Master's Degree with Doctorate earned units category has the lowest number of participants, with 4.17%.

Problem 2. Extent of Integration of Forestry Education in terms in terms of preparatory activity, lesson proper, activity, and assessment

Table 4: Mean distribution of the participant's extent of the integration of forestry education in terms of module preparatory activity

Preparatory Activity	Mean	Description
I integrate forestry education in…		
1. motivation question.	4.08	Very Frequently
2. story-telling activity.	3.79	Very Frequently

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3. drill.	3.75	Very Frequently
4. class energizer/ ice-breaker.	3.63	Very Frequently
5. educational games.	3.42	Occasionally
Overall	**3.73**	**Very Frequently**

Legend: 4.5 - 5.0(Always); 3.5 - 4.4(Very Frequently); 2.5 - 3.4(Occasionally); 1.5 - 2.4(Rarely); 1.0 - 1.4(Very Rarely)

Table 5 shows the level of the participant's extent of forestry education integration in terms of preparatory activity modules. Based on the table, integrating forestry education through motivation questions got the highest score which has 4.08 %, which also means that motivation questions are used very frequently or 51- 75% of the time, while integrating through educational games got the lowest score which has 3.42%, which also means that educational games are used occasionally or 26- 50% of the time. In total, the overall weighted mean is 3.73%, meaning that the following activities in the preparatory activity are used frequently (51-75% of the time). This indicates that teachers integrate forestry education into the preparatory activity very frequently.

Integrating forestry education as part of the motivation question helps students boost their confidence in performing and sharing their ideas in front of the class. It also helps them become more motivated to study. According to Vale (2013), questioning is a very effective method for generating organizational value. It promotes learning, exchanging ideas, creativity, and performance improvement and fosters teamwork and trust (Brooks, 2018). Rather than lecturing his students on what is true or untrue, he used questions to educate them by drawing out their comprehension of a subject and guiding them to logical conclusions.

Table 5: Mean distribution of the participant's extent of the integration of forestry education in terms of module lesson proper

Lesson Proper	Mean	Description
I integrate forestry education in…		
1. giving examples.	4.42	Very Frequently
2. valuing.	4.38	Very Frequently
3. connecting lessons to the daily life experiences of the pupils.	4.29	Very Frequently
4. discussion.	4.25	Very Frequently
5. question and answer.	4.13	Very Frequently
Overall	**4.29**	**Very Frequently**

Legend: 4.5 - 5.0(Always); 3.5 - 4.4(Very Frequently); 2.5 - 3.4(Occasionally); 1.5 - 2.4(Rarely); 1.0 - 1.4(Very Rarely)

Table 5 shows the mean distribution of the participant's extent of the integration of forestry education in terms of the module in the lesson proper. Based on the table, giving of examples got the highest score which is 4.42% which means that most of the teachers are using it in integrating forestry education 51- 75% of the time, while the question and answer got the lowest score which is 4.13% which also means that most of the teachers are using it very frequently or 51-75% of the time. In total, the overall weighted mean is 4.29, meaning that the following activities in the lesson proper are used by the teacher in the integration of forestry education very frequently (51-75% of the time).

Integrating forestry education as part of giving examples is essential to the lesson because it helps students' clearer analogy about the lesson. The research also stated that most teachers do not have seminars or proper guidance in choosing good examples, which is what the teacher needs, especially in primary grades. Visual aids, auditory aids, real objects, and a variety of additional learning materials are examples of learning resources (Agun et al., 1977).

Table 6: Mean distribution of the participant's extent of the integration of forestry education in terms of the module's activity

Activity	Mean	Description
I integrate forestry education in…		
1. enrichment activity.	3.88	Very Frequently
2. guided activity.	3.88	Very Frequently
3. individual activity.	3.83	Very Frequently
4. problem-solving activity.	3.63	Very Frequently
5. group activity.	3.50	Very Frequently
Overall	**3.74**	**Very Frequently**

Legend: 4.5 - 5.0(Always); 3.5 - 4.4(Very Frequently); 2.5 - 3.4(Occasionally); 1.5 - 2.4(Rarely); 1.0 - 1.4(Very Rarely)

Table 6 shows the mean distribution of the participant's extent of the integration of forestry education in terms of the module's activity. Based on the table, the highest variable with the highest score is the guided and enrichment activities, with 3.88%. This means that most of the teachers are using these two in integrating forestry education very frequently (51- 75% of the time), while the group activity got the lowest score which is 3.50%. In total, the overall weighted mean is 3.74% which means that all the activities in the activity part are used by the teachers in the integration of forestry education very frequently (51-75% of the time).

Integrating forestry education as part of enrichment and guided activity helps pupils become more engaged in their students and remember more information. According to Bybee (2009), through involvement in practical experiments in which the teacher solely played a guiding and supportive role, this guided approach enabled students to accept primary responsibility for their learning. The teacher-directed condition highlighted the importance of teachers in assisting students' learning, with students first being introduced to the topic and then observed. In addition, Blanchard et al. (2010) discovered that the guided-inquiry method is way more efficient than the traditional method, especially in improving the content knowledge and the process of teaching science.

