NATIONAL TRAINING WORKSHOP IN INCLUSIVE SCIENCE EDUCATION FOR LINGUISTIC AND CULTURAL DIVERSITY FOR PRE-SERVICE SCIENCE TEACHERS

TECHNICAL REPORT 3

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TECHNICAL REPORT 3

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ABOUT ESTA

Background of the Project

EU-report on science education for responsible citizenship and the Paris declaration recommend teaching all students for our better future. In Georgia, the Philippines, and Bosnia and Herzegovina, a large number of young people do not meet basic requirements in science. In international assessments of science performance, all three countries scored very low. One great challenge for science education in Georgia, Bosnia and Herzegovina, and the Philippines are the countries' plurality of languages and cultures. While the education system in Georgia, and Bosnia and Herzegovina, underwent major changes after the fall of the Soviet Union and the subsequent conflicts in power relations, colonialism has left its imprint on the Philippine education system. Science education in all three countries takes place amidst political and ethnic divides that translate into linguistic heterogeneity and cultural diversity.

Main Strategy

Building a transnational network of university science teacher educators in which evidence for the effectiveness of new approaches to science teaching and learning will be shared and discussed in order to implement only the most effective and efficient measures.

Goals of the Project

Improving the level of competencies in HEI in partner countries by professionalization and development of university science teacher educators regarding diversity in science classes (focus on language and culture). Teacher educators, in turn, will share their knowledge and skills with in-service and pre-service science teachers, and thereby contribute to a more inclusive and higher quality science teaching.

ESTA-PNU

Description of the University

The Philippine Normal University (PNU) was established on September 1, 1901 as Philippine Normal School, and as the first higher institute of learning organized during the American occupation. Renamed Philippine Normal College in 1949, it became a university in 1991. In 2009, PNU was designated as the National Center for Teacher Education under Republic Act No. 9647. It has four hubs located strategically in the archipelago: The Technology and Livelihood Hub in Southern Luzon, The Multicultural Hub in Mindanao, The Indigenous Peoples Hub in Northern Luzon, and The Environment and Green Technology Hub in the Visayas.

Influence of the project to the institution (also translation for this expression)

As the NCTE (National Center for Teacher Education), ESTA propels the University to initiate country program in teacher education curriculum to achieve teacher quality especially in the field of Sciences. This may be model science programs for pre-service and in-service Filipino teachers in all Normal Schools and government-owned Teacher Education Institutions (TEIs). Furthermore, ESTA may provide significant contribution to Philippine IP (Indigenous Peoples) Education through model IP frameworks and curricula for IP teachers and to support the IP basic education (elementary and secondary) of the country.

EXECUTIVE SUMMARY

Happier teachers would equate to more engaged students (Archer, 2017). Hence, SDG 4, which banners quality education, stipulates training and recruitment of quality teachers as an important aspect of ensuring inclusive quality education (Nilsen & Gustafsson, 2016; Seebruck, 2015). The Philippines' elaboration of SDG 4's call for quality education is an emphasis on Talent Retention, and Science Education specified in its country document, PAGTANAW 2050 (Rodil, 2021). As a priority area of PAGTANAW 2050, the country highlights plans and programs to address science teachers' poor qualifications and compensate for the loss of good science teachers who have gone abroad. Within this spectrum, the Philippine Normal University, as the National Center for Teacher Education, engages in national training for pre-service science education students through the ESTA program to introduce to future science teachers the concept and means of inclusive science education and better enact inclusive science education in the country.

Educating Science Teachers for ALL (ESTA) is an international program for the capacity building of science teachers and pre-service science students and teachers in countries where a plurality of languages and cultures exist, where science education takes place amidst political or ethnic divides that translate into linguistic heterogeneity and cultural diversity. As one of the partner countries and institutions, ESTA aims to improve the competencies of prospective or future science teachers regarding diversity in science classes, particularly in linguistics and cultural aspects. Hence, training workshops were designed to address the aforementioned goal.

The document reports on the proceedings of a training workshop (National Training Workshop in Inclusive Science Education for Linguistic and Cultural Diversity for Pre-Service Students) that focused on training Pre-service Students to enact an inclusive science education in the Philippine classrooms. Furthermore, the training workshop highlights strategies, processes, and protocols for addressing diversity and heterogeneity in class.

The training was designed using the ESTA-PNU framework, Science Education for Linguistic and Cultural Diversity in Philippine Higher Education (SELC-PhPHiEd). Designed as a 2-phased training workshop, phase 1 emphasized inputs covering the ESTA program, ESTA-PNU framework, science education, concepts on culture and language in and for science, and engagement in activities that could be conducted in science classrooms to address diversity collectively categorized as Academic Staff Tour (AST). Phase 2 of the training focused on mentoring the pre-service science students to craft their unique Lesson Exemplars anchored on the ESTA-PNU framework to enact an inclusive science education. Furthermore, the document features sample products of the pre-service science student participants (e.g., sample Lesson Exemplar, reflection, hook videos) that present how they acquired and exercised their 'agency' (Andrée & Hansson, 2020) to an inclusive quality science education.

References:

Andrée, M., & Hansson, L. (2020). Industry, science education, and teacher agency: A discourse analysis of teachers' evaluations of industry-produced teaching resources. *Science Education, 105*(2), 353–383. https://doi.org/10.1002/sce.21607

Archer, L. (2017). Happier teachers and more engaged students? Teachers developing a pedagogical approach in collaboration with researchers. *Research in Teacher Education, 7*(1), 29–32. https://repository.uel.ac.uk/item/891xw

Nilsen, T., & Gustafsson, J-E. (2016). *Teacher quality, instructional quality and student outcomes*. Springer, Cham. https://doi.org/10.1007/978-3-319-41252-8.

Rooney, A. L., & Van Ostenberg, P. R. (1999). *Licensure, accreditation, and certification: approaches to health services quality: Vol. quality assurance methodology refinement series. center for human services (CHS)*. https://www.globalhealthlearning.org/sites/default/files/reference-files/rooneu.pdf

Seebruck, R. (2015). Teacher quality and student achievement: a multilevel analysis of teacher credentialization and student test scores in California high schools. *McGill Sociological Review, 5,* 1-18.

ABOUT THE TRAINING

Rationale

In preparing science teachers for quality science education, the country needs to consider the issues and struggles against the plurality of language, diversity, and heterogeneity of learners. The Philippine plurality of language and culture is sourced from the cultural and linguistic profile of the Filipino people, with about 110 indigenous groups and more than 170 languages spoken as first languages from a multitude of regional dialects and languages (Philippines, September 28, 2017). Hence, it may be assumed that science education in the country occurs amidst ethnic divides that translate into linguistic and cultural diversity. Such social conditions in the school or classroom may hamper meaningful learning of science concepts.

Several studies claim the vital contribution of teacher quality to student learning and achievement in general (Nilsen & Gustafsson, 2016; Seebruck, 2015). SDG 4, which promotes quality education, identifies the recruitment and training of quality teachers as an important aspect of ensuring inclusive quality education. Similarly, the Philippine Professional Standards for Teachers (PPST) aim to prepare pre-service students and improve teacher quality in the country. In congruence with and in response to the Department of Education's clamor for teacher education institutions (TEIs) to produce quality teachers, there may be a need to promote programs on capacity building or training for pre-service science students to prepare them to enact their science lessons better to address the needs of culturally and linguistically diverse (CLD) students when they practice the profession.

Educating Science Teachers for All (ESTA) is a specially designed international project and program that seeks to contribute to teacher training institutions regarding science teacher preparation for inclusive science education through disseminating science teaching approaches in culturally and linguistically diverse contexts. Conscious of these conditions, the ESTA-PHIL-PNU team proposes to conduct an intensive training workshop for the pre-service science students of the Philippine Normal University system and for all invited pre-service science students from other organizations, such as PASUC and 3NS to prepare them for an inclusive and quality science education. Primarily, the training will introduce, orient, and train pre-service science education students in managing diverse classes within the context of the Philippine language and culture. The aim can be achieved by introducing the ESTA-Philippines-PNU framework (Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education [SELC-PhPHiEd]) and other ESTA resources to pre-service science students before they enter the profession. The design of lesson exemplars will also be the focus of the training program.

Objectives

The training workshop aims to introduce, orient, and train pre-service science education students to provide an avenue to successfully manage diversity in science classes within the context of the country's language and culture. Specifically, the workshop aims to:

1. Provide inputs to pre-service science students on the concepts and constructs of science education, language for the sciences, and the contextualization of lessons;
2. Acquaint the pre-service science students with strategies in managing diverse science classrooms.
3. Orient the pre-service science students on the Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELC-PhPHiEd) framework and other ESTA products.
4. Facilitate the development and validation of lesson exemplars.

Compentencies

The training workshop aims to introduce, orient, and train pre-service science education students to provide an avenue to successfully manage diversity in science classes within the context of the country's language and culture. Specifically, the workshop aims to:

1. Provide inputs to pre-service science students on the concepts and constructs of science education, language for the sciences, and the contextualization of lessons;
2. Acquaint the pre-service science students with strategies in managing diverse science classrooms.
3. Orient the pre-service science students on the Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELC-PhPHiEd) framework and other ESTA products.
4. Facilitate the development and validation of lesson exemplars.

Materials and Instruments

1. Framework

The framework for Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELC-PhPHiEd) is visualized to encompass three major components: the Filipino learners, the pedagogies and pedagogical frameworks, and the teachers' knowledge system in terms of enacting the science curriculum. SELC-PhPHiEd presents the general constructs of focus in undertaking curricular modifications, enhancements, and enactment. These general constructs outline how the blueprint may also inform the different teacher education processes that inform teacher's knowledge, trainings and research in pedagogies, and the development of products for teaching and learning such as lesson exemplars, modules, and assessment within the bounds of linguistic and cultural inclusivity. SELC-PhPHiEd is PNU's vehicle to concretely advocate transfer of technology and disseminate knowledge on linguistic and cultural inclusivity to other Teacher Education Institutions for higher quality science education in the country.

Source: https://pnu-onlinecommons.org/omp/index.php/ESTA/catalog/book/1181

Materials and Instruments

2. Instruments

Peer Review Form

This form is an evaluation tool utilized in the first level quality assurance of the developed Lesson Exemplars.

Materials and Instruments

2. Instruments

Evaluation Rubric

The LE template comes with an evaluation Rubric designed to frame the criteria for exemplars. The same tool utilized in the panel critiquing.

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

RUBRICS FOR THE LESSON EXEMPLAR (LE)

Name:		Institutional Affiliation:	
Title of the Lesson:		Area of Specialization:	

	1- Beginning	2- Proficient	3- Highly Proficient	4-Distinguished	Score/ Level
Course Learning Outcomes/Learning Competencies	Lesson objectives are NOT clear, and DO NOT match the content standards or the course learning outcomes and the identified topics. Furthermore, the tasks are not aligned with the objectives.	The content standards or course learning outcomes and the identified topics partially match the learning objectives. Some lesson objectives are clear and concise. However, not all the identified tasks match the specified learning objectives and content.	The content standards or course learning outcomes and the identified topics match the learning objectives. All the lesson objectives are clear and concise. Identified tasks match each of the specified learning objectives and content.	The set learning objectives are appropriately aligned with the content standards or course learning outcomes. All lesson objectives are clear, concise and measurable. There are provisions of supplemental learning tasks aligned with the set learning objectives and content, for a more enriched understanding of the lesson.	
About the Learners	**NOT** specific and **insufficient** detailed processes of diagnosis of class misconception are observed	**Specific** but **insufficient** detailed processes of diagnosis of class heterogeneity, and misconception are in place.	**Specific** and **detailed** processes of diagnosis of diversity, class heterogeneity, and misconception are in place.	**Specific, contextualized** and **detailed** processes of diagnosis of diversity, class heterogeneity, and misconception are in place.	

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Materials and Instruments

2. Instruments

Evaluation Form

This form was administered to the participants to assess the overall management of the training program and the attainment of the aforementioned objectives of the training.

Materials and Instruments

2. Instruments

Science Capital Survey

Description

Training Design

The training included two phases: plenary sessions and mentoring sessions. The plenary sessions are synchronous sessions for the team to discuss the major concepts and principles with the participants. The team shared their knowledge on strategies to (1) manage diverse and heterogeneous classes and (2) integrate culture and language in teaching science concepts. The plenary sessions accepted as many participants as possible on the Zoom platform. The mentoring sessions, however, only accommodated a specific number of participants. Selection criteria for the participants in the mentoring session include: 1) having a solid commitment to complete the training program; 2) having technological capability; and 3) being well-versed in one of the significant mother tongue languages in the country.

Part 2 of the training is designed as a mentoring program. This phase was conducted on a hybrid setup to accommodate pre-service students from the provinces. Onsite conduct of the mentoring session was done on different campuses of PNU if applicable. In this part or phase of the training, the participants were assigned to one or two ESTA-PNU team members with the same specialization. Mentoring and consultation included lesson exemplar development, peer review, and revision of the participants' outputs. For this part of the training, each significant activity, for mentoring and consultation, is allotted a week of engagement with the participants in small research cells [grouping according to or based on specialization: biology, chemistry, and physics; and geographic location or PNU campus]. The training included 20 hours of synchronous sessions [Plenary and Panel Critiquing] and three weeks of asynchronous sessions [Mentoring and Consultation].

TRAINING PROPER

Training Program

PHILIPPINE NORMAL UNIVERSITY
The National Center for Teacher Education
in Collaboration with
EDUCATING SCIENCE TEACHERS FOR ALL

NATIONAL TRAINING WORKSHOP IN INCLUSIVE SCIENCE EDUCATION FOR LINGUISTIC AND CULTURAL DIVERSITY FOR PRE-SERVICE SCIENCE TEACHERS

SEPTEMBER TO OCTOBER 2023

PROGRAM

DAY 01
SEPTEMBER 27, 2023
1:00-5:00 PM

Mr. Alfons Jayson O. Pelgone
ESTA-Phil-PNU Team Member
Moderator/Facilitator

OPENING PROGRAM

OPENING REMARKS
Dr. Adonis P. David
Vice President for Research, Planning and Quality Assurance

KEYNOTE 1: TEACHER QUALITY
Dr. Jennie V. Jocson
Vice President for Academics

PLENARY 1: SCIENCE EDUCATION
Prof. Marie Paz E. Morales
ESTA-Phil-PNU Project Lead

ESTA: THE DLSU EXPERIENCE
Dr. Lydia S. Roleda
ESTA-Phil-DLSU Team Leader

OPEN FORUM

DAY 02
OCTOBER 4, 2023
1:00-5:00 PM

Dr. Crist John M. Pastor
ESTA-Phil-PNU Team Member
Moderator/Facilitator

PRELIMINARIES

PLENARY 2: LANGUAGE FOR SCIENCES
Dr. Ruth A. Alido
ESTA-Phil-PNU Team Member

AST 1: DIVERSITY IN CLASS
Mr. Alfons Jayson O. Pelgone
ESTA-Phil-PNU Team Member

AST 2: CONCEPTUAL CHANGE
Dr. Leah Amor S. Cortez
ESTA-Phil-PNU Team Member

OPEN FORUM

DAY 03
OCTOBER 11, 2023
1:00-5:00 PM

Dr. Leah Amor S. Cortez
ESTA-Phil-PNU Team Member
Moderator/Facilitator

PRELIMINARIES

PLENARY 3: CONTEXTUALIZATION
Culture for Sciences
Culture Integration
Dr. Zenaida Q. Reyes
ESTA-Phil-PNU Team Member

AST 3: ACQUISITION OF SCIENCE CAPITAL
Dr. Crist John M. Pastor
ESTA-Phil-PNU Team Member

OPEN FORUM

DAY 04
OCTOBER 18, 2023
1:00-5:00 PM

Prof. Ruel A. Avilla
ESTA-Phil-PNU Team Member
Moderator/Facilitator

PRELIMINARIES

AST 4: SELF-CONCEPTS: GENDER AND CULTURE, AND THE IMPACT OF SCIENCE SELF-CONCEPT ON LEARNING BEHAVIOR
Dr. Arlyne C. Marasigan
ESTA-Phil-PNU Team Member

AST 5: TECHNOLOGY INTEGRATION
Prof. Ruel A. Avilla
ESTA-Phil-PNU Team Member

AST 6: FLIPPED CLASSROM

ORIENTATION TO LESSON EXEMPLAR (LE) DEVELOPMENT WORKSHOP
Dr. Brando C. Palomar
ESTA-Phil-PNU Team Member

OPEN FORUM

Limited to 100 slots only

WEEK 1
[ASYNCHRONOUS]
LESSON EXEMPLAR DEVELOPMENT
ESTA-Phil-PNU Team
PNU Science Educators

WEEK 2
[ASYNCHRONOUS]
LESSON EXEMPLAR PEER REVIEW
ESTA-Phil-PNU Team
PNU Science Educators

WEEK 3
[ASYNCHRONOUS]
LESSON EXEMPLAR REVISION
ESTA-Phil-PNU Team
PNU Science Educators

WEEK 4
[ASYNCHRONOUS]
LESSON EXEMPLAR PRESENTATION AND PANEL CRITIQUING AND CLOSING PROGRAM/ACTIVITY
ESTA-Phil-PNU Team
PNU Science Educators

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Phase 1: Synchronous Phase

Day 1 (September 27, 2023)

The first day of the intensive training commenced with a warm greeting from the master of ceremonies, Prof. Alfons Jayson O. Pelgone, followed by an opening prayer and the presentation of the University's vision, mission, and quality policy. He then introduced the Vice President for Research, Planning, and Quality Assurance, Dr. Adonis P. David, for his opening remarks and commended the ESTA-PNU team for their dedication to helping the participating faculty manage diversity in science classes. Dr. Brando C. Palomar discussed a statement of purpose to highlight the objectives of the training.

Two key topics for plenary sessions were presented to the pre-service science students on the first day. Dr. Marie Paz. Morales, Project Lead, presented the topic, "Purpose of Science Education," where she underscored the role of science education in achieving and realizing Education 4.0. The Project Lead of ESTA-DLSU (De La Salle University), Dr. Lydia Roleda, engaged the pre-service science student participants in ESTA-DLSU experiences highlighting cultural aperture.

Concluding the first day, Prof. Pelgone thanked the participants for their active participation and discussed a few reminders for the upcoming sessions.
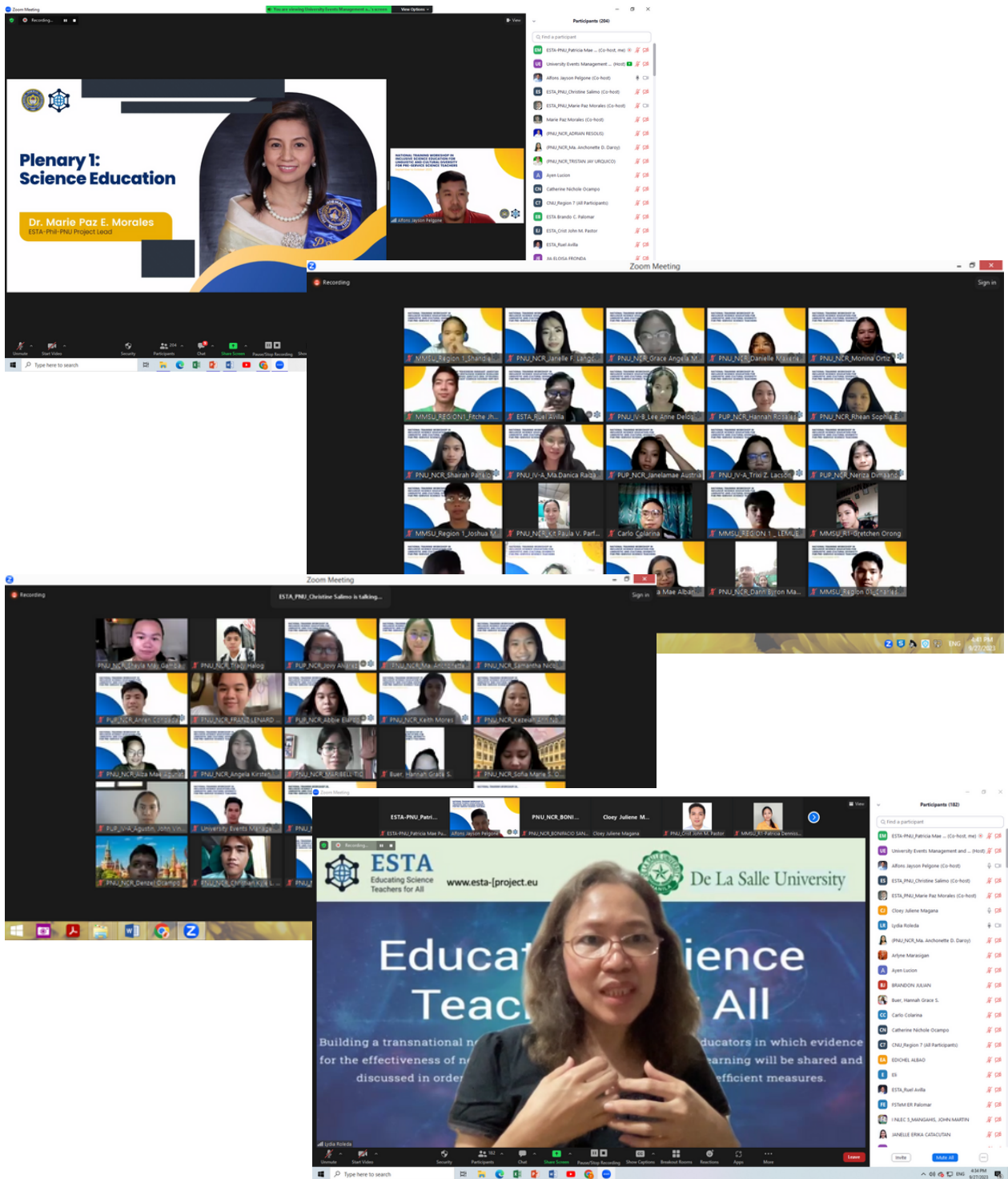
Phase 1:
Synchronous Phase

Day 2 (October 4, 2023)

Commencing the second training day, Dr. Crist John M. Pastor, as master of ceremonies, greeted the participants with a warm welcome and shared a glimpse of the first day through a recap. Emphasizing the significant role of language in science education, Dr. Ruth A. Alido discussed the topic "Language for Science." The discussion highlighted students' difficulties in the language of science, language of thought patterns in the sciences, and specialized techniques for reading the sciences.

For this second day, the ESTA-PNU team two academic staff tour topics, AST1: Diversity in Classes and AST 2: Conceptual Change. Prof. Alfons Pelgone underscored in AST 1 how diversity in classes might be diagnosed and emphasized the sensitization of the student participants to cultural and linguistic diversities. Dr. Leah Amor S. Cortez discussed interest and science education for the second AST. She emphasized the components of interest and introduced some strategies to make science teaching more interesting to learners. At the end of her talk, Dr. Cortez presented the official framework of the ESTA project, Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELCPhPHiEd).

To further accentuate the importance of engaging students in a class, Prof. Alfons Jayson O. Pelgone introduced a strategy called "hooks" that may engage students in learning science concepts. He also presented the sample hook videos created by his students incorporating language and cultural contexts to address diverse learners in a class.

Wrapping up the second day, Dr. Pastor thanked the resource persons for their substantial discussions.
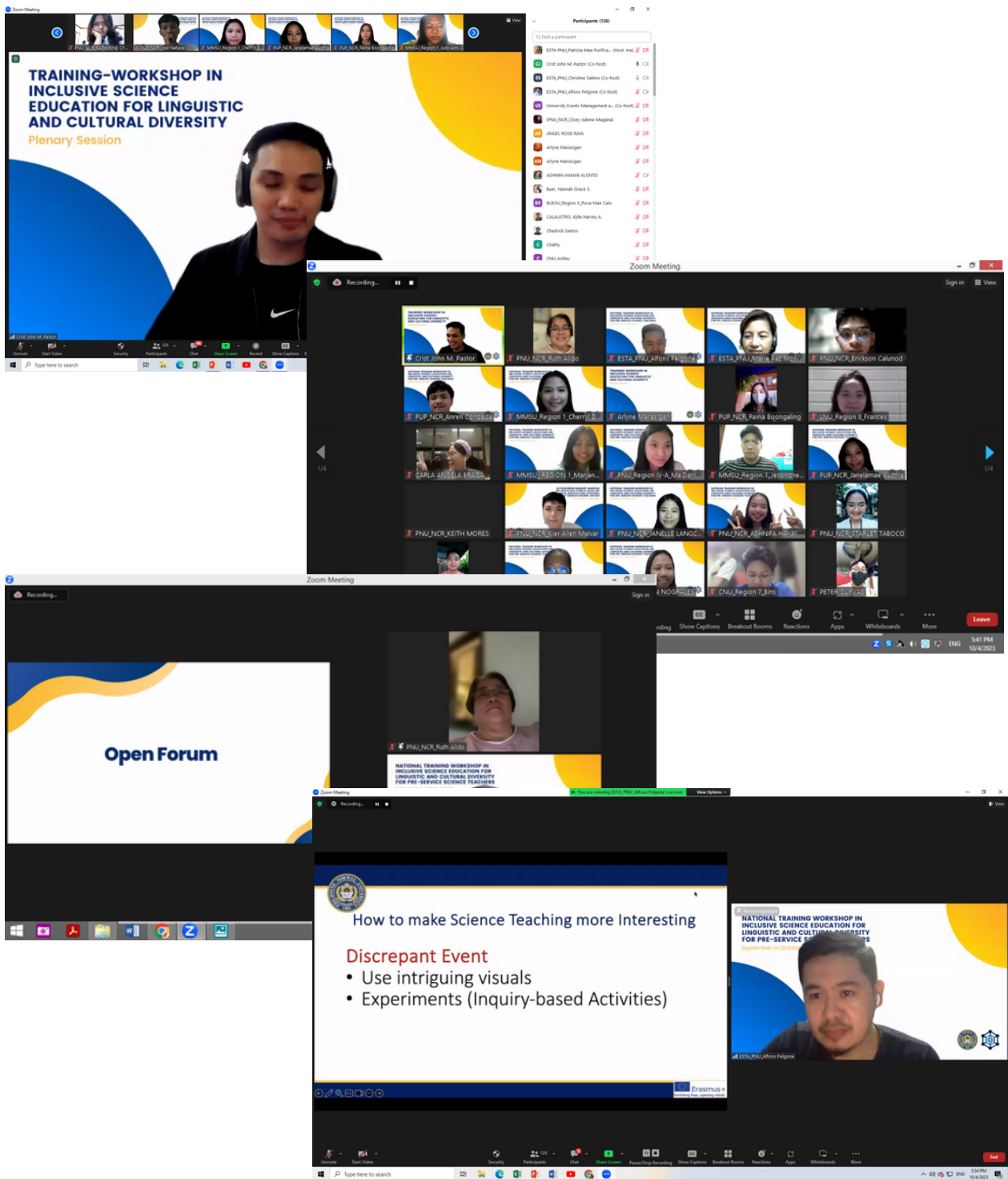
Phase 1: Synchronous Phase

Day 3 (October 11, 2023)

The third day of the training was packed with insights and discussions on culture integration, as introduced by the master of ceremonies, Dr. Arlyne Marasigan. She started the session for the day with a recap and introduced the assigned speakers, Dr. Zenaida Q. Reyes and Dr. Crist John Pastor.

Dr. Zenaida Q. Reyes discussed the topic, "Understanding Contextualization in Education," featuring the background of contextualization, its relative concepts and processes, and its implications for education. In the middle of the session, participants were asked about their concept of contextualization. Soon after, Dr. Crist John M. Pastor discussed the topic of "Culture Integration," where he featured the steps in contextualizing teaching. Dr. Pastor also discussed "AST 4: Acquisition of Science Capital."

At the end of each day, pre-service student participants were engaged in open discussion for clarifications and questions before wrapping up the sessions for the day by the moderator.
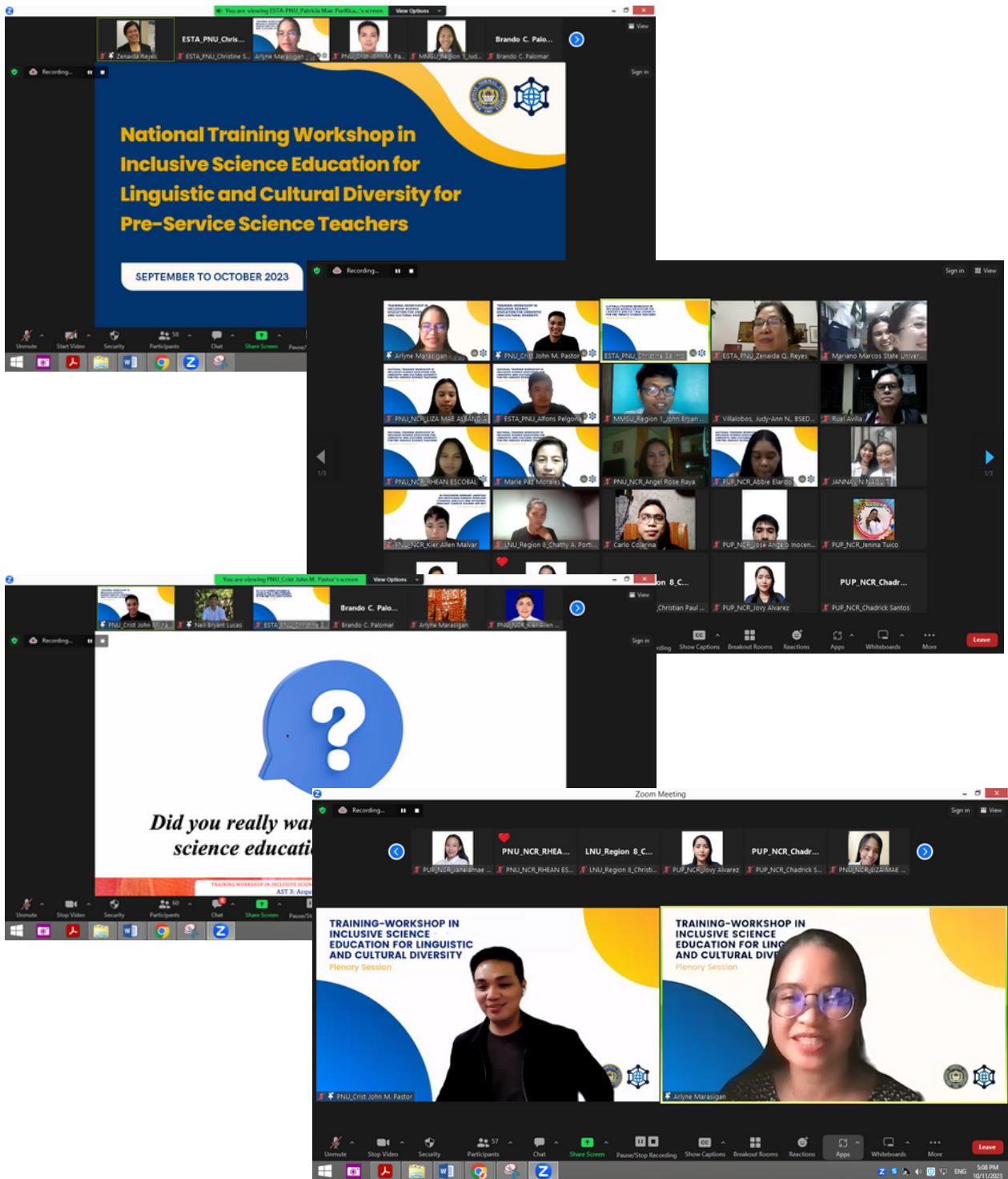
Phase 1:
Synchronous Phase
Day 4 (October 18, 2023)

Paving the way to successfully managing diversity in science classes as aimed by the training, the fourth day started with introductions and a recap of the third day's session. Prof.Ruel Avilla introduced three ESTA-PNU team members and their respective topics for discussion.

Dr. Arlyne C. Marasigan discussed "AST 3: Chemistry Self-concepts: Gender and Culture, and the Impact of Chemistry Self-concept on Learning Behavior," Intended to change the learning to a learner-centered approach. Succeeding such, Prof. Ruel A. Avilla discussed the concepts and facts related to the topic, AST 5: Technology Integration. A paper published through a project, TPACK in Philippine STEAM Education, was also presented to emphasize the technology tools used by STEAM teachers.AST 6: Flipped Classroom was discussed by Dr. Brando C. Palomar. The discussion included the background of the approach, process, and components, as well as the sample local study of the approach.

For the last topic, Dr. Brando Palomar presented and discussed the lesson exemplar as one of the major outputs of the training. He emphasized the timeline for the said deliverable in asynchronous sessions with the mentors from ESTA-PNU team members. Subsequently, Dr. Palomar discussed the groupings of mentoring sessions, agreements, and schedules.

The four-day intensive training concluded with expressions of appreciation and gratitude from participants and with the singing of the PNU Hymn.
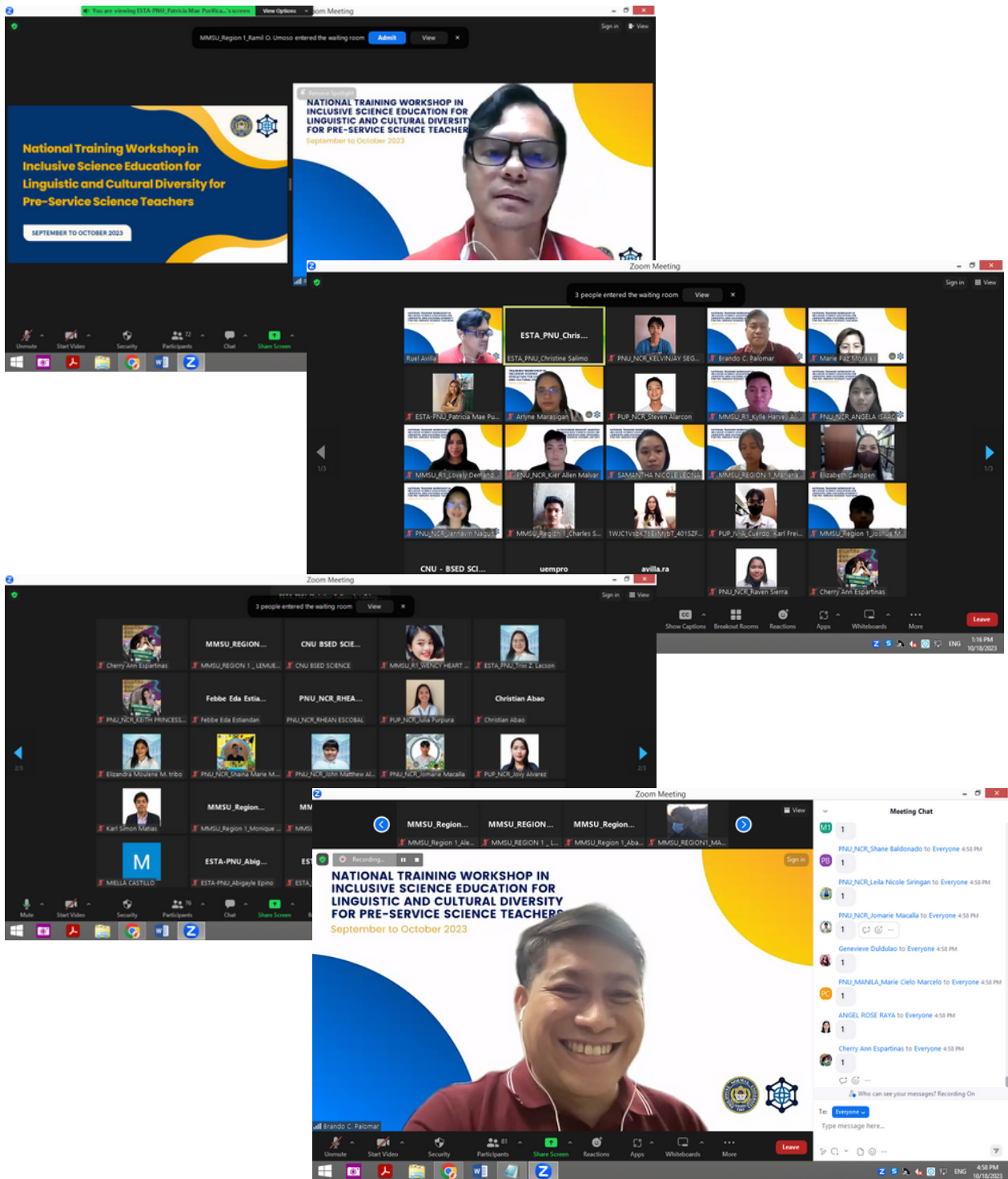
Phase 2: Asynchronous Phase

Aiming to train the participating university science educators in developing the Lesson Exemplar (LE), a month long asynchronous sessions was dedicated to mentoring sessions in small groups according to participants' specialization with mentors from ESTA-PNU team.

Week 1 [Lesson Exemplar Development]

The session focused on facilitating participants where they were able to draft and craft their Lesson Exemplars. Informal sharing was done within and across groups and disciplines to exact the finest Lesson Exemplar for a particular science lesson or topic.

Week 2 [Lesson Exemplar Peer Review]

In this session, crafted and designed Lesson Exemplars for science lessons or topics were subjected to peer review (by fellow participants) that help the developers provide varied perspectives through while peers assessed their Lesson Exemplars. The session provided constructive remarks for the improvement or enhancement of developed Lesson Exemplars and determined alignment of designed Lesson Exemplars to the aforementioned models and frameworks.

Week 3 [Lesson Exemplar Revision]

n this session, developers of Lesson Exemplars engaged in revising their products based on the comments and suggestions of their peers. This is a prerequisite to the next activity that focused on presentation of the revised Lesson Exemplars to the ESTA-Philippines-PNU Team and critiquing of the panel of evaluators.

Week 4 [Lesson Exemplar Presentation and Panel Critiquing]

In this session, crafted and designed Lesson Exemplars for science lessons or topics were presented to the participants and experts. Critiquing was done to provide constructive remarks for the improvement or enhancement of presented Lesson Exemplars and determined alignment of designed Lesson Exemplars to the aforementioned models and frameworks with a panel members from ESTA-PNU team held during the Closing Activity on March 16, 2022.
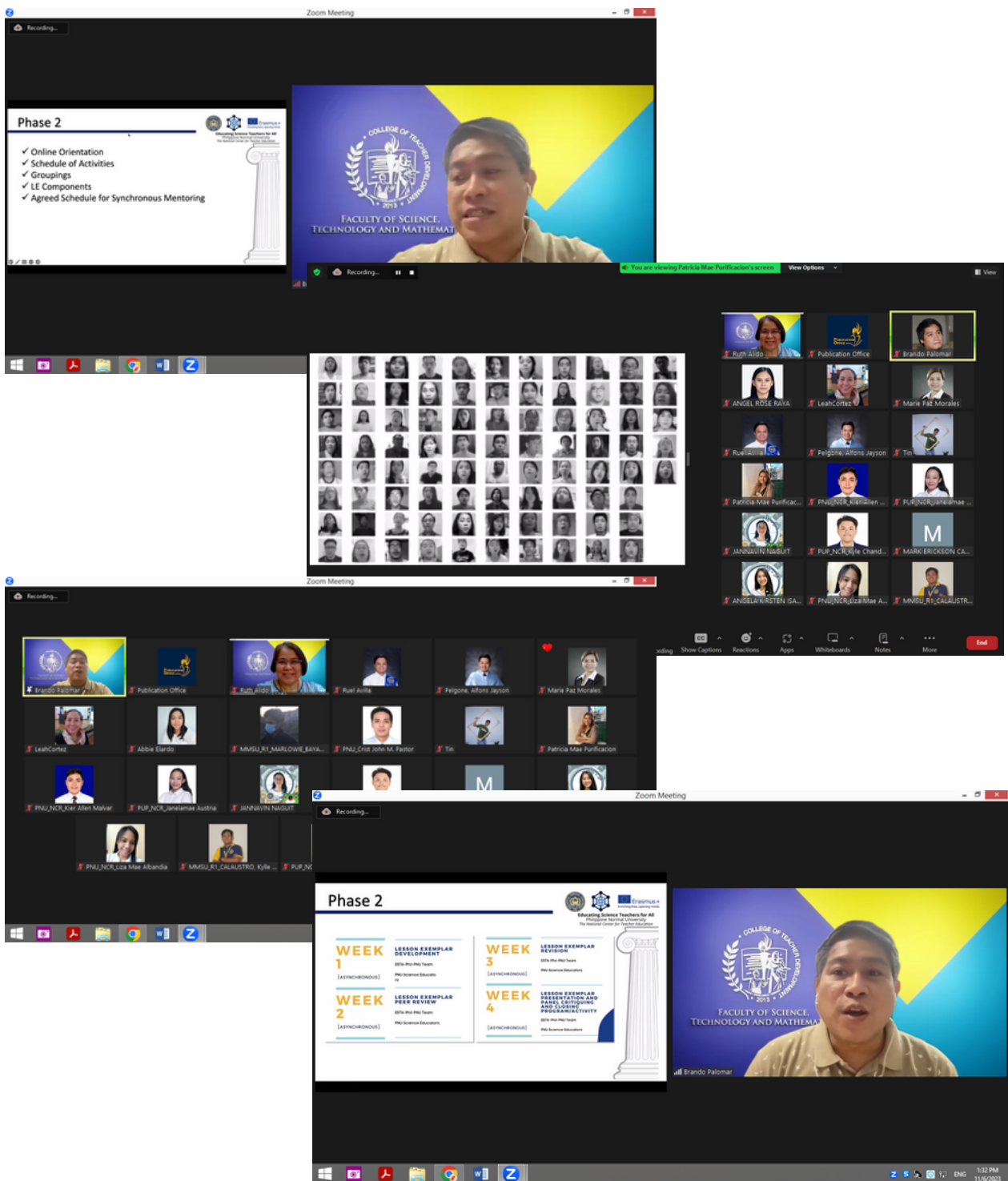
Closing Activity

November 29, 2023

Concluding the two-phase intensive training, a closing activity was held on November 29, 2023, with Prof. Alfons Jayson O. Pelgone, an ESTA-PNU team member and master of ceremonies. Dr. Ruth A. Alido, the Dean of the College of Teacher Development of the implementing institution and an ESTA-PNU team member, graced the program. She congratulated the participants for their dedication and commitment to completing the tasks for the training. Dr. Brando C. Palomar facilitated the recap of the four-day synchronous sessions, highlighting the significant discussions in each session. Prof. Ruel A. Avilla, an ESTA-PNU team member, introduced the panel members. At the same time, Dr. Crist John M. Pastor He also facilitated the discussion of the guidelines on panel critiquing and Lesson Exemplar competition to the participants. The presentation and critiquing of developed Lesson Exemplars (LE) were thoroughly conducted by the panelists (Dr. Marie Paz E. Morales, Dr. Zenaida Q. Reyes, and Dr. Ruth A. Alido). The participants considered the inputs and comments of panelists to refine their LEs.