In the same way, Enrichment Programs constitute the link between cognitive, affective, and emotional goals

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(Nogueira, 2006). Chang (1974) executed in her study that the use of creative teaching methodologies and well-planned science enrichment activities had a favorable impact on student performance in the subject. She also noted that the activity must be relevant to what the student already knows. Stake and Mars (2001) verify the effect of enrichment activities, especially if the supervising teachers are competent.

Table 7 shows the mean distribution of the participant's extent of integration of forestry education in terms of the module's assessment.

Table 7: Mean distribution of the participant's extent of the integration of forestry education in terms of the module's assessment

Assessment	Mean	Description
I integrate forestry education as…		
1. part of the choices in multiple choice type.	3.88	Very Frequently
2. subject or topic in other objective types of test.	3.71	Very Frequently
3. part of the performance-based assessment.	3.71	Very Frequently
4. part of the questions in matching-type items.	3.50	Very Frequently
5. subject or topic in essay writing.	3.33	Occasionally
Overall	**3.63**	**Very Frequently**

Legend: 4.5 - 5.0(Always); 3.5 - 4.4(Very Frequently); 2.5 - 3.4(Occasionally); 1.5 - 2.4(Rarely); 1.0 - 1.4(Very Rarely

Based on the table, integration of forestry education is integrated as part of the choices in multiple choice test got the highest score which is 3. 88%, which means it is used very frequently (51- 75% of the time) while integrating forestry education as subject or topic in essay writing got the lowest score which is 3.33% which also means it is used occasionally (26- 50% of the time). In total, the overall weighted mean is 3.63% which means that all the types of assessment are used by the teachers in the integration of forestry education very frequently (51-75% of the time).

Integrating forestry education as part of the choices in multiple choice helps students be less prone to guessing than true/ or false. It helps students recall their ideas by looking at the choices. According to Weimer (2019), multiple-choice questions have several advantages. The apparent answer is one of the most evident advantages of this type of questioning. In many circumstances, a student knows the solution to a question but cannot recall it owing to memory problems or exam stress. Seeing the solution may stimulate memory, allowing a correct response. Because multiple-choice questions are short and sharp, more of them can be asked in a test situation to provide a student with a complete examination of their knowledge of a subject. Online resources use multiple-choice questions to help youngsters focus on a test. It also helps when the correct answer is supplied alongside an explanation of why it is right in an interactive test.

Problem 4. Significant difference between the extent of integration of forestry education when grouped according to profile

Table 8: Multiple comparisons of the analysis of variance of the extent of integration of forestry education when grouped according to profile

Participants' Profile	P value	Remarks	Decision
Teaching Position	.274	Not significant	do not reject Ho
Years in Teaching	.024	significant	reject Ho
Educational Attainment	.002	Significant	reject Ho

Table 8 shows the significant difference between the extent of integration of forestry education when grouped according to profile. Based on the table, the p-value, when grouped according to their teaching position, is .274, which means that the null hypothesis is failed to reject or not significant. It also means that across the teaching position, the teacher participants don't have differences in implementing the integration of forestry education. In contrast, when they are grouped according to years in teaching and educational attainment, the p-value is lower than 0.05, which means that the null hypothesis is rejected. This also means that they have differences in implementing the integration of forestry education when they have different years in teaching and educational attainment.

Teacher quality matters. It is the most important school-related factor influencing student achievement, but a teacher cannot be determined to be qualified by checking their teaching position. According to Wenglinsky (2002), a teacher's qualification cannot be judged by their degree level, years of experience, or teaching position. Teachers impact pupils by how they engage with them, particularly in the classroom. As a result, while education and experience are crucial, they only account for a percentage of a teacher's ability to manage a classroom effectively.

4. CONCLUSIONS

The National Environmental Awareness and Education Act raises public awareness of the importance of environmental education for long-term development in the Philippines. The study aimed to determine the mechanism of the integration of forestry education in distance learning modality amidst the Covid-19 pandemic. The finding denotes that teachers' effort in maximizing mechanisms that would help students give more importance to environmental education is high and is given equal attention to other matters.

Every mode of integrating the learning of forestry education is high in preparatory activity, module lessons, activities, and assessments. It also revealed that the participants have differences in implementing the integration of forestry education across the teaching position. In contrast, according to years in teaching and educational attainment, when they are in the group, they differ in the implementation of forestry education.

5. RECOMMENDATIONS

Finding the ideal mechanism makes it possible to integrate forestry education into the distance learning modality. Nevertheless, some things need to be considered, such as the deficit of seedlings. It would be problematic if there were insufficient seedling production because the subject mainly focuses on planting trees. The struggle for most students, especially in remote areas, is to provide their materials for growing even if they have a lot to produce. It would be a high cost for schools to supply each student with the needed materials. The major challenge is that Forestry Education was not recognized as a subject even before distance learning was established. Forestry Education may be taught as a subject, not only as a supplement to EPP and Science classes. Most students currently dismiss becoming foresters, farmers, or agronomists because these professions are given different treatment and benefits than other careers. It may be an autonomous course. It may be valued in the same way we heed doctors, nurses, and other professions.

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