Before the announcement of the winners of Lesson Exemplars and Hook Videos, the moderator initiated the participants' impressions and verbal evaluation of the training program. To formally close the program, Dr. Adonis P. David, the Vice President for Research, Planning, and Quality Assurance, facilitated the synthesis and closing remarks of the training. He expressed his sincere gratitude to the university officials for their unwavering support, the UEMPRO and team for facilitating the online event, the faculty members for their active participation, the facilitators from the Publication Office, and the entire ESTA-PNU team. He further encouraged the pre-service science student participants to celebrate Science Education's power and work together to liberate the Science classroom toward responsive and relevant content knowledge.
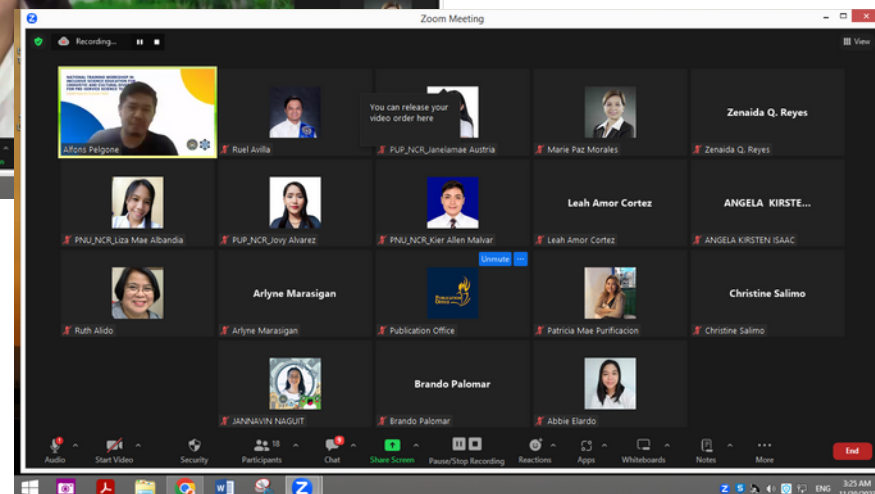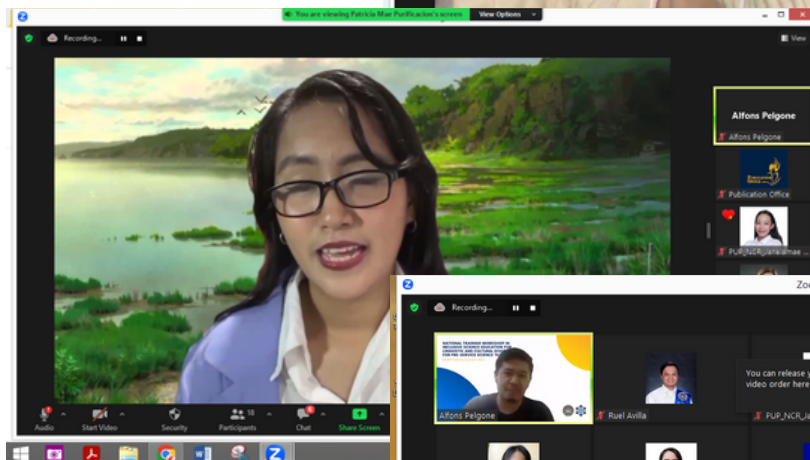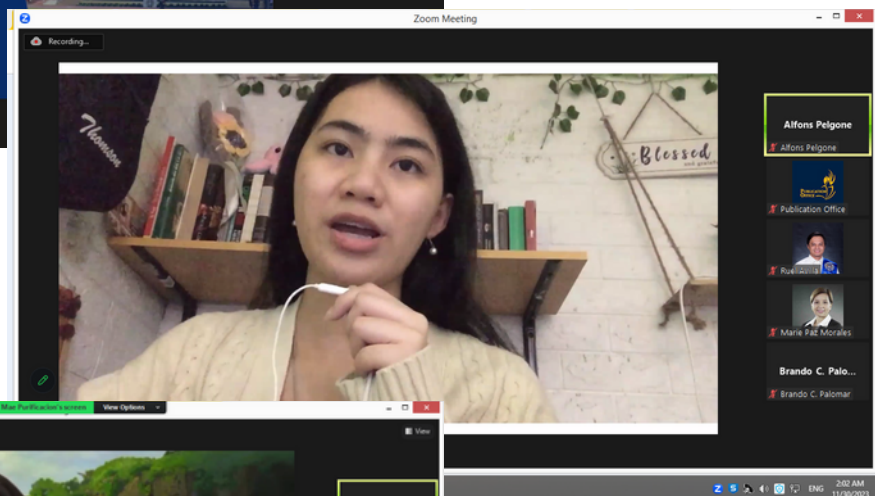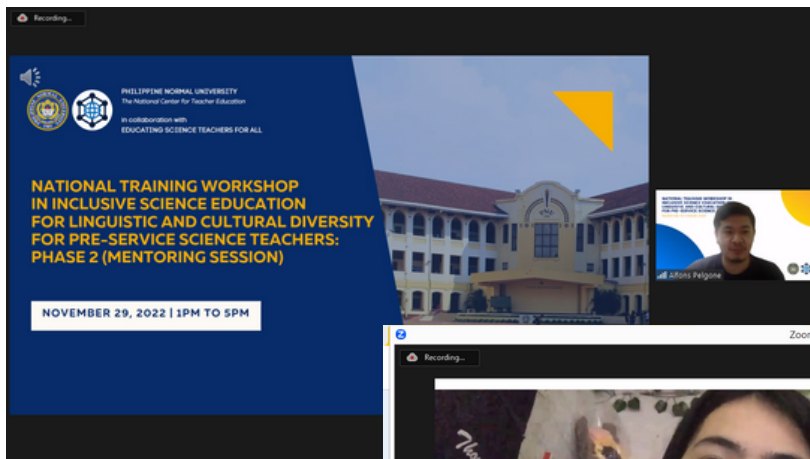
Closing Activity Program

NATIONAL TRAINING WORKSHOP IN INCLUSIVE SCIENCE EDUCATION FOR LINGUISTIC AND CULTURAL DIVERSITY FOR PRE-SERVICE SCIENCE TEACHERS: PHASE 2 (MENTORING SESSION)

November 29, 2023, Wednesday | 1 to 5 PM

Zoom Meeting link:
https://bit.ly/ESTA_Pre-serviceTraining_Phase2

Prof. Alfons Jayson O. Pelgone
ESTA-Phil-PNU Team Member
Master of Ceremonies

CLOSING PROGRAM

PRELIMINARIES

OPENING REMARKS

Dr. Ruth A, Alido
ESTA-Phil-PNU Team Member

RECAP OF THE MENTORING PROGRAM AND ORIENTATION ON PANEL CRITIQUING

Dr. Brando C. Palomar
ESTA-Phil-PNU Team Member

PRESENTATION OF PANEL MEMBERS

Prof. Ruel A. Avilla
ESTA-Phil-PNU Team Member

GUIDELINES FOR COMPETITION

Dr. Crist John M. Pastor
ESTA-Phil-PNU Team Member

Q&A

PRESENTATION OF LESSON EXEMPLARS AND HOOK VIDEOS

PARTICIPANT IMPRESSION

CLOSING REMARKS

Dr. Adonis P. David
Vice President for Research, Planning, and Quality Assurance
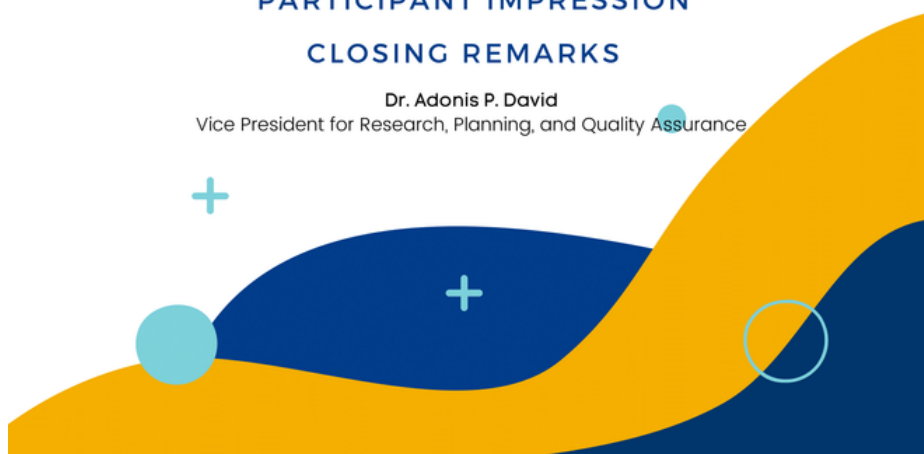
SAMPLE OUTPUTS

Lesson Exemplar

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

LESSON EXEMPLAR

<table>
<tr><th colspan="3">LEARNING STANDARDS</th></tr>
<tr><th colspan="3">Course Intended Learning Outcome(s) (CILO)/Most Essential Learning Competencies (MELCS)</th></tr>
<tr><td colspan="3">A. Explain how typhoon develops and how it is affected by landmasses and bodies of water
B. Trace the path of typhoons that enter the Philippine Area of Responsibility (PAR) using a map and tracking data
(S8ES -IIf - 21)</td></tr>
<tr><th>Objectives
This lesson exemplar allows the learners to:</th><th>Content</th><th>Tasks
(What tasks should I give to students to ensure realization of the objectives)</th></tr>
<tr>
<td>a. Explain the process of typhoon formation through experiments on "formation of LPA" and "Typhoon in a bottle";
b. Infer why Philippines is prone to typhoons and how landmasses and bodies of water affects it.
c. Design infographics that illustrates typhoon formation and its impact on both humans and the environment.</td>
<td>1. Understanding Typhoons
1.1 How typhoons develop
1.2 Why the Philippines is prone to typhoons
1.3 How landforms and bodies of water affect typhoons within the Philippine Area of Responsibility (PAR)</td>
<td>1. **Pre-test** on concepts through google forms.
2. **Recall** of previous topic on Earthquakes and Faults
3. **Engage students motivation and elicit prior knowledge** through a game (Pictionary).
4. **Perform experiments** on "Formation of LPA"
5. **Address other concepts and misconceptions** through active discussion with interactive tool called "Mentimeter"
6. **Group activity** entitled "Let's Plot the PAR".
7. Enhance learning experience through **reflective exit tickets**.
8. **Create infographics** on how a typhoon is formed and how it is affected by landmasses and bodies of water.</td>
</tr>
<tr><th colspan="3">FILIPINO LEARNER</th></tr>
<tr><td colspan="3">Diagnosing the Learner</td></tr>
<tr><td colspan="3">Based on your survey, describe the target audience for this lesson; What types of learning styles will you need to be mindful of?

The target audience for this lesson appears to be a diverse group encompassing various backgrounds, and interests. Some learners are: Visual learners, Auditory learner, Kinesthetic Learners and some being Social learners.</td></tr>
<tr><td colspan="3">**Class/Learner's Demographic Profile**

Year Level: ___Grade 8___   Ethnicity: 37 Filipino Students living in NCR and 3 Students outside NCR

Course/Discipline: _Science - Earth and Space 8: Understanding Typhoons_   Language(s): Filipino, English and Bisaya

Number of Students: __40 students___

Gender: LGBTQIA, Cis-Male, Cis-Female</td></tr>
</table>

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Other forms of Heterogeneity (e.g., Technical Capability, economic status, race, disability, others with special needs)

The learners shared their background through LMS introductory task. Other forms of heterogeneity to be considered are students with low economic status, different racial backgrounds, varying technological capabilities, and individual with special needs. Addressing these forms of heterogeneity involves providing equitable access to resources and acknowledging and accommodating these diversities, the classroom becomes a more inclusive and supportive space for all students to thrive academically and personally.

sconception/Course Topic Impression

- Typhoon is different from hurricanes and cyclones. The correct concept is that they are all the same weather phenomenon, the only difference is on the region in which they occur.
- Typhoons has uniform effect on different geological regions. The correct concept is that typhoons can vary significantly based on different factors.
- Typhoons only occur in certain season. The correct concept is that typhoon does not occur in only one specific season, typhoons only have specific season in which they are more likely to form and intensify.
- Air can 'hold' a certain amount of water vapour. The correct answer is that water is continuously evaporating and condensing, at all temperatures. Although the rate of evaporation depends on temperature, the rate of condensation does not. As the temperature increases, the rate of evaporation increases.
- If a storm is only a tropical storm or a category 1 hurricane, it isn't dangerous and you don't need to consider evacuating or prepare. The truth is that Tropical storms and hurricane categories are based on a hurricane's maximum sustained wind speed. A tropical storm is classified as a storm with winds ranging from 39-73 mph, and a category 1 hurricane can have winds from 74-95 mph. Needless to say, even the winds from a tropical storm can produce seriously damaging winds, and a category 1 hurricane is even worse.
- Only homes and communities on the coast need to be worried when a hurricane is approaching. People living further inland are safe. The correct concept is that Hurricanes are some of, if not the largest weather phenomenon on the planet. Some hurricanes can create strong winds within an area with a 1,000 mile diameter. Although they lose power when they make landfall, they can still bring incredible destruction with them, reaching hundreds of miles inland.
- Hurricanes move slowly, so you have plenty of time to evacuate if you wait until the storm is near the coast. The truth is that Whether or not an evacuation order has been issued, if a hurricane could potentially strike your community, it is essential to evacuate well in advance of its arrival. Although the storm surge often peaks when the storm makes landfall, it is possible for the waters to rise and flood your community hours beforehand.

References:
- Shepherd, M. (2016, May 16). 5 Common Misconceptions About Hurricanes. Forbes. https://www.forbes.com/sites/marshallshepherd/2016/05/16/five-common-misconceptions-about-hurricanes/?sh=37d4d2803d6c
- Ullrich , G. (2021, August). 15 dangerous hurricane myths and the truth behind them. Default. https://germaniainsurance.com/blogs/post/germania-insurance-blog/2021/08/09/15-dangerous-hurricane-myths-and-the-truth-behind-them
- Weather and Climate: A Teachers' Guide. (2021). Royal Meteorological Society. https://www.metlink.org/wp-content/uploads/2021/02/RMS_weather_and_climate_title_and_content.pdf
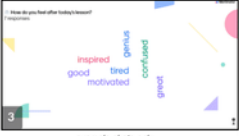
PEDAGOGIES	
What skills will be addressed by this lesson?	*What activities may be integrated into each to help enhance the learning of the content? [CLIL]*
Cognitive Skills (Link)	**Language Function (Link)**
Recall, Analyze, Define, Infer, Examine, Discuss, Relate, Create.	1. **Reading**
	dents will be able to read and comprehend reading materials provided and infer why Philippines is prone to Typhoons. Additionally, they'll be able to read and comprehend the group and laboratory activities provided by the teacher.
Science Process Skills	
Recalling, Inferring, Observing, Analyzing, Classifying, Critical Thinking.	2. **Listening**
	The learners will be able to participate in the activities and discussions. Additionally, they will be able to listen during lectures and listen to their peers during experiments and group activities.
Future Skills (Link)	
Collaboration, Social and cross-cultural interaction, Self Management, Sense Making, Ability to reflect, Digital literacy, Critical thinking.	3. **Writing** The learners will be able to create an experiment and accomplish the group activity. Additionally, students will be able to accomplish the laboratory sheets and activity sheets and take notes from the lecture.
Scientific Attitudes and Filipino Values	
Curiosity, Willingness to change opinion, critical mindedness, Creativity, Perseverance, & Bayanihan (Cooperation)	4. **Speaking** The learners will be able to enunciate words clearly when giving a report. Additionally, learners will be able to share their thoughts and knowledge to the class through active discussion.

What are the action words and vocabulary for this lesson? Please provide Mother Tongue translation for each identified vocabulary [MTB-MLE]

English-Tagalog-Bisaya/Cebuano
- Typhoon - bagyo (nabubuo sa Karagatang Kanlurang Pasipiko)
- Hurricane - bagyo (nabubuo sa Karagatang Atlantiko at Silangang Pasipiko)
- Cyclone - bagyo (nabubuo sa Karagatang Timog Pasipiko at ocean and Karagatang Indian)
- Landmass - kalupaan
- Bodies of water - karagatan
- Flood - baha
- Counterclockwise - direksiyong salungat sa direksiyon ng mga kamay ng orasan
- Southwest Monsoon - Habagat
- Northeast Monsoon - Amihan
- Weather - Panahon
- Sun-araw-adlaw
- Rainy weather - Tig-ulan - panahon nga kanunay adunay ulan
- Sunny Weather - tig-init - taas nga panahon nga adunay adlaw ug dili kayo masinati ang ulan
- Raining-nag-uwan
- Sun- adlaw
- Klima - kahimtang sa panahon

Key Language (*Link to all constructs of Key Languages*)	
(What children need to recognize/produce)	

Action Words (scientific processes)

- *Asking Questions*
- *Forming hypothesis*
- *Conducting Research*
- *Drawing conclusions from evidences*
- *Deductive and inductive reasoning*

Language Structure

- *Most vocabulary includes terms in the English and Filipino language, some mother tongue terms wold be integrated.*
- *Teacher incorporates local examples, stories, or experiences related to typhoons to make the lesson more relatable and culturally connected to the students' experiences.*
- *To support language there would be a use of visual aids such as posters, infographics, or diagrams with bilingual labels to reinforce vocabulary and concepts*

Vocabulary

- Typhoon - a tropical cyclone that develops in the Northwest Pacific Ocean.
- Hurricane- a type of storm called a tropical cyclone, which forms over tropical or subtropical waters.
- Cyclone- intense circular storms that originate over warm tropical oceans.
- Eye - The calm center of a typhoon.
- Eyewall - The region of intense thunderstorms and strongest winds surrounding the eye of the typhoon.
- Storm Surge - a rise in seawater level caused by a typhoon's winds and low pressure, often leading to coastal flooding.
- Landmass - a continent or other large body of land.
- Coriolis effect - force due to Earth's rotation, it deflects the direction of the wind to the right in the northern hemisphere and to the left in the southern hemisphere.
- Low-Pressure System - Disturbances, such as clusters of thunderstorms, interact with the warm ocean surface and start to develop a rotating, organized system.
- Dissipation- Typhoons eventually lose their strength as they move over cooler waters or encounter land.
- Flood - rising and overflowing of a body of water
- Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAG-ASA) - National Meteorological and Hydrological Services agency of the Philippines mandated to provide protection against natural calamities and to ensure the safety, well-being and economic security of all the people.

TEACHER KNOWLEDGE	
Technology Being Used by Students	**Technology Being Used by Teacher**
What technology will my students use in this lesson?	*What technology will I use in this lesson?*
Applications: • *LMS* • *Google Forms for pretest* • *Mentimeter for the discussion* • *Canva for the assignment* • *Plicker for assessment*	Applications: • *LMS* • *Google Forms for pretest* • *Mentimeter for the discussion* • *Canva for the presentations/drills/preliminary activities/discussion*

Gadgets/Tools: • Tablet or Cellphone	• Plicker for assessment • Google Drive for storage of data Gadgets/Tools: • Tablet or Cellphone • Laptop • SMART TV or Projector
What were your reasons for choosing the technology for the students to use? • Creative and innovative • Supports collaboration and communication • Alignment of technology to the lesson proper • Free and easy to access • Makes tasks more efficient and organized	**What were your reasons for choosing the technology for the students to use?** • Creative and innovative • Supports communication • Alignment to the lesson proper • Free and easy to access • Makes checking and accomplishing tasks more efficient and organized • Makes interaction to students more engaging and efficient. • Sustainable and easy to navigate tools.
What are the limitations and potential problems in utilizing the technology? • Unavailability of devices • Power interruption • Internet connectivity • Unaccesible features of some websites • Knowledge of use in technology	**What are the limitations and potential problems in utilizing the technology?** • Unavailability of devices • Power interruption • Internet connectivity • Features that may be inaccessible • Skills of students in the usage of technology • Unexpected technical malfunctions of problems
Assessment for Learning (Formative Assessment)	**Teacher Competence**

Assessment Strategy
 	
I. **ELICIT:** Recitation
 	
II. **ENGAGE:** Pictionary & Guess the Gibberish
  ○ Show picture of 2 famous typhoon in Ph
 	
III. **EVALUATION** : 5-item multiple choice quiz through Plicker
 	
IV. **EXTEND** : Creation of infographics using Canva (by group)
  ○ Topic: different precautionary measures needed before, during, and after typhoon.
 	
Feedback Strategy
 	
• Mentimeter Responses, Recitation, as well as reflective exit tickets.
 	
Technology which will be integrated in the Assessment
 	
• Google forms, Mentimeter and Plicker.
 	
Technology which will be integrated in the Feedback System
 	
• Mentimeter
	What other skills (language competence, multicultural knowledge system, TPCK) and attitudes do you need in order to implement the lesson?
	
	1. Establishing high but achievable expectations
	2. Ability to build an Inclusive and Culturally sensitive learning environment
	3. Embedding and encouraging higher order thinking along with teaching foundation skills
	4. Efficient and effective usage of technology and applications in the instruction.
	5. Well-written and organized lesson plan alongside learning management plan.

Assessment of Learning (Summative Assessment)	**Readings/Materials/Tools**
1. How do you know students met the learning objectives and targets? • Atleast 75-80 % of the class passed the diagnostic assessment. • Through reflections.	**What materials, readings, and tools do you need to improve your competence and confidence in teaching the topic?** • Videos from PAGASA showing how typhoons are formed

• Performance on experiments and group activities. • Accomplishment of laboratory and work sheets. • HOTS based questions during discussion.	• Online Simulations to showcase typhoon formation • Earth Science Books • Journals or Feature News about Typhoons and its effects to people • DepEd Modules • Curriculum Guide • News and weather updates about typhoons
2. What technology will you use to facilitate assessment of learning? • Plicker • Google Forms	

PROCESS

Walkthrough of the lesson (how will you deliver the lesson/topic (from engaging the student to ensuring achievement of learning objectives?)

1. How will I ensure interdisciplinarity (Use of STEAM Approach)?

Science: In the "Formation of LPA" experiment and in ""Let's Plot the PAR" concepts of high and low pressure, the relationship between temperature and pressure changes, the impact of landforms and bodies of water, and other components and their effects on atmospheric conditions serve as vital atmospheric conditions pivotal in typhoon formation.

Technology: Mentimeter will be integrated during the discussion. Google forms, Plcker, and Canva will also be used for the assessment.

Engineering: In the "Formation of LPA" experiment students will build a model of how a LPA is formed using different household materials.

Arts: Students will create their own infographics on how a typhoon is formed and how it is affected by landmasses and bodies of water using Canva.

Mathematics: In Plotting of Philippine Area of Responsibility (PAR) students will coordinate geometry to map latitude and longitude, applying scale factors for accurate representation, and measurement of boundaries.

2. How will I integrate culture, Language, gender and context in my lesson?
.
• Incorporate local stories, knowledge, facts or historical narrative related to typhoon in the philippines.
• Use local language or introduce terms from other dialects. Offer translations or interpretations to ensure all students can access and understand the content.
• Provide materials and instruction in different language or add more visual icons to support understanding, ensuring that language difference to do not act as barriers in students learning
• Connect the lesson to students' daily lives, emphasizing how typhoons affect their communities, homes, and families. Encourage discussions on the social and economic implications of typhoons in the local context.

3. How will I encourage my students to communicate what they know and want to know?

• By allowing them to share their ideas and opinions through the platform "mentimeter"
• Advance posting of lesson materials (modules, ebooks & lab activity).
• By allowing them to collaborate or work by groups.
• Have students accomplish exit tickets before the end of the lesson.
• Through different questioning techniques.

4. What combination of pedagogies will I use to design the Lesson? How will I ensure the integration of the principles of inclusivity in my pedagogies?
• STEAM Approach, CLIL, 7E's, Constructivism, Experiential Learning Theory

5. What instructional flow would capture all these plans? (Present the lesson flow below. Use any applicable model, e.g. Experiential model, 7E's)

LESSON PHASE	ESSENTIAL QUESTION/S	ACTIVITY	EXPECTED OUTPUT/LEARNING
Elicit		RECALL: The teacher will ask volunteers to have a short active recall on the previous topic.	Students must be able to recall concepts of the previous topic.
Engage	What are the different typhoons that had made history in the Philippines? What the different foundational terms in typhoon formation?	PICTURE TALK: Students will share their ideas and reflect upon the 2 pictures of famous typhoons that hit the Philippines. GUESS THE GIBBERISH: Students will guess the gibberish words which are terms that are essential for the understanding of typhoon formation	Students must be able to identify these typhoons and provide brief insights about them. Students must be able to guess the terms that will be used for the topic.
Explore	How do typhoons form?	GROUP EXPERIMENT: The class will be asked to assemble their pre-selected groups. The teacher will then facilitate and assist the students in doing their activity entitled "Formation of LPA". 	Students must be able to perform the experiment on formation of LPA and understand how LPA is formed and leads to typhoon formation.
Explain	How landmasses and bodies of water affect the formation of typhoons? Why is the Philippines prone to typhoons?	ACTIVE DISCUSSION: The teacher will provide additional knowledge on how the formation of typhoons is affected by landmasses and bodies of water. The teacher will also address misconceptions about typhoons. For several circumstances, the teacher will ask the students to participate in the Mentimeter survey and ask questions to keep the discussion active. *example photo only.*	Students must be able to understand the effects of landmasses and bodies of water in the formation of typhoons. Students must be able to infer this concept to the Philippine context. Students must actively participate in the Mentimeter survey that the teacher will conduct.

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Elaborate	What effects do landforms and water bodies have on weather patterns and typhoon formation inside the PAR? What are the indications of PAR in weather forecasting? What influences the movement of typhoons?	ACTIVITY: The groups will perform another activity entitled "Let's Plot the PAR" and and answer the guide questions. **Link to the activity sheet:** https://drive.google.com/file/d/1FgRXk3N5lPzxK7 0U3ywOwlbgqiEnM1Fiw/view?usp=sharing	Students must be able to accomplish their worksheets. Students must also be able to provide their reflections about the topic.
Evaluate	How does typhoon form? Why is Philippines prone to typhoon?	QUIZ: The teacher will conduct a 5-item quiz using Plicker.	Students must be able to demonstrate understanding on the topic and pass the 10-item quiz.
Extend	How a typhoon is formed and how it is affected by landmasses and bodies of water? As students, how can you take part in helping your community during the typhoon?	INFOGRAPHICS MAKING: The teacher will provide instructions on the assignment which is to create infographics that illustrates typhoon formation and its impact on both humans and the environment via The topic is about how a typhoon is formed and how it is affected by landmasses and bodies of water.	Students must be able to produce an comprehensive and informative infographics that demonstrates their understanding on the topic and their personal reflections on how typhoons affect humans and the environment.

How will the lesson delivery manifest efficient classroom management?

Through a structured and well-thought-out lesson plan and exercises, the lesson delivery shall demonstrate an efficient classroom. The lesson instructions are personalized and modified based on the interests and needs of the students, ensuring that the instruction is relevant and inclusive for all. The teacher also used technology to maximize the potential learning outcomes. All of this is backed by the educators' content understanding as well as their mastery of classroom management and instructional pedagogies.

How will I integrate technology into the lesson's delivery?

In implementing this lesson, a blend different technologies will be employed to enhance engagement and learning. Included here are gadgets or tools which are Phones/Tablets, a SMART TV/Projector setup, Laptop. These gadgets shall be utilized thorought the discussion to access different platforms and learning materials. Applications are also used, this includes the Learning Management System (LMS), Google Forms for assessment, Mentimeter for interactive discussions, Canva for creative assignments, and Plicker for diverse assessment. This holistic approach aims to leverage technology's diverse facets, catering to different aspects of the lesson and providing a dynamic and interactive educational experience.

Summary: How will technology, content, and pedagogical knowledge work together in this lesson?

Technology, content, and pedagogical knowledge are essentials to deliver the lesson effectively. Each component plays a significant role in the instruction. The content provides the foundational knowledge and learning objectives essential for student understanding. Technology amplifies the delivery by providing diverse tools and platforms for engagement, access to information, and interactive learning experiences. And ofcourse, the pedagogical knowledge of the teacher, which guides the instructional methods, ensuring that the content is effectively conveyed through various technological means while catering to diverse learning styles and making sure that the learning environment is safe and healthy for learners. Together, these components synergize to maximize the learning of students and motivation of students.

REFLECTIONS
(Please accomplish this part after lesson delivery)

1. What worked or didn't work in the delivery of the lesson?

2. What difficulties have you encountered (during planning and delivering the lesson)?

3. What insight have you gained?

4. How do these insights connect to or affect your teaching practice, and personal and professional life philosophy?

MODIFICATIONS
(Please accomplish this part after lesson delivery)

APPENDICES

Approved
Concept Paper

Training Workshop in Inclusive Pre-Service Science Education for Linguistic and Cultural Diversity

INCLUSIVE DATES:

Synchronous: July 5, 12, 19, and 26 (all Wednesday afternoon of July), Mentoring: Hybrid session [as per schedule with mentors: Term 1 2023-2024], Closing Activity: End of Term 1 (TBA)

PURPOSE:

This intensive training is intended to introduce, orient, and train pre-service science education students of the PNU system and other invited intuitions (e.g., pre-service science education students of PASUC schools and 3NS) on inclusive science education.

PROPONENT:
ESTA-PHIL-PNU Team

RATIONALE:

Preparing science teachers for quality science education for the country needs to consider the issues and struggles against plurality of language, diversity, and heterogeneity of learners. The Philippine plurality of language and culture is sourced from the cultural and linguistic profile of the Filipino people, with about 110 indigenous groups and more than 170 languages spoken as first languages from a multitude of regional dialects and languages (Philippines, September 28, 2017). Hence, it may be assumed that science education in the country takes place amidst ethnic divides that translate into linguistic and cultural diversity. Such social conditions in the school or classroom may hamper meaningful learning of science concepts.

Several studies claim the vital contribution of teacher quality to student learning and achievement in general (Nilsen & Gustafsson, 2016; Seebruck, 2015). In fact, SDG 4, which promotes quality education, identifies the recruitment and training of quality teachers as an important aspect of ensuring inclusive quality education. Similarly, the Philippine Professional Standards for Teachers (PPST) aim to prepare pre-service students and improve teacher quality in the country. In congruence with and in response to the Department of Education's clamor for teacher education institutions (TEIs) to produce quality teachers, there may be a need to promote programs on capacity

building or training for pre-service science students to prepare them to better enact their science lessons to address the needs of culturally and linguistically diverse (CLD) students when they practice the profession.

Educating Science Teachers for All (ESTA) is a specially designed international project and program that seeks to contribute to teacher training institutions in terms of science teacher preparation for inclusive science education through disseminating science teaching approaches in culturally and linguistically diverse contexts. Conscious of these conditions, the ESTA-PHIL-PNU team proposes to conduct an intensive training workshop for the pre-service science students of the Philippine Normal University system and for all invited pre-service science students from other organizations, such as PASUC and 3NS, to prepare them for an inclusive and quality science education. Primarily, the training will introduce, orient, and train pre-service science education students in the management of diverse classes within the context of the Philippine language and culture. The aim can be achieved by introducing the ESTA-Philippines-PNU framework (Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education [SELC-PhPHiEd]) and other ESTA resources to pre-service science students before they enter the profession. The design of lesson exemplars will also be the focus of the training program.

Objectives:

The training workshop aims to introduce, orient, and train pre-service science education students in the aspect of providing an avenue to successfully manage diversity in science classes within the context of the country's language and culture. Specifically, the workshop aims to:
1. Provide inputs to pre-service science students on the concepts and constructs of science education, language for the sciences, and the contextualization of lessons;
2. Acquaint the pre-service science students with strategies in managing diverse science classrooms.
3. Orient the pre-service science students on the Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELC-PhPHiEd) framework and other ESTA products.
4. Facilitate the development and validation of lesson exemplars.

Competency/ies:

1. Acquire an understanding and appreciation of the concepts and constructs of science education, language for the sciences, and the contextualization of lessons;
2. Obtain an overarching understanding of the Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELC-PhPHiEd) framework and other ESTA products.
3. Gain knowledge on the different theories, concepts, and principles in relation to the three major constructs of the SELC-PhPHiEd framework, which are: Filipino learners, teachers' knowledge, and suited pedagogies anchored on all PPST domains.
4. Prepare pre-service science students for quality teaching proficiency through an intensive training on language and cultural diversity for an inclusive science education.
5. Acquire skills in developing Lesson Exemplars as directed or guided by the framework and models.

Training Design:

The training will include two phases: plenary sessions and mentoring sessions. The plenary sessions are designed as synchronous sessions for the team to discuss the major concepts and principles with the participants. The team will share their knowledge on strategies on how to: (1) manage diverse and heterogeneous classes; and (2) integrate culture and language in teaching science concepts. The plenary sessions will accept as many participants as possible on the Zoom platform. The mentoring sessions, however, will only accommodate a specific number of participants. Selection criteria for the participants in the mentoring session include: 1) having a strong commitment to complete the training program; 2) having technological capability; and 3) being well-versed in one of the major mother tongue languages in the country.

Part 2 of the training is designed as a mentoring program. This phase will be conducted on a hybrid setup to accommodate pre-service students from the provinces. Onsite conduct of the mentoring session will be done on different campuses of PNU. In this part or phase of the training, the participants will be assigned to one or two of the ESTA-PNU team members with the same specialization. Mentoring and consultation will include lesson exemplar development, peer review, and revision of the participants' outputs. For this part of the training, each major activity, as aforementioned, for mentoring and consultation is allotted a week of engagement with the participants in

small research cells [grouping according to or based on specialization: biology, chemistry, and physics; and geographic location or PNU campus]. In summary, the training will include 20 hours of synchronous sessions [Plenary and Panel Critiquing] and three weeks of asynchronous sessions [Mentoring and Consultation].

Expected Number of Participants:

Participants in this activity will accommodate as many as 500 pre-service science students for synchronous learning and a maximum of 100 pre-service science students for mentoring.

Proposed Charge per Participant:

Participation in this intensive training program will be free of charge. The project (Educating Science Teachers for All) will cover all costs related to participants' registration, while participants will be responsible for their own internet and communication expenses.

Materials and Instruments:

This intensive training will utilize the following materials and instruments in the entire training program:

1. *Lesson Exemplar (LE) Template.* This template designed based on the SELC-PhPHiEd framework will serve as guide to participants in the design and development of their respective Lesson Exemplars and all attached documents [e.g., worksheets, assessment].
2. *Peer Review Form.* This form is an evaluation tool will be utilized in the first level quality assurance of the developed Lesson Exemplars
3. *Evaluation Rubric.* The LE template comes with an evaluation Rubric designed to frame the criteria for exemplars. The same tool will be utilized in the panel critiquing.
4. *Reflection Template.* This will be utilized to help our participants document their journey in the training program in case they want to craft their manuscript.

5. *Evaluation Forms.* These forms will be administered to the participants to assess the overall management of the training program and the attainment of the aforementioned objectives.

MATRIX OF TOPICS, OUTCOMES, ASSESSMENT, ACTIVITIES AND OUTPUTS

Sub-Topics and Time Allotment for every topic (in hours)	Expected Learning Outcomes	Activities to Achieve Learning Outcomes	Assessment Strategies including, Assessment Tools	Requirements/Outputs
Plenary Sessions				
Day 1: [1:00-5:00 PM] Opening Program: **Keynote 1:** Teacher Quality	Acquires understanding and appreciation of Teacher Quality including applicable sustainable development goals, and national goals	Synchronous Online Lecture/ Talk/ Sharing	Presentation of key concepts, critical issues, and innovations from ESTA Project Leaders and invited speaker Q&A strategies during the sharing process	Questions prepared by the participants to demonstrate a deeper understanding of the topic.
Plenary 1: Science Education	Obtains an overarching understanding of Philippine science education language.			
Keynote 2: ESTA Program and the International Consortium	Be familiar and appreciates the international capability building and international consortia			

5. *Evaluation Forms*. These forms will be administered to the participants to assess the overall management of the training program and the attainment of the aforementioned objectives.

MATRIX OF TOPICS, OUTCOMES, ASSESSMENT, ACTIVITIES AND OUTPUTS

Sub-Topics and Time Allotment for every topic (in hours)	Expected Learning Outcomes	Activities to Achieve Learning Outcomes	Assessment Strategies Including, Assessment Tools	Requirements/Outputs
Plenary Sessions				
Day 1: [1:00-5:00 PM] Opening Program: **Keynote 1:** Teacher Quality	Acquires understanding and appreciation of Teacher Quality including applicable sustainable development goals, and national goals	Synchronous Online Lecture/ Talk/ Sharing	Presentation of key concepts, critical issues, and innovations from ESTA Project Leaders and invited speaker Q&A strategies during the sharing process	Questions prepared by the participants to demonstrate a deeper understanding of the topic.
Plenary 1: Science Education	Obtains an overarching understanding of Philippine science education language.			
Keynote 2: ESTA Program and the International Consortium	Be familiar and appreciates the International capability building and international consortia			

Day 2: [1:00-5:00 PM] **Plenary 2: Language for Sciences** **AST 1: Diversity in Class** **AST 2: Conceptual Change**	Gains knowledge on language diversity, language for the sciences, and possible strategies for science teachers to develop language command. Enhances the teaching proficiency of pre-service science students by acquiring strategies for the management of diversity in class and approaches for the conceptual implementation of conceptual change in science classes.	Synchronous Online Lecture/ Talk/ Sharing Workshop	Presentation of key concepts, critical issues, and innovations from ESTA-Philippines-PNU team members Q&A strategies during the sharing process	Questions prepared by the participants to demonstrate a deeper understanding of the topic.
Day 3: [1:00-5:00 PM] **Plenary 3: Contextualization** • Culture for Science • Culture Integration **AST 3: Self-concepts: gender and culture, and the impact of science self-concept on learning behavior**	Gains knowledge on contextualization, culture for science and cultural integration, and possible strategies for pre-service science students to contextualize their science lessons Prepares pre-service science students for quality teaching proficiency through acquiring strategies on how to integrate gender and culture in science classes and	Synchronous Online Lecture/ Talk/ Sharing Workshop	Presentation of key concepts, critical issues, and innovations from ESTA-Philippines-PNU team members Q&A strategies during the sharing process	Questions prepared by the participants to demonstrate a deeper understanding of the topic.

AST 4: Acquisition of Science Capital	by acquiring science capital.			
Day 4: [1:00-5:00 PM] **AST 5**: Technology Integration **AST 6**: Flipped Classroom	Prepares pre-service science students for quality teaching by acquiring strategies on how to integrate technology in science classes. Prepares pre-service science students for quality teaching by acquiring strategies on how to implement Flipped Classroom Acquires knowledge on how to develop lesson exemplars as directed or guided by the frameworks and models.	Synchronous Online Lecture/ Talk/ Sharing Workshop	Presentation key concepts, critical issues and innovations from ESTA-Philippines-PNU team members and invited speakers Q&A strategies during the sharing process	Questions prepared by the participants to demonstrate a deeper understanding of the topic.
Mentoring Sessions				
Week 1 [Asynchronous] Lesson Exemplar Development	Acquires skills in developing Lesson Exemplars as directed or guided by the frameworks and models.	Workshop Facilitation	Facilitation of Workshop on Designing Lesson Exemplars	Lesson Exemplar submission Reflection Form
Week 2 [Asynchronous] Lesson Exemplar Peer Review	Acquires skills in assessing developed Lesson Exemplars as peer guided by the SELC-PhPHIEd framework	Peer Review Workshop	Facilitation of Peer Review of Developed Lesson Exemplars	Peer Review Form Reflection Form
Week 3 [Asynchronous] Lesson Exemplar Revision	Acquires skills in enhancing Lesson Exemplars as per	Workshop on Revision of Lesson Exemplars	Facilitation of Workshop on Enhancing	Rubric on ESTA Lesson Plans

AST 4: Acquisition of Science Capital	by acquiring science capital.			
Day 4: [1:00-5:00 PM] AST 5: Technology Integration AST 6: Flipped Classroom	Prepares pre-service science students for quality teaching by acquiring strategies on how to integrate technology in science classes. Prepares pre-service science students for quality teaching by acquiring strategies on how to implement Flipped Classroom Acquires knowledge on how to develop lesson exemplars as directed or guided by the frameworks and models.	Synchronous Online Lecture/ Talk/ Sharing Workshop	Presentation key concepts, critical issues and innovations from ESTA-Philippines-PNU team members and invited speakers Q&A strategies during the sharing process	Questions prepared by the participants to demonstrate a deeper understanding of the topic.
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	peer assessment/ evaluation		Lesson Exemplars	
Week 4 Lesson Exemplar Presentation and Panel Critiquing Closing Program/Activity		Presentation and Critiquing	Critiquing and revision of Lesson Exemplars	Presentation and Critiquing of Lesson Exemplars

Sub-Topics and Time Allotment for every topic (in hours)	Program Flow	Oral Presentation Themes	Speakers and Moderators
Day 1: [1:00-5:00 PM] Opening Program:	1:00-1:45 PM Opening Program		
Keynote 1: Teacher Quality	2:00-2:45 Keynote 1	**Keynote 1: Teacher Quality** This session will provide key discussion points on teacher quality. The aim is to provide teachers with an understanding of the extent of teacher quality in achieving quality education, referencing global themes such as the SDGs and national focus.	**VPA Jennie V. Jocson** Vice President for Academics, PNU-Manila
Plenary 1: Science Education	2:45-3:30 Plenary 1	**Plenary 1: Science Education** This session will familiarize teachers with the general purposes of science education and the aims and goals of science education in the Philippines.	**Dr. Marie Paz Morales** ESTA-Phil-PNU Project Lead
Keynote 2: ESTA Program and the International Consortium	3:30-4:30 Keynote 2	**Keynote 2: ESTA Program and the International Consortium** This session will focus on the description and nature of the international capacity-building program for science teachers.	**Prof. Sylvia Markic** ESTA-Project Lead
	4:30-5:00 Q&A		Moderator/Facilitator: **Prof. Alfons Jayson O. Pelgone** ESTA-Phil-PNU Team

Day 2: [1:00-5:00 PM]	1:00-1:30 PM Preliminaries		
Plenary 2: Language for Sciences	1:30-2:30 Plenary 2	**Plenary 2: Language for Sciences** This session focuses on the rhetorical functions, syntactic constructions, and vocabulary frequently used in scientific discourse. In reviewing the language for science, the participants will be directed to the aspects of language that can be highlighted in the module exemplars.	**Dr. Ruth A. Alido** ESTA-Phil-PNU Team
AST 1: Diversity in Class	2:30-3:30 AST 1		
	3:30-4:30 AST 2	**AST 1: Diversity in Class** This academic staff tour engages participants through a thorough discussion of how to diagnose diversity in class. The session will familiarize participants with probable ways and activities to detect diversity and heterogeneity in class.	**Prof. Alfons Jayson O. Pelgone** ESTA-Phil-PNU Team
AST 2: Conceptual Change		**AST 2: Conceptual Change.** This academic staff tour engages participants through a thorough discussion of interest in science education as well as the conceptual change model. Part of the highlight of the session is the presentation of 'hooks' in teaching science, which may be in the form of videos, puzzles, or intriguing questions. The session is directed towards understanding how students coming from various socio-economic, cultural, and language backgrounds bring with them a sense of	**Dr. Leah Amor S. Cortez** ESTA-Project Team

Day 2: [1:00-5:00 PM]	1:00-1:30 PM Preliminaries		
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		conceptual understanding. Teacher knowledge of conceptual change allows science educators to provide engaging learning experiences to our science learners.	
	4:30-5:00 Q&A		Moderator/Facilitator: Dr. Crist John M. Pastor ESTA-Phil-PNU Team
Day 3: [1:00-5:00 PM]	1:00-1:30 PM Preliminaries		
Plenary 3: Contextualization • Culture for Sciences • Culture Integration	1:30-3:3 Plenary 3	Plenary 3: Contextualization This session leads the participants to acquire a deep understanding of the concept, background, and teaching-learning processes of contextualization. Included in the session is the development of one's epistemology of contextualization as the basis of one's praxis.	Dr. Zenaida Q. Reyes ESTA-Phil-PNU Team
AST 3: Acquisition of Science Capital	3:30-4:30 AST 3	AST 3: Acquisition of Science Capital This session focuses on the identification of factors and drivers that encourage students to learn science.	Dr. Crist John M. Pastor ESTA-Phil-PNU Team
	4:30-5:00 Q&A		Moderator/Facilitator: Dr. Leah Amor S. Cortez ESTA-Phil-PNU Team

Day 4: [1:00-5:00 PM]	1:00-1:30 PM Preliminaries		
AST 4: Self-concepts: gender and culture, and the impact of science self-concept on learning behavior	1:30-2:30 AST 4	AST 4: Self-concepts: gender and culture, and the impact of Science self-concept on learning behavior. This session focuses on students' science self-concept with respect to their cultural background and gender. The session also highlights the students thinking about science and scientists and the colonial portrayal of Filipinos.]	Dr. Arlyne C. Marasigan ESTA-Phil-PNU Team
AST 5: Technology Integration	2:30-3:30 AST 5	AST 5: Technology Integration This session focuses on the nature, significance, and methods of technology integration. The session also highlights some frameworks used in technology interaction inside a science classroom.	Prof. Ruel A. Avilla ESTA-Project Team
AST 6: Flipped Classroom Topic 1: Orientation to Lesson Exemplar (LE) Development Workshop • Agreements for Part 2: LE Development Workshop • Groups for Consultation and Mentoring	3:30-4:30 AST 6 and Orientation to LEs	AST 6: Flipped Classroom This session presents the theoretical underpinnings and instructional processes implemented in science teaching through the flipped classroom approach (FCA). It also highlights the instructional technologies and significant implications of FCA as utilized in science teaching based on current empirical studies. Similarly, this session provides insights on how FCA is appropriately applicable in teaching science in the context of the	Dr. Brando C. Palomar ESTA-Project Team

		pandemic and post-pandemic experiences.	
		Orientation to Lesson Exemplar (LE) Development Workshop This session aims to present the features of the instructional design of the Lesson Exemplar anchored on the developed frameworks and models. The session also intends to familiarize the participants on the implementing guidelines on how to develop Lesson Exemplars influenced by the aforementioned models, agreements, groupings, and processes of consultation and mentoring.	Dr. Brando C. Palomar ESTA-Project Team
	4:30-5:00 Q&A		Moderator/Facilitator: Prof. Ruel A. Avilla ESTA-Phil-PNU Team
Week 1 [Asynchronous] Lesson Exemplar Development		**Lesson Exemplar Development** The session will focus on facilitating participants' ability to draft and craft their Lesson Exemplars. Informal sharing may occur within and across groups and disciplines to determine the finest Lesson Exemplar for a particular science lesson or topic.	ESTA-Phil-PNU Team PNU Science Educators

Week 2 [Asynchronous] Lesson Exemplar Peer Review		Lesson Exemplar Peer Review In this session, crafted and designed Lesson Exemplars for science lessons or topics will be subjected to peer review (by fellow participants) to help the developers provide varied perspectives while peers assess their Lesson Exemplars. This session aims to provide constructive remarks for the improvement or enhancement of developed Lesson Exemplars and to determine the alignment of designed Lesson Exemplars to the aforementioned models and frameworks.	ESTA-Phil-PNU Team PNU Science Educators
Week 3 [Asynchronous] Lesson Exemplar Revision		Lesson Exemplar Revision In this session, developers of Lesson Exemplars will engage in revising their products based on the comments and suggestions of their peers. This is a prerequisite to the next activity, which will focus on the presentation of the revised Lesson Exemplars to the ESTA-Philippines-PNU Team and the critiquing of the panel of evaluators.	ESTA-Phil-PNU Team PNU Science Educators

Week 4 Lesson Exemplar Presentation and Panel Critiquing and Closong Pogram/Activity		Lesson Exemplar Presentation and Panel Critiquing In this session, carefully crafted and designed Lesson Exemplars for science lessons or topics will be presented to the participants and experts. Critiquing will also be done to provide constructive remarks for the improvement or enhancement of presented Lesson Exemplars and to determine the alignment of designed Lesson Exemplars to the aforementioned models and frameworks.	ESTA-Phil-PNU Team PNU Science Educators

PROGRAM OUTCOMES:

1. **People Service**: Training of pre-service science students of PNU System and from invited organizations (PASUC) or TEIs (3NS)

2. **Products**:
    1. ESTA-Phil-PNU Team
        1. Training Design
        2. Documentation of the Training Program
        3. Presentations and Activities
        4. Video Recordings
        5. Mentoring Program
    2. Participants
        1. Lesson Exemplars in Science
        2. Attachments to Lesson Exemplars
            1. Assessment Tools
            2. Worksheets or Activity Sheets
            3. Reading Materials (if applicable)
            4. List of References
        3. Reflection Notes/Journal

3. **Publication**: One publication on training

Week 4 Lesson Exemplar Presentation and Panel Critiquing and Closing Pogram/Activity		Lesson Exemplar Presentation and Panel Critiquing In this session, carefully crafted and designed Lesson Exemplars for science lessons or topics will be presented to the participants and experts. Critiquing will also be done to provide constructive remarks for the improvement or enhancement of presented Lesson Exemplars and to determine the alignment of designed Lesson Exemplars to the aforementioned models and frameworks.	ESTA-Phil-PNU Team PNU Science Educators

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ESTA-PNU Team

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2. Ruth A. Alido, Ph.D.
3. Marie Paz E. Morales, Ph.D.

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3. Alfons Jayson O. Pelgone, M.S.
4. Brando C. Palomar, Ph.D.

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- FSTEM Science Faculty Members
- Science Faculty Members from the PNU Hubs

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Editor

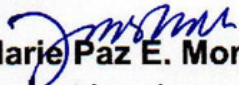Ma. Antoinette C. Montealegre, DALL
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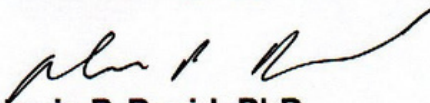Mr. Ronnie B. Pagal

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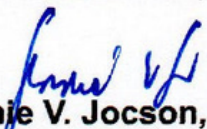
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Submitted by:

Marie Paz E. Morales, PhD
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Recommending Approval:

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Vice President for University Relations and Advancement

Approved:

Bert J. Tuga, PhD
University President

ESTA-PNU Framework

Primer

Informed
Consent Form

INFORMED CONSENT FORM

Research Title: **Educating Science Science Teachers for All (ESTA)**
Researcher(s): **ESTA-Philippines-PNU Team**
Participant's Name: _____

What is the study about?

This research is about building a transnational network of science teachers. Evidence for new science teaching and learning approaches will be shared and discussed with pre- and in-service teachers to implement only the most effective and efficient measures for quality and inclusive science education.

Why are you asking me?
You are being asked to participate in this study because you are a pre-service science education student of invited Teacher Education Institutions (TEIs) or Higher Education Institutions (HEIs).

What will you ask me to do if I agree to be in the study?
You will be engaged in a course or in courses with several training sessions on how to develop Lesson Exemplars (LE) using templates created by the ESTA-Philippine-PNU as dictated by the Science Education for Linguistic and Cultural Diversity in Philippine Public Higher Education (SELC-PhPHiEd) framework. You will also be asked to develop Lesson Exemplar using ESTA LE templates. Surveys and interviews may be done for more data sourcing. The interview is expected to take about one hour or more, depending on your response/s.

Is there any audio/video recording?
The interview/s will be audio or video recorded. Because your voice will be potentially identified by anyone who hears the tape, confidentiality of what you say on the tape cannot be guaranteed, although the researchers will try to limit access to the tape. The video recordings will be strictly confidential.

What are the dangers to me?
Your participation in this study entails minimal risk. Your participation WILL NOT AFFECT your standing in the school. Questions, concerns, complaints about this research, benefits or risks associated with being in this study can be addressed to **ESTA-Phil-PNU** through his/her email at esta@pnu.edu.ph

How will you keep my information confidential?
All information obtained in this study is strictly confidential unless disclosure is required by law. All data will be kept in a locked file cabinet and password-protected computer. Your name will be replaced by a pseudonym when data are disseminated.

Is there any benefit to society due to my participation in this research?
Your participation in this study may help address heterogeneity and diversity in the Philippine classroom for a more inclusive science education. Furthermore, your participation will mean a

voluntary decision to partake in PNU's advocacy for teacher quality, which is believed to translate to better student learning and performance.

Is there any benefit to me for taking part in this research study?
There is no direct monetary benefit to participants in this study. However, participation in this study may help you have more ways of looking at your classrooms preparing more inclusive and meaningful science lessons for the learners.

Will I get paid for being in the study? Will it cost me anything?
There is no cost or payment for participating in this study.

What if I want to leave the study?
You have the right to refuse to participate or to withdraw at any time without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that your data be destroyed or deleted unless a de-identifiable state is in place. However, withdrawing from the project does not mean you can no longer use what you have learned from the ESTA training in your teaching practice.

What about new information/changes in the study?
If significant new information relating to the study becomes available, which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant: By signing this consent form, you agree that you read, or it has been read to you, and you fully understand the contents of this document. By signing this form, you agree that you are 18 years of age or older and agree to participate in this study. By signing this form, you allow anonymized data to be included in research dissemination.
Signature: _____ Date: _____

Lesson Exemplar

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

LESSON EXEMPLAR

LEARNING STANDARDS		
Course Intended Learning Outcome(s) (CILO)/Most Essential Learning Competencies (MELCS)		
1.		
2.		
3.		
4.		

Objectives	Content	**Tasks** (What tasks should I give to students to ensure realization of the objectives)
1.a. 1.b. 2.a. 2.b. (please provide additional rows if needed.)	1.a. 1.b. 2.a. 2.b.	1.a. 1.b. 2.a. 2.b.

FILIPINO LEARNER
Diagnosing the Learner
Based on your survey, describe the target audience for this lesson; What types of learning styles will you need to be mindful of?

Class/Learner's Demographic Profile

Year Level: _____

Ethnicity: (please write the percentage of students belonging to specific Ethnic groups)

Course/Discipline: _____

Language(s): (please write the percentage of the specific languages where students can speak proficiently)

Number of Students: _____

Gender: (please write the percentage of the gender of the students, including LGBTQIA+)

Other forms of Heterogeneity (e.g., Technical Capability, economic status, race, disability, others with special needs)

Misconception/Course Topic Impression

PEDAGOGIES	
What skills will be addressed by this lesson?	*What activities may be integrated into each to help enhance the learning of the content? [CLIL]*
Cognitive Skills (Link)	**Language Function (Link)**
	1. Reading
Science Process Skills	
	2. Listening
Future Skills (Link)	
	3. Writing
Scientific Attitudes and Filipino Values	4. Speaking

What are the action words and vocabulary for this lesson? Please provide Mother Tongue translation for each identified vocabulary [MTB-MLE]

Key Language (*Link to all constructs of Key Languages*) (What children need to recognize/produce)	
Action Words (scientific processes)	*Vocabulary (other terms)*
Language Structure	

TEACHER KNOWLEDGE	
Technology Being Used by Students	**Technology Being Used by Teacher**
What technology will my students use in this lesson?	*What technology will I use in this lesson?*

What were your reasons for choosing the technology for the students to use?	What are the limitations and potential problems in utilizing the technology?
What are the limitations and potential problems in utilizing the technology?	What are the limitations and potential problems in utilizing the technology?

Assessment for Learning (Formative Assessment)	**Teacher Competence**
Assessment Strategy	*What other skills (language competence, multicultural knowledge system, TPCK) and attitudes do you need in order to implement the lesson?*
Feedback Strategy	
Technology which will be integrated in the Assessment	
Technology which will be integrated in the Feedback System	

Assessment of Learning (Summative Assessment)	**Readings/Materials/Tools**
1. How do you know students met the learning objectives and targets?	*What materials, readings, and tools do you need to improve your competence and confidence in teaching the topic?*
2. What technology will you use to facilitate assessment of learning?	

PROCESS
Walkthrough of the lesson (how will you deliver the lesson/topic (from engaging the student to ensuring achievement of learning objectives?)
1. How will I ensure interdisciplinarity (Use of STEAM Approach)?   *(What specific activities will integrate STEAM?)*   **S:**   **T:**   **E:**   **Arts:**   **M:**

2. How will I integrate culture, Language, gender and context in my lesson?

3. How will I encourage my students to communicate what they know and want to know?

4. What combination of pedagogies will I use to design the Lesson? How will I ensure the integration of the principles of inclusivity in my pedagogies?
- **STEAM Approach**
- **CLIL**
- **7E's**
- **Constructivism**
- **Social constructivism Theory**
- **Second Language Acquisition Theory**
- **Experiential Learning Theory**

Other: (please specify)

5. What instructional flow would capture all these plans? (Present the lesson flow below. Use any applicable model, e.g. Experiential model, 7E's)

Lesson Phase	Essential Question/s	Activity (specify the modalities)	Expected Output/Learning

How will the lesson delivery manifest efficient classroom management?

How will I integrate technology into the lesson's delivery?

Summary: How will technology, content, and pedagogical knowledge work together in this lesson?

REFLECTIONS
(Please accomplish this part after lesson delivery)

1. What worked or didn't work in the delivery of the lesson?

2. What difficulties have you encountered (during planning and delivering the lesson)?

3. What insight have you gained?

4. How do these insights connect to or affect your teaching practice, and personal and professional life philosophy?

MODIFICATIONS
(Please accomplish this part after lesson delivery)

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Rubrics for the Lesson Exemplar

Educating Science Teachers for All

Philippine Normal University
The National Center for Teacher Education

RUBRICS FOR THE LESSON EXEMPLAR (LE)

Name:		Institutional Affiliation:	
Title of the Lesson:		Area of Specialization:	

	1- Beginning	2- Proficient	3- Highly Proficient	4-Distinguished	Score/ Level
Course Learning Outcomes/Learning Competencies	Lesson objectives are unclear and DO NOT match the content standards, course learning outcomes, or identified topics. Furthermore, the tasks are not aligned with the objectives.	The content standards, course learning outcomes, and the identified topics partially match the learning objectives. Some lesson objectives are clear and concise. However, only some identified tasks match the specified learning objectives and content.	The content standards, course learning outcomes, and the identified topics match the learning objectives. All the lesson objectives are clear and concise. The identified tasks match each of the specified learning objectives and content.	The set learning objectives are appropriately aligned with the content standards or course learning outcomes. All lesson objectives are clear, concise, and measurable. There are provisions for supplemental learning tasks aligned with the set learning objectives and content for a more enriched understanding of the lesson.	

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About the Learners	The diagnostic processes of class misconceptions are observed, but the details are **insufficient** and **NOT** specific.	The diagnostic processes of class misconception and heterogeneity are in place and **specific,** but the details are **insufficient.**	The diagnostic processes of diversity, class heterogeneity, and misconceptions are in place and are detailed and specific.	**Specific, contextualized,** and **detailed** processes of diagnosis of diversity, class heterogeneity, and misconceptions are in place. These processes are not only detailed and specific but are also contextualized.	
Pedagogies	The pedagogies identify and address learners' necessary skills, language functions, assessment, and management to achieve the lesson objectives. However, the lesson components must be aligned appropriately, sequenced, and organized.	The pedagogies are appropriate to the teaching model used in the lesson, and these substantially address the skills, language functions, assessment, and management of learners of the lesson objectives. The lessons are well-aligned and are correctly sequenced and organized. Adequate synchronous and asynchronous learning opportunities are likewise provided.	The pedagogies are contextualized and culturally anchored. The teaching model is appropriate, and the lessons substantially address the skills, language functions, assessment, and management of learners' understanding of the lesson objectives. The lesson is systematically organized to provide adequate synchronous and asynchronous learning opportunities.	The pedagogies are interdisciplinary, contextualized, and culturally anchored. The teaching model is appropriate and relevant, and the lesson is well-aligned with the set objectives, substantially addressing learners' skills, language functions, assessment, and management. The organization of lessons is methodical and provides substantial synchronous and asynchronous learning opportunities.	

Erasmus+
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Connection among content, pedagogical approach, and technology	The connection among content, pedagogy, and technology is stated but **NOT** evident.	Some of the content, instructional strategies, and technology are connected.	There is a solid connection among the content, instructional strategies, and technology, and such connections are described in the lesson exemplar.	Content, instructional strategies, and technology are strongly connected, AND the lesson plan includes a description of connections and other interdisciplinary applications.	
Rationale for Instructional Strategy/ies	The rationale for selecting the instructional strategies is indicated but insufficient, and the instructional activities in the lesson plan need to be better grounded in sound principles.	The rationale for selecting the instructional strategies is sufficiently explained, but the lesson plan's instructional activities need to be aligned.	The rationale for selecting the instructional strategies used is sound, and the lesson plan's instructional activities are well-aligned.	The rationale for selecting the instructional strategies is sound and explicitly anchored to a learning theory; the instructional activities in the lesson plan are equally clearly defined and well-aligned.	
Appropriateness of technology for instructor use	The use of technology for instruction is limited to the activities in the lesson plan.	The use of technology for instruction is sound and appropriate for the planned activities in the lesson.	The use of technology for instruction is well-chosen and matches the various phases of the lesson activities.	The use of technology is precise and highlights the relevant instructional strategies.	
Completeness:	One or more key elements in the lesson plan are missing or are insufficient.	The lesson plan is complete and contains all required elements and attachments, such as activities and worksheets.	The lesson plan contains all the required elements and attachments, such as activities or worksheets that show clear examples and scaffolding of various parts.	The lesson plan is complete and exemplary. Pedagogy and assessment are relevant to and responsive to the needs of divers	

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				of ethnicity, gender, class, and ability, including those with special needs.	
Language and Mechanics	The lesson plan contains multiple grammar errors and inappropriate word choices that get in the way of understanding.	Grammar and word choice errors are minimal, and the lesson plan is well put together.	The lesson plan contains minimal errors, and the writing demonstrates a good understanding of grammar and appropriate word choice.	The lesson plan is error-free, and writing demonstrates a superior understanding of grammar and appropriate word choice.	
Comments/Suggestions:					

Evaluated by:		
Date:		

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Peer Review Form

Educating Science Teachers for All

Philippine Normal University
The National Center for Teacher Education

PEER-REVIEW FORM

Name: _____   Program enrolled in: _____

Subject/Grade Level: _____

Content Standard: _____

Lesson Title: _____

ESTA Dimension	Attributes	5 Exceeds standard	4 Meets standard	3 Nearly meets standard	2 Does not meet standard	1 No Evidence	Remarks/Suggestions
Course Learning Outcomes/Learning Competencies	Provides clear lesson objectives	☐	☐	☐	☐	☐	
	Topics/Content match the learning objectives	☐	☐	☐	☐	☐	
	The identified tasks match each of the specified learning objectives and content	☐	☐	☐	☐	☐	

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Filipino Learners	Specific and detailed processes for diagnosing diversity, class heterogeneity, and misconceptions are in place.	☐	☐	☐	☐	☐
Pedagogies	Skills [cognitive, science process, future] are accurately identified.	☐	☐	☐	☐	☐
	Language functions match the provided activities.	☐	☐	☐	☐	☐
	Exhibits contextualization/cultural integration					
	Interdisciplinarity is evident and feasible.	☐	☐	☐	☐	☐
	Assessments match instructional methods.	☐	☐	☐	☐	☐
	Strategies or Theories of Learning and Principles of Teaching are reflected in the LE					
	The lesson appears to help organize and manage student behavior—*Explains sequence of events and procedures for students.*	☐	☐	☐	☐	☐
Teacher's Knowledge						
Technology	The lesson plan/exemplar incorporates at least one technology.	☐	☐	☐	☐	☐
	Discusses possible limitations to technology or potential problems, as well as solutions.	☐	☐	☐	☐	☐

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	Provides a clear rationale for technology choice.	☐	☐	☐	☐	☐
	Demonstrates understanding of technology as a teacher tool or student tool.	☐	☐	☐	☐	☐
Pedagogical Content Knowledge	Selects effective teaching strategies appropriate to the subject domain to guide student thinking and learning.	☐	☐	☐	☐	☐
	Demonstrates awareness of possible student misconceptions.	☐	☐	☐	☐	☐
	Presents appropriate strategies for developing understanding of the subject content.	☐	☐	☐	☐	☐
Technological Pedagogical Knowledge	Chooses technologies enhancing approaches (teacher-centered approaches) –*Uses technology to present material.*	☐	☐	☐	☐	☐
	Chooses technologies enhancing student learning (student-centered approaches) –*Students use technology to explore content and achieve learning goals.*	☐	☐	☐	☐	☐
	Provides clear rationale for technology choice to deliver instruction.	☐	☐	☐	☐	☐

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Technologic al Content Knowledge	Chooses appropriate technologies for the subject domain (mathematics, science).	☐	☐	☐	☐	☐	
	The link between technology and content is obvious or explicit	☐	☐	☐	☐	☐	
Technologic al Pedagogical Content Knowledge	Appropriately uses content, pedagogy, and technology strategies.	☐	☐	☐	☐	☐	
	Technology enhances content objectives and instructional strategies.	☐	☐	☐	☐	☐	
Completeness	The lesson plan is complete with all its intended attachments [e.g., activitiesworksheets,eets etc.] AND includes the following: • addresses higher-order thinking as per Bloom's Taxonomy • integrates with other content areas • provisions for students with special needs.	☐	☐	☐	☐	☐	
General Comments/Suggestions:							

Summary of Attendance

Day 1

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

Day 1

Full Name (Full Name (Given Name M.I. Last Name)	School/Institution
Lloyd Steven N. Mequiabas	Philippine Normal University
Sofia Marie S. Olasiman	Philippine Normal University- Manila
Noralyn C. Sultan	Philippine Normal University
Magbanua, Grace Angela	Philippine Normal University Manila
Shakira Shannen R. Tanchongco	Philippine Normal University
Jonathan A. Mapalo	Philippine Normal University
Christian Jacob M. Batuna	Philippine Normal University- Manila
Danielle Maxene V. Macapagal	Philippine Normal University - Manila
Ericka Mincra P. Cabaluna	Philippine Normal University
Jannavin A. Naguit	Philippine Normal University-Manila
Rhean Sophia P. Escobal	Philippine Normal University-Manila
Franz Lenard T. Ander	Philippine Normal University - Manila
Jhon Paul L. Cristobal	Philippine Normal University
Kit Paula V. Parfan	Philippine Normal University - Manila
Mendoza, Allyna Jaira V.	Philippine Normal University
Shielo A. Parmis	PNU
Reina A. Cuizon	PNU
Averil R. Berano	Philippine Normal University
Harvey Jay B. Calomot	Philippine Normal University
Teddy B. Espenesin	PHILIPPINE NORMAL UNIVERSITY
Kelvinjay A. Segun	Philippine Normal University - Manila
Mark P. Balduman	PNU Manila
Malvar, Kier Allen C.	PNU Manila
Maria Carey C. Bigno	Philippine Normal University - Manila
Ckenlie C. Suboc	Philippine Normal University - Manila
Leila Nicole Siringan	Philippine Normal University

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Katherine Cymel P. Oh	Philippine Normal University
May B. Cabalejo	Philippine Normal University
Gwyneth Lynn Gallo	Philippine Normal University
Delos Reyes, Vince Iverson Cedric A.	PNU-Manila
Crismae T. Ramos	Philippine Normal University
Cris Jhon S. Bilar	Philippine Normal University - Manila
Myles G. Llorca	Philippine Normal University
Louise Angeli C. Terez	Philippine Normal University
Jullie Rhey C. Pelaez	Philippine Normal University- Manila
Ashnifa Hayani A. Alonto	Philippine Normal University - Manila
Aiza Mae S. Agunat	Philippine Normal University
Irish Claire P. Latorre	Philippine Normal University-Manila
Sheyla May O. Gambalan	Philippine Normal University
Liza Mae R. Albandia	Philippine Normal University- Manila
Marc Tracy D. Halog	Philippine Normal University-Manila
Miella L. Castillo	Philippine Normal University
Harvey Jay B. Calomot	Philippine Normal University
Jovy D. Alvarez	Polytechnic University Of The Philippines - Sta. Mesa
Bonifacio N. Santizas Jr.	Philippine Normal University - Manila
Samantha Nicole T. Leona	Philippine Normal University
Dann Byron G. Mahinay	Philippine Normal University
Tori Cestina Stacy Q. Binsol	PNU Manila
Miko C. Jose	MMSU CTE
Jose Angelo S. Inocentes	Polytechnic University Of The Philippines - Manila
Karl Freidrich F. Cuerdo	Polytechnic University Of The Philippines
Ma. Anchonette D. Daroy	Philippine Normal University - Manila
Regine Ellie C. Barrameda	Philippine Normal University-Manila
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Technical Report

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Jaypee C. Bernaldez	PNU-Manila
Kelvinjay A. Segun	Philippine Normal University - Manila
Edwin Aldrin Joy R. Yadao	Mariano Marcus State University
Chadrick Nathaniel R. Santos	Polytechnic University Of The Philippines
Christian M. Abao	MMSU
Monique Trisha R. Marcial	Mariano Marcos State University
Ma. Danica Raiza A. Caliwan	Philippine Normal University - Manila
Raven Vera L. Sierra	PNU - Manila
Jhandy Mark T. Miranda	Polytechnic University Of The Philippines
Elizandra Moulene M. Tribo	PNU-MANILA
Princess Mhay P. Curitana	Philippine Normal University - Manila
Chruzette C. Marzo	Philippine Normal University
Marlowie L. Bayangos	MMSU
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Angela Kirsten S. Isaac	Philippine Normal University (NCR)
Liza S. Nicor	Philippine Normal University (PNU)
Edichel M. Albao	Philippine Normal University - Manila
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Daniel Paolo L. Tapiceria	Mariano Marcos State University
John Vincent A. Agustin	Polytechnic University Of The Philippines
Kylle Harvey A. Calaustro	MAARIANO MARCOS STATE UNIVERSITY
Trixi Z. Lacson	Philippine Normal University
Shandie V. Carbonell	Mariano Marcos State University
Julia Sayle Nicole R. Purpura	Polytechnic University Of The Philippines - Manila
Mika Angelee A. Lequina	MMSU
Margaret Czyrille V. Agpaoa	Mariano Marcos State University
Shiello D. Ogatis	Philippine Normal University
Anren Paul P. Condada	Polytechnic University Of The Philippines

Educating Science Teachers for All

Philippine Normal University
The National Center for Teacher Education

Luke Timothy Breis Tanqui-On	Polytechnic University Of The Philippines
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Roxane I. Ventura	Mariano Marcos State University
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Lovely M. Demandante	Mariano Marcos State University
Patricia Dennisse A. Balico	Mariano Marcos State University
Carmona, Jules Darryl F.	Philippine Normal University
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Lemuel Rei L. Coquial	Mariano Marcos State University
Joseph Miles K. Margallo	Philippine Normal University - Manila
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Kathrina V. Grande	Mariano Marcos State University
Galeon, Hershey C.	Philippine Normal University
Kyla Mae Quinit	Mariano Marcos State University
Reina Mae D.S. Boongaling	Polytechnic University Of The Philippines
Ron Jacob C. Ogbac	Polytechnic University Of The Philippines
Christian Paul Peñalosa	Leyte Normal University
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Hannah E. Rosales	Polytechnic University Of The Philippines
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Christian Kyle L. Sabal	Philippine Normal University
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Charles S. Aganus	Mariano Marcos State University (College Of Teacher Education)
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Karl Simon N. Matias	Polytechnic University Of The Philippines
Denber S. Moraga	PNU
Fernandez, Aleena Czerine L.	MMSU
Ornopia, Mary Ann D.	Philippine Normal University
Geiralos R. Alic	Cebu Normal University
Shane B. Baldonado	Philippine Normal University

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Angelina B. Nery	Polytechnic University Of The Philippines
Nicole R. Adonis	Leyte Normal University
Aaron Lendsey S. Santillan	Cebu Normal University
Angelo M. Perez	PUP - Sta Mesa
Precilla C. Busa	Polytechnic University Of The Philippines
Richmond Andrei T. Rivera	Mariano Marcos State University
SHIELA MAR MADAMBA	Mariano Marcos State University
Judy-Ann N. Villalobos	Mariano Marcos State University
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Judy-Ann N. Villalobos	Mariano Marcos State University
Justine Paul N. Buena	Leyte Normal University
Shaira M. Yanson	Cebu Normal University
Mangahis, John Martin	Philippine Normal University (Manila)
Wilianne Mae D. Bustaliño	Philippine Normal University - Manila
Frances T. Tabanao	Cebu Normal University
RV Lyn T. Santiago	Philippine Normal University
Joel B. Natural	PUP
Abbie Rose P. Elardo	Polytechnic University Of The Philippines
Angel Rose J. Raya	Philippine Normal University - Manila
Riza Jane M. Escuadro	Cebu Normal University
Blaire Frances M. Tejano	Cebu Normal University
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Carlo Colarina	Polytechnic University Of The Philippines
Shana Mae M. Ocasla	Leyte Normal University
Ruth Michaelle C. Dizon	Philippine Normal University
Chierry Mae P. Nadonza	Leyte Normal University
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Jele Z. Manghino	Cebu Normal University

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Aprilrose Niña E. Tubigon	CNU
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Gretchel A. Queztas	Leyte Normal University
Kisha Rose D. Alburo	Cebu Normal University - Main Campus
Louielyn Gargoles	Cebu Normal University
Rafeal E. Rosales	Philippine Normal University
Rommel Martin F. Mates	CEBU NORMAL UNIVERSITY
Adellee Fate J. Sinajon	Cebu Normal University
Khlaraize M. Seblos	Cebu Normal University
Frances Diane S. Tapdasan	Cebu Normal University
Jason L. Sardido	Cebu Normal University
Mark Erickson S. Calunod	Philippine Normal University
Cloey Juliene C. Magana	Philippine Normal University
Louie Rey B. Puno	PUP
Kezeiah Ann B. Nograles	Philippine Normal University
Lieja Marie Pogoy	CNU
Jhairyl S. Bandalan	Cebu Normal University
Ayen M. Lucion	Philippine Normal University
Peter Cuevas	Cebu Normal University
Abueva, Jason, L.	Cebu Normal University
Britta Dale C. Dinawanao	Cebu Normal University
Elaiza Marie C. Venus	Polytechnic University Of The Philippines
Kyla Nicole Ferrer Sierras	Cebu Normal University
Yaghnna Ainein T. Yankin	Cebu Normal University
Marie Cielo D. Marcelo	Philippine Normal University
Jose Martin T. Ferrer	Pangasinan State University-Bayambang Campus
Franchezlyn C Gaid	Leyte Normal University

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Karylle Victoria D. Caasi	Philippine Normal University Manila
Hernandez, Charls Gianna N.	Philippine Normal University
Leah Pamela P. Hortelano	Cebu Normal University
Maria Shen C. Magno	Cebu Normal University
Sophia Marie A. Rivera	PNU
Mylene Grace P. Sumagang	Cebu Normal University
Uriel B. Villamor	Cebu Normal University
Althea L. Tapayan	Cebu Normal University
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Summary of Attendance

Day 2

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Philippine Normal University
The National Center for Teacher Education

Day 2

Full Name (Given Name M.I. Last Name)	School/Institution
Peter Cuevas	Cebu Normal University
Lloyd Steven N. Mequiabas	Philippine Normal University - Manila
Karl Freidrich F. Cuerdo	Polytechnic University of the Philippines
Binssein C. Manloloyo	Cebu Normal University
Balauro, Wency Heart C.	Mariano Marcos State Univerrsity
Maria Shen C. Magno	Cebu Normal University
Jess-Rone R. Corpuz	Mariano Marcos State University
John Matthew L. Albero	PNU-Manila
Starlet M. Taboco	Philippine Normal University
Kylle Harvey A. Calaustro	Mariano Marcos State University
Daniel Paolo L. Tapiceria	Mariano Marcos State University
Kit Paula V. Parfan	Philippine Normal University - Manila
Keith Princess C. Mores	Philippine Normal University
Angelo M. Perez	PUP - Sta Mesa
Jhon Paul L. Cristobal	Philippine Normal Universtiy
Miko C. Jose	MMSU CTE
Jiera Marasigan	PUP
Frances D. Gumayao	Leyte Normal University
Kier Allen C. Malvar	PNU Manila
Jovy D. Alvarez	Polytechnic University of the Philippines - Sta. Mesa
Kyla Mae Quinit	Mariano Marcos State University
Elizandra Moulene M. Tribo	PNU-Manila
Judy-Ann N. Villalobos	Mariano Marcos State University - College of Teacher Education
Shandie V. Carbonell	Mariano Marcos State University
Hannah Grace S. Buer	Polytechnic University of the Philippines

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Jonalyn Aranduque	Cebu Normal University Main Campus
Kaye Charmagne D. Sabado	Mariano Marcos State university
Joshua G. Miranda	Mariano Marcos State University
Janelle F. Langcauon	Philippine Normal University- Manila
Danielle Maxene V. Macapagal	Philippine Normal University - Manila
Aleena Czerine L. Fernandez	Mariano Marcos State University
Lemuel Rei L. Coquial	Mariano Marcos State University
Franz Lenard T. Ander	Philippine Normal University - Manila
Mark Erickson S. Calunod	Philippine Normal University - Manila
Kezeiah Ann B. Nograles	Philippine Normal University- Manila
Neil Bryant I. Lucas	Mariano Marcos State University
Liza Mae R. Albandia	Philippine Normal University- Manila
Lovely M. Demandante	Mariano Marcos State University
Monique Trisha R. Marcial	Mariano Marcos State University
Mika Angelee Lequina	Mariano Marcos State University
Jun Adriane B. Racaza	BUKIDNON State University
Glycel Ira T. Macalma	Mariano Marcos State University
Brandon L. Julian	MMSU-CTE
Samantha Nicole T. Leona	Philippine Normal University
Kaye Traya	Bukidnon State University
Ronafe G. Impat	Mariano Marcos State University - College of Teacher Education
Anren Paul P. Condada	Polytechnic University of the Philippines
Margaret Czyrille V. Agpaoa	Mariano Marcos State University
Jeizil A. Villamor	Polytechnic University of the Philippines
Ramil O. Umoso	MMSU
Marjanah Celine A. Juan	Mariano Marcos State University
Marvelous Grace A. Ducusin	Mariano Marcos State University
Roxane I. Ventura	Mariano Marcos State University
Edwin Aldrin Joy R. Yadao	Mariano Marcos State University

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Neriza E. Dimaano	Polytechnic University of the Philippines
Nicole B. Patanao	PUP Manila
Joel B. Natural	PUP
Janelamae F. Austria	Polytechnic University of the Philippines
Althea M. Dela Cruz	MMSU
Fitche Jhaiemarc R. Ibarra	Mariano Marcos State University
Ma. Danica Raiza A. Caliwan	Philippine Normal University - Manila
Rhay Mark P. Mamintal	MMSU
Raullyn-Ann G. Sumayod	Leyte Normal University
Jose Angelo S. Inocentes	Polytechnic University of the Philippines - Manila
Ricardo L. Buenaseda	Polytechnic University Of The Philippines
Richmond Andrei T. Rivera	Mariano Marcos State University
Galiza, John Bryan	Mariano Marcos State University
Shiello D. Ogatis	Philippine Normal University - Manila
Marlowie L. Bayangos	MMMSU
Christian Paul Penalosa	Leyte Normal University
Angelina B. Nery	PUP
Ashley Diane R. Carcueva	Cebu Normal University
Kisha Rose D. Alburo	Cebu Normal Univeristy Main Campus
Julia Sayle Nicole R. Purpura	Polytechnic University of the Philippines - Manila
Charles S. Aganus	Mariano Marcos State University
Ancilla Marie T. Dillo	Polytechnic University of the Philippines
Kyle Chandler T. Del Rosario	Polytechnic University of the Philippines Manila
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Reina Mae D.S. Boongaling	Polytechnic University of the Philippines
Godwin Miles Angelo S. Adtoon	Leyte Normal University
Kathrina V. Grande	Mariano Marcos State University
Denzel C. Ocampo	Philippine Normal University
Gretchen J. Orong	Mariano Marcos State University - college of teacher education
Raymond B. Barrientos	Philippine Nornal University - Manila
Liza S, Nicor	Philippine Normal University Manila
John Vincent A. Agustin	Polytechnic University of the Philippines
Justine Paul N. Buena	Leyte Normal University
Patricia Dennisse A. Balico	Mariano Marcos State University
Ana Ella Ramirez	Leyte Normal University
Steven J. Alarcon	Polytechnic University of the Philippines
Ron Jacob C. Ogbac	Polytechnic University of the Philippines
Genevieve G. Duldulao	Mariano Marcos State University
Carole Anne M. Lim	Leyte Normal University
Reymart H. Boybanting	Bukidnon State University
Jariz Jymzfiel A Tan	Leyte Normal University
Shaena Mae Layaoen	Mariano Marcos State University
Rachel Mae M. Suñiga	Philippine Normal University - Manila
Shiela Mae Madamba	Mariano Marcos State University
Rosa Mae C. Calo	Bukidnon State University
Chathy A. Portillo	Leyte Normal University
Aaron Lendsey S. Santillan	Cebu Normal University
Karl Simon N. Matias	Polytechnic University of the Philippines
Frances T. Tabanao	Cebu Normal University
Francient Camposo	Cebu Normal University
Katherine Cymel P. Oh	Philippine Normal University
Jhon Lenard D. Dionisio	Polytechnic University of the Philippines

Yanson, Shaira M.	Cebu Normal University
Hannah E. Rosales	Polytechnic University of the Philippines
Vince Iverson Cedric A. Delos Reyes	PNU-MANILA
Louie Rey B. Puno	PUP
Ashnifa Hayani A. Alonto	PNU- Manila
Catherine Nichole Ocampo	Cebu Normal University
Carlo Colarina	Polytechnic University of the Philippines
Abbie Rose P. Elardo	Polytechnic University of the Philippines
Angela Kirsten S. Isaac	Philippine Normal University (Manila)
Gwyneth Lynn L. Gallo	Philippine Normal University
Rv Lyn T. Santiago]	Philippine Normal University Manila
Adellee Fate J. Sinajon	Cebu Normal University
Jhairyl S. Bandalan	Cebu Normal University
Jason L. Abueva	Cebu Normal University- main
Blaire Frances M. Tejano	Cebu Normal University
Frances Diane S. Tapdasan	Cebu Normal University
Frances Kate C. Ouano	Cebu Normal University
Dann Byron G. Mahinay	Philippine Normal University
Angel Rose J. Raya	Philippine Normal University - Manila
Shana Mae M. Ocasla	Leyte Normal University
Nicole R. Adonis	Leyte Normal University
Khlaraize M. Seblos	Cebu Normal University
Jannavin A. Naguit	Philippine Normal University - Manila
Louielyn E. Gargoles	Cebu Normal University
Cloey Juliene C. Magana	Philippine Normal University
Sophia Marie A. Rivera	PNU

Summary of Attendance

Day 3

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

Day 3

Full Name (Full Name (Given Name M.I. Last Name)	School/Institution
Lovely M. Demandante	Mariano Marcos State University - College of Teacher Education
Neil Bryant I. Lucas	Mariano Marcos State University
Glycel Ira T. Macalma	Mariano Marcos State University
Marvelous Grace A. Ducusin	Mariano Marcos State University
Jenina C. Tuico	PUP Manila
Samantha Nicole T. Leona	Philippine Normal University
Monique Trisha R. Marcial	Mariano Marcos State University
Wency Heart C. Balauro	Mariano Marcos State University
Christian Jacob M. Batuna	PNU-Manila
Steven J. Alarcon	Polytechnic University of the Philippines
John Vincent A. Agustin	Polytechnic University of the Philippines
Shandie V. Carbonell	Mariano Marcos State University
Christian M. Abao	Mariano Marcos State University
Kaye Charmagne D. Sabado	Mariano Marcos State University
Ronafe G. Impat	Mariano Marcos State University - College of Teacher Education
Kit Paula V. Parfan	Philippine Normal University - Manila
Margaret Czyrille V. Agpaoa	MMSU- CTE
John Matthew L. Albero	Philippine Normal University - Manila
Miella L.Castillo	Philippine Normal University
Precilla C. Busa	Polytechnic University of the Philippines
Angel Rose J. Raya	Philippine Normal University - Manila
Rhean Sophia P. Escobal	Philippine Normal University - Manila
Jovy D. Alvarez	PUP - Sta. Mesa
Judy-Ann N. Villalobos	MMSU - CTE
Miko C. Jose	MMSU CTE

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Jhon Lenard D. Dionisio	Polytechnic University of the Philippines
Kier Allen C. Malvar	PNU - Manila
Nicole B. Patanao	PUP Manila
Kylle Harvey A. Calaustro	MARIANO MARCOS STATE UNIVERSITY
Althea M. Dela Cruz	MMSU
Julia Sayle Nicole R. Purpura	PUP - Manila
Monina V. Ortiz	Philippine Normal University - Manila
Christian Paul Peñalosa	Leyte Normal University
Ramil O. Umoso	MMSU
Ron Jacob C. Ogbac	Polytechnic University of the Philippines
Janelamae F. Austria	Polytechnic University of the Philippines
Fitche Jhaiemarc R. Ibarra	Mariano Marcos State University
Gretchen J. Orong	Mariano Marcos State University -College of Teacher Education
John Bryan Galiza	Mariano Marcos State University
Joshua G. Miranda	Mariano Marcos State University
Karl Freidrich F. Cuerdo	Polytechnic University of the Philippines
Jhandy Mark T. Miranda	Polytechnic University of the Philippines Main
Marjanah Celine A. Juan	Mariano Marcos State University
Aleena Czerine L. Fernandez	Mariano Marcos State University
Shaena Mae Layaoen	Mariano Marcos State University
Jude Andrew L. Cagaoan	Philippine Normal University - Manila
Franchezlyn C. Gaid	Leyte Normal University
Lemuel Rei L. Coquial	Mariano Marcos State University
Liza Mae R. Albandia	Philippine Normal University-Manila
Liza S, Nicor	Philippine Normal University - Manila
Kathrina V. Grande	Mariano Marcos State University
Mika Angelee A. Lequina	MMSU
Marlowie L. Bayangos	MMSU
Jeizil A. Villamor	Polytechnic University of the Philippines

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Richmond Andrei T. Rivera	Mariano Marcos State University
Charles S. Aganus	Mariano Marcos State University
Brandon L. Julian	MMSU
Genevieve G. Duldulao	Mariano Marcos State University
Richmond Andrei T. Rivera	Mariano Marcos State University
Rhay Mark P. Mamibtal	MMSU CTE
Jiera Marasigan	Polytechnic University of the Philippines
Daniel Paolo L. Tapiceria	Mariano Marcos State University
Cherryl P. Dahilig	MMSU-CTE
Patricia Dennisse A. Balico	Mariano Marcos State University
Edwin Aldrin Joy R. Yadao	MMSU
Roxane I. Ventura	Mariano Marcos State University
Abbie Rose P. Elardo	Polytechnic University of the Philippines
Joel B. Natural	PUP Sta. Mesa
Hannah Grace S. Buer	Polytechnic University of the Philippines
Shiela Mae Madamba	Mariano Marcos State University
Jess-Rone R. Corpuz	Mariano Marcos State University
Ricardo L. Buenaseda	Polytechnic University of the Philippines
Kyla Mae Quinit	Mariano Marcos State University
Chathy A. Portillo	Leyte Normal University
Reina Mae D.S. Boongaling	Polytechnic University of the Philippines
Kyle Chandler T. Del Rosario	PUP Manila
Jennyvave D. Yambagon	Bukidnon State University
Raven Vera L. Sierra	Philippine Normal University
Carlo Colarina	Polytechnic University of the Philippines
Karl Simon N. Matias	Polytechnic University of the Philippines
Jose Angelo S. Inocentes	Polytechnic University of the Philippines Manila
Angela Kirsten S. Isaac	Philippine Normal University
Neriza E. Dimaano	Polytechnic University of the Philippines
Jannavin A. Naguit	Philippine Normal University Manila

Summary of Attendance

Day 4

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

Day 4

Full Name Full Name (Given Name M.I. Last Name)	School/Institution
Kaye Charmagne D. Sabado	MMSU
Monique Trisha R. Marcial	Mariano Marcos State University
Jhon Paul L. Cristobal	PNU
Lovely M. Demandante	Mariano Marcos State University - College of Teacher Education
Kelvinjay A. Segun	Philippine Normal University
Jeizil A. Villamor	Polytechnic University of the Philippines
Shaena Mae Q. Layaoen	Mariano Marcos State University
Miella L. Castillo	Philippine Normal University
Christin Jale B. Ruiz	Philippine Normal University
Louielyn E. Gargoles	Cebu Normal University
Kit Paula V. Parfan	Philippine Normal University-Manila
Siringan Leila Nicole	PNU Manila
Kylle Harvey A. Calaustro	MMSU
Joshua G. Miranda	Mariano Marcos State University
Christian Jacob M. Batuna	Philippine Normal University- MANILA
Marvelous Grace A. Ducusin	MMSU- CTE
Jules Darryl F. Carmona	PNU
Althea M. Dela Cruz	MMSU
Rhean Sophia P. Escobal	Philippine Normal University- Manila
Raven Vera L. Sierra	Philippine Normal University
Jess-Rone R. Corpuz	Mariano Marcos State University
Rommel Martin F. Mates	Cebu Normal University
Judy Mark D. Beatingo	Philippine Normal University- Manila
Glycel Ira T. Macalma	MMSU-CTE
Raymond B. Barrientos	Philippine Normal University - Mainila
Vince Iverson Cedric A. Delos Reyes	PNU-Manila

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Keith Princess C. Mores	Philippine Normal University
John Bryan Galiza	Mariano Marcos State University
Elmer C. Dador Jr.	Philippine Normal University
Liza Mae R. Albandia	PNU-Manila
John Matthew L. Albero	PNU NCR
Judy-Ann N. Villalobos	Mariano Marcus State University - College of Teacher Education
Balauro, Wency Heart Cabildo	Mariano Marcos State University
Jhairyl S. Bandalan	Cebu Normal University - Main Campus
Mc Kayla Mae C. Bandola	Palawan State University
Margaret Czyrille V. Agpaoa	MMSU-CTE
Trixi Z. Lacson	PNU
Christian Paul Peñalosa	Leyte Normal University
Liza S. Nicor	Philippine Normal University - Manila
Abbie Rose P. Elardo	Polytechnic University of the Philippines
Brandon L. Julian	MMSU-CTE
Ashnifa Hayani A. Alonto	Philippine Normal University - Manila
Samantha Nicole T. Leona	Philippine Normal University
Shandie V. Carbonell	Mariano Marcos State University
Ramil O. Umoso	MMSU
Jannavin A. Naguit	Philippine Normal University - Manila
Patricia Dennisse A. Balico	Mariano Marcos State University
Louise Angeli C. Terez	Philippine Normal University
Kier Allen C. Malvar	PNU - Manila
Nichaela E. Dela Torre	Palawan State University
Cherryl P. Dahilig	MMSU-CTE
Marjanah Celine A. Juan	MMSU
Gretchen J. Orong	Mariano Marcos State University - College of Teacher Education
Angel Rose J. Raya	Philippine Normal University
Rhay Mark P. Mamintal	MMSU

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Jomarie L. Macalla	Philippine Normal University
Marie Cielo D. Marcelo	Philippine Normal University
Miko C. Jose	MMSU CTE
Kathrina V. Grande	Mariano Marcos State University
Kyla Mae R. Quinit	Mariano Marcos State University
Leah Pamela P. Hortelano	Cebu Normal University (CNU)
Mika Angelee A. Lequina	MMSU
Daniel Paolo L. Tapiceria	Mariano Marcos State University
Jenina C. Tuico	PUP MANILA
Hanni Claire M. Cabanillas	Palawan State University
Aleena Czerine L. Fernandez	Mariano Marcos State University
Genevieve G. Duldulao	Mariano Marcos State University
Ronafe G. Impat	Mariano Marcos State University - College of Teacher Education
Nikka Jayne B. Paz	Palawan State University
Judelyn Tandeg	Palawan State University
Lemuel Rei L. Coquial	MMSU
Alvarez, Jovy D.	PUP - Sta. Mesa
Frederick John V. Francisco	Palawan State University
Jennelyn Mae M. Rodriguez	Palawan State University
Jude Andrew L. Cagaoan	Philippine Normal University - Manila
Peter Cuevas	Cebu Normal University
Julia Sayle Nicole R. Purpura	PUP - Manila
Kisha Rose D. Alburo	Cebu Normal University - Main Campus
Joseph Miles K. Margallo	Philippine Normal University
Steven J. Alarcon	Polytechnic University of the Philippines
Charles S. Agamus	Mariano Marcos State University
Marlowie L. Bayangos	Mariano Marcos State University
Ashley Diane R. Carcueva	Cebu Normal University
Fitche Jhaiemarc R. Ibarra	Mariano Marcos State University - College of Teacher Education

Kyle Chandler T. Del Rosario	PUP Manila
Elizandra Moulene M. Tribo	PNU-Manila
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Neil Bryant I. Lucas	Mariano Marcos State University - College of Teacher Education
Roxane I. Ventura	Mariano Marcos State University
Jiera Marasigan	PUP
Aiza Mae S. Agunat	PNU
Grace S.Talanquines	Palawan State University
Janelamae F. Austria	Polytechnic University of the Philippines
Mangahis, John Martin	Philippine Normal University
Karl Simon N. Matias	Polytechnic University of the Philippines
Mark Erickson S. Calunod	Philippine Normal University - Manila
Jonalyn Aranduque	Cebu Normal University
Lee Anne G. Delos Rios	PNU-Manila

Participant Profile

Training Participants

Table 4

Participant Profile (Basic Education Science Teachers)

Characteristics	Phase 1 (n = 808) f(%)	Phase 2 (n = 99) f(%)
Gender		
• Female	540 (66.8)	63 (62.37)
• Male	260 (32.17)	33 (33.33)
• Non-binary	8 (1%)	3 (2.97)
Teaching Area		
• Science	720 (89.11)	99 (100)
• Mathematics	46 (5.69)	
• Others (e.g., STEM)	42 (5.2)	
Grade level assignment		
• Primary and elementary school	122 (15.1)	12 (12.12)
• High school/senior high school	390 (48.27)	87 (87.87)
• Tertiary level	270 (33.42)	
Academic Rank		
• Teacher 1-3	708 (87.62	81 (81.81)
• Master Teacher	79 (9.78)	15 (15.15)
• Department heads	9 (1.11)	3 (3.03)

Table 5

Participant Profile (Pre-Service Science Education Students)

Profile	Frequency	Percentage
Age		
Above 30	1	0.31%
25-30	2	0.62%
20-25	217	66.77%
15-20	105	32.31%
Sex		
Male	104	32.00%
Female	221	68.00%
Gender identity		
Male	97	29.85%
Female	220	67.69%
Non-binary	8	2.46%
Mother tongue		
Filipino	210	64.62%
English	3	0.92%
Other dialects	112	34.46%
Language spoken at home		
Filipino	210	64.62%
Dialect	112	34.46%
English	3	0.92%
Geography (Regions)		
I	36	11.08%
IV-A	23	7.08%
IV-B	16	4.92%
VII	34	10.46%
VIII	25	7.69%
X	12	3.69%
NCR	117	36.00%

Profile	Frequency	Percentage
None	222	68.31%
With training attended	103	31.69%
covered in a lecture/seminar	120	36.92%
module on topic	86	26.46%
covered over multiple lectures/seminars	119	36.62%
covered in a lecture/seminar	130	40.00%
module on topic	151	46.46%
covered over multiple lectures/seminars	44	13.54%
Special Needs		
covered in a lecture/seminar	112	34.46%
module on topic	105	32.31%
covered over multiple lectures/seminars	108	33.33%

Profile	Frequency	Percentage
Year Level		
Fourth Year	103	31.69%
Third Year	114	35.07%
Second Year	69	21.23%
First Year	1	0.30%
Graduate	2	0.62%

Analysis of Evaluation

Educating Science Teachers for All
Philippine Normal University
The National Center for Teacher Education

Evaluation for National Training Workshop in Inclusive Science Education for Linguistic and Cultural Diversity for Pre-Service Science Teachers

What gender do you identify as?
109 responses

- Male
- Female
- Non-binary

63.3%
34.9%
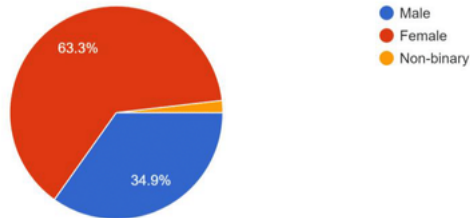
Is Filipino your mother tongue? (If no, please specify)
109 responses
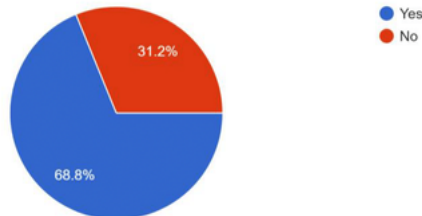
- Yes
- No

31.2%
68.8%

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What language do you speak at home?
109 responses
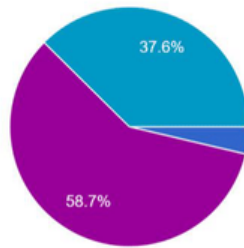
- English
- Spanish
- Korean
- Chinese
- Filipino
- Other major languages in the Philippines. Please specify:
  _____

37.6%
58.7%

Which languages are you capable of speaking fluently?
109 responses

Language	Responses
English	83 (76.1%)
Spanish	0 (0%)
Korean	0 (0%)
Chinese	0 (0%)
Filipino	102 (93.6%)
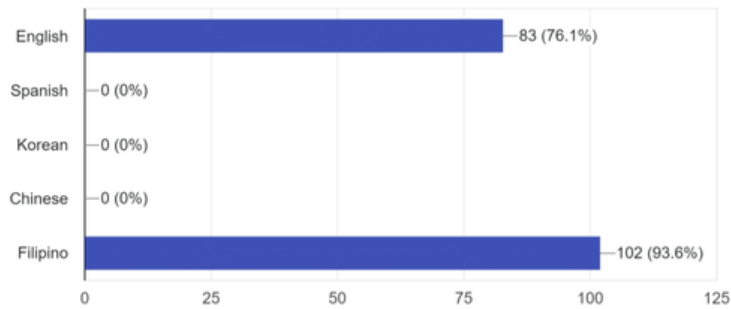
Part II.

Which, if any, of the following describes your opinion? Please respond to each of the following statements by choosing one of the provided responses indicating your agreement level.

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Which if any of the following describes your opinion? Please respond to each of the following statements by choosing one of the possible responses indicating your agreement area.
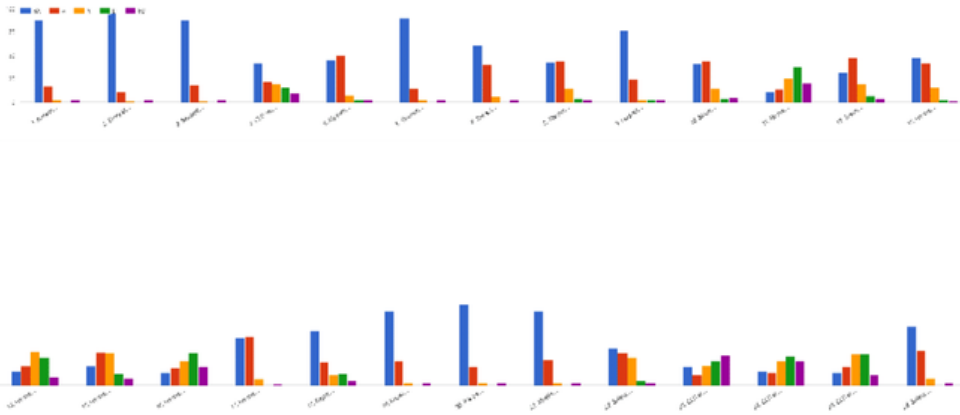
Direction: Please rate the activity in terms of the specified criteria.
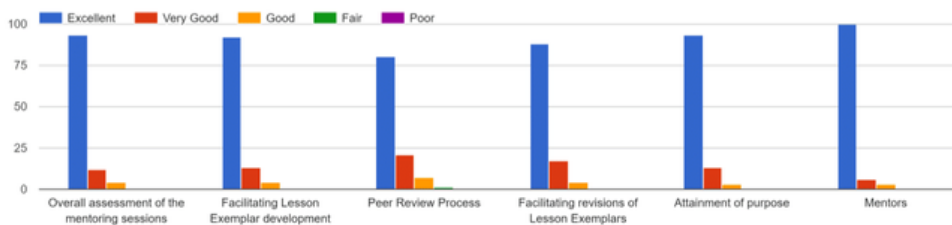
Was there anything you particularly liked about the training?

- I like the discussion of the levels of culture as I have a better perspective in understanding and respecting everyone.

- I liked about the training on how as a pre-service teacher we encounter he CLD students and how we must do to them.
- Yes, when the speaker talked about diverse learners and how we as a teacher could help them.
- The connection of culture and individyality to science
- everything
- 1
- It tells us about how diverse are learners in the classroom and the approaches that suits the learners.
- I think that what i like about this training is that it gives us tips and tricks in order for us to better our teaching strategies
- New knowledges that is imparted.
- It was informative
- I liked the inclusive lessons that this training taught me
- I really loved how the lesson exemplar is crafted! It allows us teachers to think critically in how to teach Sciences in our own classrooms.
- Yes, the way how you share information. It is very informative and I easily grasp the concept that speakers presented
- It tackles how to handle diverse learners.
- I loved all the topics because I found them very applicable to our practice, especially on developing our youth's science capital.
- About the strategies and teaching approaches that were presented to make teaching and learning effective.
- All.
- I learned how to deal with various learners inside the science classrooms. As well as I have been refreshed in my PCK ideas.
- I liked how the speakers given tips on how to help me as a future teacher to how to make science more exciting for the students
- All the topics discussed in the training are a great help for me in my chosen career
- All
- I like how every speakers have explained and elaborated their topic effectively.
- I like the way they provide different topic every session. It makes the seminar/workshop more interesting.
- What I like about the training is, it is very interactive
- I actually like all parts of the training, from the speakers to the topics that was discuss. I do really gain a lot from this training that I can use to my future endeavor.
- It was very organized.
- The interactiveness
- I liked how the speakers open my mind about the new trend in education, which is more relevant. I appreciate the wisdom of all the speakers throughout the four days of training.
- Yes
- I like the idea of flipped classroom and technological integration in teaching because it there are lots of benefits in applying them.
- The way the speakers were able to convey how cultural differences is not a hindrance in education and how we, as future educators should treat and interact with our students without hurting them.

- I love the way they are open about any topics that can help the attendees know and understand more about a topic.
- It is well organized
- I like how we were oriented on how to properly address the misconception amd make the student understand the correct concept without unintentionally offending them.
- The speakers are taught us well in the training
- one benefit of training for CLD (Culturally and Linguistically Diverse) students for science teachers is the emphasis on creating inclusive and engaging learning environments that accommodate diverse cultural and linguistic backgrounds. It often involves incorporating interactive teaching methods, culturally relevant materials, and fostering a supportive classroom community.
- Flipped Classroom and Ing. Tech
- Competent resource speakers
- none
- I liked about the training is how the speakers emphasized the diversity of learners. Hence, as teachers, we have to learn and consider their differences like their culture, ethnic groups, religion, etc. to make them feel welcomed and accepted in a learning institution.
- Learning about Flipped Classroom
- The pre-conceptual learning and the flipped classroom setup.
- Yes
- The topics itself are very interesting for me since it helps me to become a great science teacher with consideration of my student's background.
- Something that I lole about the training is that the lectures are comprehensive and with utmost dedication from the speakers. The complexities imbued along with the necessities given from the lectures made me realize how important teaching science for the betterment of our future students.
- Yes, it is about how science teachers should be open for CLD students.
- All the topics were very interesting, but my favorite was the discussion about conceptual change.
- I like this training because it helps me understand how to be a good teacher and also teaches me the things I need to remember to promote inclusivity.
- The speakers were all very knowledgeable and showed their mastery of their topics.
- It is very informative especially to pre-service teachers like us and it is a good way of preparing us from entering the field of teaching science.
- I liked how the inclusive education was given a prior attention in discussion because this will help us to understand more and it can be used on our Ed7 courses.
- I like the Session in Day two where the discussion is all about hooks it Is very interesting another one is the session about the language of Science I love the how the instructor state that Science is very interesting subject however because of language barrier it results for misunderstanding.
- The inclusivity and equal treatment to all students regardless of what culture they are in.
- I liked how diverse the information that you can get in different speakers.
- Form the first to the last week of the session, all of the speakers excelled in their certain topics. Which this make me more attentive and gain insightful learning that is beneficial for me. The part I particularly like the most is the last part because this is what I can relate and the topic manifested
- None
- The training's objectives are met. I appreciate the diverse talks we had throughout the training duration.
- All the parts and sessions, sharing and lessons

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- What I like about the training is that it is very helpful for us pre-service to know that there are factors that will affect to teach our students smoothly and the speaker's advices are very crucial for us to apply when we are in the field of teaching already.
- I am currently creating my research and it focuses on teaching science on inclusive classroom and I really like the 2nd session that talks about the diversity and inclusion elements.
- The inclusivity and the equal treatment regardless of culture, gender or age.
- The things I liked during the training is that it improves my knowledge when it comes to different aspects and field of teaching styles and method. Moreover, I do like the method of the speaker where in they will seek for feedback if the student fully understand the discussion or not. I also like the way they discussed every lessons and they highlighted things that are relevant in teaching styles.
- The how the speakers interact with the participants and how they cater the questions.
- I like the way how our guest speakers did their lecture today, it is more engaging and makes me focus to the lecture.
- I really love that some of the speakers engage / hooks the interest of learning by allowing us to respond what we know/feel about the topic being discussed. They also relate Science as a way for us to reinforce our responses for the betterment of interaction amongst everyone in the webinar.
- I like that the speakers are well-versed with the topics.
- I liked all the topics discussed during the training most especially the interaction btween the speakers and the participants.
- More than the knowledge that I am able to attain in this training, it contributes to the richness of my perspective and value that I uphold that science is indeed for everyone. I highly commend the interactive activities we had such as sharing of experiences and ideas for an interactive learning.
- Yes, the interaction of the speaker and audience through comments
- The participation
- The statement conveys a highly positive learning or conference experience where the topics discussed were captivating and the speakers excelled at effectively conveying the core message to the trainers, resulting in a deep and meaningful understanding. The "very interesting" topics suggest a well-curated and engaging selection, while the speakers' adept communication skills ensure clarity and engagement. Importantly, the trainers comprehending the essence of these messages underscores the event's success in not just transmitting information but also fostering profound understanding, making it an enriching and impactful learning environment.
- What I really like about the training is that it makes them feel like we are just in an online classroom setting. It is not only about lecturing and presentation, but it also encourages the participation of everyone, which I think is a great way to connect with the participants.
- The comprehensive talk about each category.
- Yes, it would be speakers who shared their expertise to us. They gave a lot of tips or suggestion to us that will surely help un in our respective fields.
- the way he delivered the topic
- Interactions with the instructor presenting
- I like how the training is facilitated and also the speakers way of delivering their topic.
- Yes
- One of the thing I liked about the training is how they teach every specific topic, in order for us to know what and how will be our approach as a science teacher if we will be in a particular situation.

- Yes, I liked how the teacher's made the training enjoyable and exciting. This training give me a lot of things to understand as a future teacher.
- i liked that it is very informative and presents me with new ideas I need in my future career.
- As pre-service teacher every part of this training is I believed is essential, I liked every part of it
- Yes. The training was very timely and significant for science teachers since in this time, many misconceptions about scientific knowledge are emerging and some students only rely on the web in learning science because some students find science to be a boring subject because of its complexity and since it is our responsibility to deliver science in a much comprehensive and interesting way, us, teachers, should be able to make our students appreciate science through different methods by which this training has provided.
- What I really liked about the training is the classroom like setting vibes that it gives to us. Unlike any other workshops, it is not only about lectures and discussions, but it also involves the participation of all, which for me, increases our experiences and engagement in the sessions.
- All the discussion was good and interesting.
- The training's essence aligned with its intended goals, with students from diverse geographical backgrounds participating. Inclusivity was actively promoted throughout the sessions, fostering a welcoming and equitable learning environment.
- The speakers are all eloquent and are masters of what they discussed.
- What I really liked about the training is the classroom like setting vibes that it gives to us. Unlike any other workshops, it is not only about lectures and discussions, but it also involves the participation of all, which for me, increases our experiences and engagement in the sessions.
- I liked that it covers various concerns on science education.
- Yes, I liked the sharings of the various speakers it really gave me an Idea for my future endevour on how to manage studeents with different culture and how should I become a better educator for all.
- It is how we cater the individual needs of the learners
- What I like about the training is, it is very interactive in nature
- all of the learnings I heard i like it
- N/A
- N/A
- Everything about the training was insightful and meaningful for me. The speakers were able to deliver their lessons well and was able to choose topics that can be very useful for us pre-service teachers. I appreciate all of the lessons discussed but I appreciate it when the speakers go from concepts or theories then is followed by specific teacher examples/real life situations on how these concepts can be applied.
- Yes, actually there a lot, though I wasn't able to attend to some discussions because of technical difficulties , I like the part when I was able to know know some of the application that I can use teaching science lessons. Aside from that, I liked how they introduced to us the flipped classroom.
- The friendly speakers.
- I really enjoyed the discussions because the speakers are all great in delivering their topics.
- Everything about it because those discussions are great help in improving one self as a teacher
- I liked how open the thoughts are which engages us to think more outside the box and reflect about how science pre service teachers should meet the needs of the learners by cld.
- The delivery of message

- I liked and appreciated how experienced and knowledgeable the speakers were. They were able to provide and tell stories and scenarios that showcases how to handle a classroom with diverse learners.
- The thing I liked the most about the training is the experiences of the speakers when it comes to Cultural Diversity in Science classroom. How they shared moments where they find challenges and find a way to deal with it. I think these knowledge that I get from the speakers would help me so much in my future carrer as an Educator
- I really liked the idea of having different group of students participating in this training, because it makes us experience what we are learning in this training. For me that is the most important aspect of training inclusivity.
- I liked that the training was able to cover a wide range of topics that helped us pre-service teachers gain a better grasp of how to handle CLD students.
- As a pre-service science teacher, I found the workshop sessions on classroom management techniques to be particularly helpful. The trainers emphasized the importance of establishing a positive and inclusive classroom culture, and provided us with practical strategies for managing challenging behaviors. We also discussed the role of effective communication, building positive relationships with students, and how to encourage student participation in class. In addition, the workshop on STEM education was very informative. We learned about the latest trends and innovations in STEM education, and how to integrate STEM concepts into our science lessons. We also explored ways to incorporate hands-on and project-based learning activities to engage students and promote critical thinking skills. Overall, the training provided me with valuable insights and tools that I can use in my future practice as a science teacher. The interactive and collaborative nature of the workshop sessions also allowed me to network with other pre-service teachers and learn from their experiences.
- The eagerness of the speakers
- Too many
- Too many

What suggestion do you have for further development of the training?

- I suggest to make the training more engaging and more fun as plain talks and presentation easily bore the audience.
- N/A
- none
- w
- none
- none
- 1
- I feel like it more should be a form of collaboration.
- None
- Load fee sana☺
- None
- N/A

- N/A.
- More lectures related to our programs because for me it really helps us as a pre-service teacher
- none
- N/A
- Overall the training is great and informative.
- None.
- None as of the moment. The training is very accessible and easy to understand. Professors were highly knowledgeable and experts in their own fields.
- N/A
- None
- N/A
- Nothing
- None so far
- None. The training was engaging and fun.
- None
- None
- On-site training
- None
- N/A
- N/A
- More days of training para hindi congested masyado ang mga topics.
- Active engagement of the participants
- It is fine this way.
- none
- I don't have any suggestion I appreciate the efforts of the speakers since the beginning of the training, as they have been dedicated to educating us thoroughly on the subjects.
- return to in person session.
- none
- N/A
- None.
- n/a
- None so far
- N/A
- I suggests interactive game inclusions to relive the audience especially in long discussions.
- This is not a suggestion but more a request. I hope we can also experience in person seminars like this in the near future.
- I would like to suggest that speakers would further apply inquiry-based learning
- Inquiry based approach
- Getting speakers from different cultures
- None
- More inquiry based approach because if the teacher is just explaining and not questioning the students may get bored. But overall Ive learned a lot from this training.
- I love the training, one thing i want to suggest is I want some speaker to have more engagement to the participants in that way it is more engaging.
- N/A

- Some parts took so long that it became kind of boring.
- The training was carried thoroughly.
- None
- N/A
- None
- I guess next time there should be a TWG (technical working group) who will present the presentations of the speakers and it should start on time and end on time.
- Please make it face to face for more interactive training.
- n/a
- The suggestion I liked to develop in the training is when the speaker get too much words that will make a audince boring, he or she should asked a student to check on them or to get their attention.
- none
- N/A
- N/A. This webinar is really what I need for me to apply them in my Field Study endeavors this fourth year. Thank you for the opportunity po!
- On-site trainings
- It may be a bit of a hassle but I think having a face-to-face training is also a fun and an interactive way to engage the participants of the training.
- I think that employing other platforms such as mentimeter, jamboard and etc will also be effective to help the discussion more engaging. This will enable the participants to harness activities or questions to be answered.
- I suggest building more interaction with the audience by asking more questions or sharing experiences to encourage them to really pay attention.
- Nothing
- None so far
- The online training is a good way to enhance the skills of science teachers. However, I think it would be more fun to conduct a face-to-face workshop, even for at least a day, so that we could be able to see and hear the guests and speakers physically. It may be disadvantageous for participants from faraway regions, but if it is only possible, that is my only suggestion.
- To conduct a face-to-face training
- N/A
- More days of training
- Nothing
- None
- F2F
- N/A
- N/A
- I suggest that the training should be face-to-face to improve our learning experience.
- None. All of the contents provided in this training was substantial as well as the speakers who delivered each topics.
- I am very satisfied with the training, and I could not refer any more suggestions. But if the is one thing, it is to have a face-to-face sessions.
- I think, we need to invest more in quality training. Because training is one of the important need of one person, and it is very beneficial to all.

- Regularly assess the training program's impact and relevance to maintain its effectiveness over time.
- I am very satisfied with the training, and I could not refer any more suggestions. But if the is one thing, it is to have a face-to-face sessions.
- The training was interactve, however, I hoped that it was more interactve so that the participants remain interested.
- No suggestions because I w as really satisfied with the training and I took in so much knowledge.
- Active participation or maybe someday we could have physical gathering
- None so far
- none
- N/A
- N/A
- I suggest that this training be made available for more students and that it can be someday done in a face to face set up
- Maybe in terms of the time frame, I just had a minor problem like I experienced running out of mobile data that is why I wasn't able to finished some sessions. Aside from that, there is none.
- Shorten the discussion to fit the time.
- This is my first time to attend the ESTA training for pre-service science teachers, and I really learned a lot from the four sessions of discussion and workshop. My only comment is that keep up the good seminar and training programs because those are really helpful for aspiring teachers.
- none
- more engaging activities that the participants can join even in online set up.
- None
- None
- A cleaner and much simplified Powerpoint presentation would make a really good way to attract the attention of the participants. And probably a little fun games like icebreakers would do. Other than that, everything was superb
- Plan to make students or participants more engaged in the discussion.
- Some students cannot attend the training during weekdays so I suggest to do it during weekends.
- "There are several ways that professional trainings for pre-service science teachers can be further developed or improved:
-
- Personalization: Pre-service science teachers have different levels of experience, needs, and learning styles. Thus, it is important for professional trainings to be personalized and tailored to the individual needs of the participants. This could include pre-assessments, individualized coaching, and differentiated instruction.
- Integration of technology: As technology continues to play an increasingly important role in education, professional trainings should incorporate the latest technological tools and platforms to enhance the learning experience. This could include online modules, virtual reality simulations, and gamification.
- Collaboration: Professional trainings should provide opportunities for pre-service science teachers to collaborate and network with each other, as well as with experienced educators and researchers. This could include group projects, online discussion forums, and mentoring programs.

- By incorporating these elements, professional trainings for pre-service science teachers can be further developed and improved to better meet the needs of the participants and promote their growth and development as educators."
- None
- Please make this work
- None

What is your take-home message?

- My take-home message is that teachers must be open-minded about the differences of his or her students. The teacher must always set a relationship to his or her students to be respected and trusted at the same time, because good relationship of teacher and students creates a safe space for students to learn.
- Cultural diversity enriches the educational experience for both you as a teacher and students.
- As a citizen of the Philippines I/we should serve and contribute to our country first.
- w
- Let us make our classroom more inclusive. Let us make science inclusive and accessible
- students came to school to learn and not to have fun
- 1
- Im feeling great im part of the seminar.
- Teachers are not just mere teachers, they are creative and explorers.
- Inclusivity will be implemented
- It is important to learn the culture of the students and respect them to encourage them to learn and engage in science
- I have learned that CLD students must be catered by their science teachers for them to be able to cope and learn a lot of things in the class.
- We should make learning meaningful amidst diversity <3
- Never get tired of learning
- Widen your perspective, strategies, and be open to all students.
- We, teachers are not just drivers of excellence but also inclusivity in science learning. Our subject is somehow being stigmatized as something difficult and expensive but from this webinar, it proves that such stigma is false because teachers are a huge factor in ensuring the learners are accepted, motivated, and supported in their journey.
- We will make Science a more interesting and interactive one.
- I can't really summarize all the learning I gained from the training beacuse they are a lot, especially the learning techniques and strategies that I can use in my future classroom.
- Diversity is everywhere, especially inside the science classroom. As an educator, it is our duty to cater all the needs of our learners. To become an effective teacher, learning must happen.
- As a teacher I should create a multi cultural discussion about science
-
- I'd like to quote what sir ER said awhile ago that " successful people or individuals are those who takes risk"

- Thank you
- Science is a difficult subject however with a better understanding, mastery, and proper approach your future learners would be able to love science the way you do.
- As teachers we should have mastery to the subject matter. It is also our responsibility to cater the diverse need of the students.
- So grateful for this seminar. It contributes to the values Im looking forward to contain.
- Technology will never replace educators. Thus, technology in the hands of a good educator will promote transformative learning that will alleviate the situation of our country, in general.
- This training is very helpful to us, so thank you so much for doing this.
- To be an effective teacher, I realized the importance of carefully planning the lesson, the benefits of using flipped classroom, and technological integration in teaching.
- Cultural diversity is not a hindrance to learn science.
- Each learner has their own set of strengths, weaknesses, backgrounds, experiences, and learning styles. Recognizing and respecting these differences is crucial.
- If we can't teach the way how we want to teach our future children in class, learn through them.
- "Not all students are the same high
- achieving learners and low achieving. What I can do is to put a twist into my lesson plans in order to address both classroom concerns."
- Effective training for science educators is paramount to cultivating a dynamic and engaging learning environment. Firstly, emphasizing hands-on experiences and practical experiments equips educators to foster curiosity and critical thinking among students. Secondly, integrating technology tools into the training process enables educators to stay current with advancements, enhancing their ability to convey complex scientific concepts effectively. Thirdly, promoting a student-centered approach in training encourages educators to tailor their methods to individual learning styles, ensuring inclusivity and understanding. Furthermore, fostering collaboration and networking opportunities among science educators allows for the exchange of best practices and innovative teaching strategies. In conclusion, ongoing professional development is essential to empower science educators with the skills and mindset needed to inspire the next generation of scientific minds.
- My take-home message would be that the training emphasizes the importance of creating inclusive and effective learning environments for CLD students by integrating interactive teaching methods, culturally relevant materials, and fostering a supportive classroom atmosphere.
- Integrate technology in flipped classroom
- Technology should be integrated in culturally diverse learners.
- none
- Thank you ESTA for giving us this opportunity to learn about various strategies that could help us teach our students effectively.
- Appreciate Science and encourage interest in it.
- Science is for all regardless of Gender, Age, and Socio-economic status.
- Learners have diverse needs and as teachers, we can adapt strategies or skills in able to cater or give them what they need.
- Being a science teacher doesn't only mean that I only teach science with just my own way. I need to consider different aspects my students have in order to make learning fun and for my lessons to be easily understood.
- Learning Science is Fun!

- Education is for all regardless of sex, culture, race or age. We have equal opportunities
- Teaching science has many aspects that we need to work on, but we can be better through proper knowledge and training for our students.
- I've realized that fostering diversity, providing flexible learning routes, being aware of conceptual change phases, making science teaching more engaging, and producing engaging science hook films are crucial elements of a successful science education. Students from various backgrounds are motivated to explore the wonders of science in my classroom, where curiosity is encouraged to flourish. Along with improving my teaching, this seminar has given me a fire in my belly to keep developing and creating in the area of scientific education.
- Having CLDs in the classroom will prove to be difficult but it is a teacher's responsibility to ensure that every learner is in a positive and nourishing classroom environment.
- Thank you for organizing this training. I really learned a lot.
- We should always remember that teachers is one of the source to better future, as what I've learned in this seminar let us use science to make a scientific knowledge into a useful things.
- Teaching Science is not that easy however in proper approach and training I know it will be fun and interesting.
- As an aspiring teacher, this will serve as a lifetime learning experience.
- Teachers should make all students feel included even in different subjects like science.
- I am thankful with this seminar because it is beneficial for me as I am in this discipline.
- None
- Learners are diverse. This diversity is an advantage to help learners feel more connected and have the teaching and learning process more relevant
- I would like to thank the speakers in sharing their experiences and knowledge. These sessions will improve my teaching and learning abilities especially in my future career as a future teacher.
- My take-home message is that whatever preparation does the teacher do there will always be factors that may affect to teach our students smoothly and effectively but to overcome it we should be more innovative and use the power of technology to let the students to be engaged to the class especially for the CLD students that were having hard time to grasp the new culture inside the classroom.
- Learning how to set up an inclusive science classroom would help me improve as a teacher and will give every student the chance to thrive. The above-mentioned idea may be achieved in a significant way because to the effective use of language, pedagogy, and technology.
- Science is for all. As a future science educator, I will make sure that my students will view science as an interesting subject
- My takes away in this training is that as a future teacher, we should be adaptable and flexible when it comes to changes in our work. As a teacher we should be the one to encourage our students to respect and accept everyone's differences. We should be unite in terms of giving knowledge and do not be afraid to share our thoughts and opinions to other. As a pre-service teacher, it is important to practice diversity and inclusivity in our environment.
- By accommodating diverse learning styles and needs, it ensures that every student can access and engage with scientific concepts and experiments. Inclusive science education not only fosters a sense of belonging but also contributes to a more holistic and equitable approach to learning, ultimately nurturing a future generation of scientists and thinkers with a wide range of perspectives and talents.

- My take-home message is every student is unique but as a teacher, I should have the drive and determination to meet their needs in a science classroom as a teacher.
- I think my take-home message is that teachers must be trained to become the next Carl Sagan or Neil deGrasse Tyson. It's our job to introduce and guide our learners into the wonders of Science and assure them that Science and the ways of Science are important parts of their lives.
- "Teaching is telling and learning is listening" is not anymore the trend in education. It is not anymore relevant.
- There are many challenges when teaching Science but there is always a way, a solution, in every problem.
- Science education is for everyone and me as a preservice teacher, I will make it possible.
- Do your best to become one of the best science teachers for children and also to build a good foundation of knowledge for them as early as possible.
- I was able to participate in a useful training
- In the realm of education, every teacher's uniqueness should align with the needs of their students. As a future science educator, I understand the importance of research in crafting a better world. Moreover, we must also embrace the ethnic and cultural diversity of our students, as highlighted by the "Inclusive Science Education for Linguistic and Cultural Diversity" training, which underscores the significance of adapting science education to be inclusive and equitable. This inclusivity not only benefits our educational landscape but also represents a fundamental step toward equal opportunities, breaking down barriers that hinder access to scientific knowledge. By valuing and respecting the diversity of languages and cultures within science classrooms, this training champions an enriched and globally connected scientific community.
- Culturally and linguistically diverse learners are not a hindrance in a classroom. It is the educators' responsibility to adapt and adjust to these students. And learning their language is not the only means to connect with them; we have current technologies that educators could utilize in delivering and enhancing the learning experience of the students. Aside from that, we, as science educators, are bound to teach students only the truth about the scientific facts of our world, space, and universe.
- Science teachers are more than just teaching science concepts it is also their job to create a learning environment where no gets left behind.
- This training has led me to a realization that we teachers play a crucial role in student's learning. If teachers are skilled, have enough resources, and good training or skills, then he/she could effectively play the role of being an effective teacher.
- The importance of adapting teaching methods to suit diverse student needs, as highlighted in the Flipped classroom approach. Moreover, recognizing the influence of self-concept, gender, and culture on learning behavior underscores the need for inclusive and culturally sensitive education to foster optimal academic development.
- Adapting to what my students need does not need one's effort but for the whole class
- As a future science educator, I will try to apply my learnings in this training to my future classes not just for myself and for my students but also for the community.
- N/A
- My take home message is, as a future science teacher I must understand and take in my mind that in order for me to make my students interested in my subject I must first make in love with science because I believed the more they see how I am interested in science, the more they will also fall in love with it.

- In this training I learned how to manage a room with different culture's and beliefs, I gained a lot of knowledge of the things I should do and shouldn't do. This training improves my knowledge about culture diversity
- Thank you ESTA for doing something to help the future science teachers in navigating the diverse classroom.
- Learning science will always be full of ups and downs. How? Us, teachers will not always make all students understand all science concepts but, we can make them appreciate science through the contextualization of science concepts in their everyday lives as it may help them to know that science can be found everywhere even in the smallest or largest things on earth or in everything that they do.
- Culturally and linguistically diverse learners are not a hindrance in a classroom setting, and we could utilize technology to improve their learning experience. Aside from that, as science educators, we must teach students about the importance of science and scientific facts about our world, space, and universe.
- I've learned a lot in discussion and in training. It will be very helpful to me as a future science teacher, I will use it to have a better class.
- Inclusive science education for linguistic and cultural diversity prepares students for a globalized world by teaching them how to work collaboratively and effectively with people from various linguistic and cultural backgrounds.
- Culturally and linguistically diverse learners are not a hindrance in a classroom setting, and we could utilize technology to improve their learning experience. Aside from that, as science educators, we must teach students about the importance of science and scientific facts about our world, space, and universe.
- I learned so many things that I find it hard to enumerate all of it. However, my main take-home message is that, I will aspire to become a science teacher that will work efficiently. A teacher that caters all the needs of the diverse learners in my classroom.
- My take-home message is all the learnings that was passed down unto us, future educators in the future and the tips on how to navigate out teaching journy in the future.
- If you can't teach your learner the way you want it, learn through them.
- Science is a difficult subject, however, with a proper method of teaching or approach to the learners, they will like science the way you love science
- none
- N/A
- N/A
- "I gained a lot of knowledge and reflections in our sessions. From the different concepts, techniques, frameworks, skills and ways to address different things that may come in my teaching carreer. But I've learned overall that being a teacher is not an easy job but indeed it is very noble. It takes a lot of passion and love to be able to be a teacher, but a teachers impact to a students can be beyond what we can imagine.
- I am very much honored to be in this field. Getting deeper on the ""hows"" and ""whats"" of being a teacher both amazes me and pressures me, but the feeling that lingers is the want to improve. I want to be good for my students, I want to become someone who can actually help them learn and improve not just with the subject, but through out their life. And I acknowledge that being a teacher is a continous learning journey, I learn about practices, the technicalities, techniques and about

myself and my students. And I know it can be hard, but i know its something that I want.

- I also learned that looking at my students beyond their eyes is important. Being aware that they have different cultures, backgrounds, characters and personality allows me to know how to deliver my teaching more effectively. This is important as to how the content is important. It's essential to approach each student as an individual with unique needs and aspirations. By doing so, I can tailor my teaching methods to accommodate various learning styles, ensuring that no one is left behind. This, in turn, fosters a more inclusive and equitable classroom environment. With this creating a safe space for learners is a fundamental aspect of effective teaching.

-
- As a pre- service teacher, I've come to understand that my role extends beyond imparting academic knowledge. It's about nurturing the whole person, helping students build character, develop critical thinking skills, and cultivate a love for lifelong learning. "
- We can make science interesting if we're open to explore new ways of learning that relates in today's generation.
- Be kind and be friendly to all, despite their ethnicity or culture.
- I will utilize what I have learned from this training workshop when I begin my teaching profession.
- Good luck to the future teachers
- my takeaway about this training is that cld is important for us to consider in teaching and in our strategies itself because it is our responsibility to meet the learners needs and help them reach their full potential as well we also grow as their teachers. Since education is a two way street in our learner centered curriculum.
- Learning science is fun
- Learning and understanding the diversity of the learners in the classroom allows us educators to become more open minded and efficient.
- I really appreciate the time and effort of the people behind this training, having a 3 knowledgeable day is such an amazing opportunity for us future educators to really understand linguistic and cultural diversity in classrooms and how to aid possible challenges that might arise in our future teaching career.
- Everyone needs to have the opportunity in the same way that mainstream students do. It is also their birthright to receive inclusive education. It is not their fault they were born in a different situation, but it will be our fault if they don't get what most of us is getting.
- Science must be introduced, explained, and taught properly and in a manner that is easy to understand to all genders, working class, and ethnic minorities in order to reduce biases and misconceptions about being a scientist or "science geek". Home environment, especially parents, have a huge role in developing the child's interest and learning in science.
- I would say that professional trainings for pre-service science teachers play a critical role in preparing them for their future practice as educators. The training should be comprehensive, interactive, and personalized, and provide practical tools and resources that could be used in the classroom. Additionally, incorporating technology, collaboration, and evaluation could further enhance the effectiveness and impact of the training. Overall, the training should foster a positive and supportive learning environment that promotes the growth and development of pre-service science teachers.
- Be passionate
- Be passionate
- Be passionate

Is there anything that you'd like to implement to your classroom? How?

- I would like to implement safe space of learning for my future students by making the classroom inclusive for all, open-minded and free of judging from one another. Mistakes are normal and is not fun to laugh about but must be corrected in the most respectful and decent way. I would do this by setting as an example and creating a teacher-students relationship that sets boundary of closeness to my future students.
- I would like to celebrate cultural diversity through events, projects, and activities that showcase and appreciate the various cultures represented in your classroom.
- Having a survey on how they would like to teach Science to them.
- w
- Differentiation technique, by giving activities diffrenetly suiting the capabilities of learners
- Integration of technology
- 1
- I will implement a science based classroom in the future.
- Technologies.
- equality
- Inclusivity. By building healthy and respectful environment
- N/A
- Technology Integration as well as all lessons in inclusivity will be implemented in my future classroom! <3 It is of utmost significance that we bring the best for our students' effective learning through varying technologies such as the varying Google Applications and other softwares and applications.
- collaboration and creativity through different technology.
- Flipped Classroom
- I would like to further engage my students in individualized instruction.
- The integration of ICT and hook videos.
- None.
- Understanding and respect will be highly implemented in my classroom.
- I would like to implement the flipped classroom to help students more excited in learning Science
- I would like to implement or integrate ICT tools in my classroom, and develop a safe and inclusive classroom.
- Nothing. Just the particular implementation inside the classroom
- Inclusivity
- I'd like to implement all the valuable things Ive learned in the 5-week seminar through following the systematic approach.
- Teaching as telling and learning as listening is not anymore the trend today. Hence, I should implement Educational Technology in my classroom that also fits the context of the community.
- A good communication in a class is the most important to me.
- I'd like to implement flipped classroom and technological integration in my teaching because I have experienced it first-hand in one our courses and I would say that even though it was challenging, I really learned a lot and was able to bring out the best in me.

- Inclusivity, by accommodating most of my students' needs as long as it is within my power and does not violate anyone or anything.
- I'd make an effort to understand the cultural backgrounds and experiences of my students and incorporate diverse perspectives into the curriculum. This would help students feel valued and acknowledged for who they are.
- Ofcourse, since we do have a multiple intelligences and an individual learners this is very important to establish in a room so that there will be no left behind.
- Giving challenge to students may help in making them use their critical thinking and collaborative skills.
- Upon completing the training for science educators, I would implement hands-on experiments and practical activities, creating an immersive learning environment that sparks curiosity and critical thinking. Additionally, integrating relevant and up-to-date technology tools would enhance the delivery of complex scientific concepts, ensuring students are well-prepared for the digital age. Embracing a student-centered approach, I would tailor my teaching methods to accommodate diverse learning styles, fostering inclusivity and understanding. Encouraging collaborative projects and group discussions would promote peer interaction and the exchange of ideas, cultivating a supportive and interactive classroom culture. Lastly, I would continually seek opportunities for professional development, staying abreast of emerging educational trends and refining my instructional strategies to inspire a lifelong love of science in my students.
- I would aim to introduce interactive learning methods and diverse perspectives into the curriculum, possibly by incorporating multimedia resources, promoting group discussions, and integrating case studies that highlight a range of cultural backgrounds. This approach is intended to boost student engagement and comprehension.
- Appropriate Flip classroom
- none
- I would allow my students to explain their answer using their mother tongue (to help them elaborate their ideas, as well as their classmates could also learn their language.)
- The Flipped Classroom. I can implement this by following hoe flipped classroom is done. From their I can assess if it's truly effective and a better approach for learners.
- Flipped Classroom. This set-up create its own potential to be used in the education the only thing we could do is to assess first our learners and their resources to effectively implement the setup.
- Yes, about the Technology integration. In every part of the lesson, technology can be untilized for better and productive learning.
- Technology. Because of this times were technologies are rampant, I think it is best to apply those on my classroom so that my learners will be ready for the future and will also help them to understand my lessons with flexibility.
- I'd like to implement and improve on integrating technology in teaching to provide a better and interactive approach in student engagement.
- Yes, and that is inclusion. Of course, first thing to do is to provide an environment that welcomes them.
- I would like to implement inclusivity in my classroom.
- Inclusivity
- I would like to implement using different languages inside the classroom. I can do this by trying to identify my CLD learners and try to communicate with them using their mother tongue
- For now, I can't decide yet.

- Inclusive Education, by giving everyone a time to participate in class without getting other students left behind.
- I want to implement the inclusivity in my class in that way no one is left behind.
- Inclusivity and positive environment
- -
- The flipped classroom is what I can try to implement in the classroom because this will make my students given prior knowledge about the activity. By giving preliminary activities such as pre lab and providing guide questions.
- None
- Utilizing technology must be my prioritized. However, I am particularly keen in applying the diversity and inclusivity practices/tips imparted by the speakers. I also want to invest and be knowledgeable in building science capital and using it as advantage.
- I want to implement a classroom setting which can help the students to grow, to develop and improve their skills. I will also intend to employ what I learned from these sessions.
- If there is something I would like to implement inside my classroom is the use of online interactive learning applications. I will use it during my discussions to help them analyze the topic more and at the same time they will be engaged and be able to participate actively inside the classroom.
- Implementing inclusive activity in the classroom. Such as creating a safe space students to share during think-pair-share activity as well as choosing relevant literature while incorporating science for all.
- The ways on how to handle culturally diverse individuals.
- I would like to implement a inclusivity in our classroom. I will let anyone in my class to give their opinions and ideas about a certain things and make a decision that will not validate their rights.
- I want to implement inclusive education in my classroom and by implementing various strategies, such as creating flexible curriculum materials that cater to different learning styles and abilities, providing additional support through inclusive classroom settings, and utilizing assistive technologies to accommodate students with diverse needs.
- I'd like to try flipped classroom however I should be considerate on implementing this since not anyone has an access on their gadgets and internet connection. Other ideology presented for every lectures should be implemented in the way how I think with my classroom.
- I definitely want to implement hook videos (with my effort in improving the art of questioning). Keep it short and engaging during Science discussions where the actual thing is dangerous for a particular grade level or that it is beyond our current capabilities of grasping it, whether they may be in terms of proximity from the school I teach or of abstract nature (i.e., a lot of math computations).
- Inclusive education. By implementing appropriate approaches in the learning process and environment.
- I'd like to continuously implement the integration of ICT to my classroom. Through the use of powerpoints and other tools or softwares/sites like Clsspoint to have an interactive and effective discussions with the class.
- In my future classroom, I think that one thing I will certainly implement in my classroom is respect for everyone. I will acknowledge the diverse learners to cater their needs. In addition, I will also employ the use of technology to help me in delivering science concepts more engaging to the learners and so they will be interested in science.

- yes, some of the activities discussed in the previous weeks from this training through exploring it first and afterwards, make a plan on how to make it possible and useful
- Everything I have learned
- The best implementation in the classroom is a commitment to adapting science education to be inclusive and equitable, fostering an enriched and globally connected scientific community by recognizing and respecting the diversity of languages and cultures within science classrooms. This approach ensures that all students, regardless of their linguistic and cultural backgrounds, have equal access to scientific knowledge and opportunities, breaking down barriers that may hinder their educational progress. By also implementing a student-centered approach, students are encouraged to become critical thinkers, facilitating a deeper understanding of lessons and skill development, thereby enhancing the overall educational experience.
- If there was an activity that I wanted to implement in my classroom, it was the utilization of current technology. I believe that using applications, websites, and other online platforms can help enhance the learning experiences of students. Activities like quizzes can be done using websites. I believe that using technology will help overcome some barriers between myself and my students.
- Understanding the background of each student and apply that on my lesson plans. I can achieve this by engaging myself to them more.
- Yes, it would be the implementation of technology in the classroom I can implement this by using the devices that are present and accessible for us teachers and learners like cellphones, laptops, and internet connection to be able to utilize it for a better learning experience.
- It would be the incorporation of elements from the Flipped classroom approach. To do this, instructors could create engaging pre-class materials like videos, readings, or interactive modules, allowing students to familiarize themselves with the content before class. During in-class sessions, they could focus on discussions, problem-solving, and addressing students' questions. This shift in the traditional teaching model encourages active participation and deeper understanding.
- A couple of the things that aligned with my philosophy of teaching.
- Hopefully I can implement all my learnings in this training.
- None
- I want to implement in my classroom is the open communication, that they will tell me if I am being too fast in teaching or if they do not understand what I am saying. I will make them comfortable in asking a question so that, the teaching and learning session will be effective.
- Yes, by learning about their culture and respecting it
- "I would like to implement the flipped classroom. Its ability to improve teacher-student connection makes me want to implement it. Teachers can better meet individual learning needs by providing tailored help and advice. Students are expected to arrive to class prepared to participate in meaningful debates, which fosters responsibility and accountability.
- "
- I would implement the answering of an exit ticket after every session by giving them a question about what they have learned throughout the session and how are these learnings present in their everyday lives for me to monitor if my students have learned something from each session.
- I would like to try integrating technology such as the use of applications and websites in delivering classroom activities such as quizzes. I could use apps or websites such as quizzizz or Kahoot.
- The model ideal behavior of every student. For us to understand each other and be a better student.

- Creating an inclusive classroom environment will be my top priority in the future, ensuring that every student feels a strong sense of worth. I will incorporate strategies to address the diverse needs of all my students, fostering an atmosphere where everyone can thrive.
- I would like to try integrating technology such as the use of applications and websites in delivering classroom activities such as quizzes. I could use apps or websites such as quizzizz or Kahoot.
- I will implement inclusivity in my classroom that also intergrates the effective use of technology.
- Yes, ever since I dreamed of being a teacher I always hate having to be forced to do activities that are not relevant to me in any way, what I like to implement in my classroom is the freedom of students to choose whether they think the activity is going to be helpful for them, if not then they can suggest what alternative activities they might think that is possible enough to be done and that they will think that is relevant to them.
- Equality and Equity
- I would like to implement different strategies that combines both traditional teaching and modern teaching.
- none
- N/A
- N/A
- The last lesson about flipped classroom is something that I would consider implementing in my classroom. I find it valuable and innovative approach which offers aray of advantages. It allows students and teachers to maximize their time, allow varied forms of instruction, promotes collaboration and active learning and more. Besides this I would also apply how I should differentiate my instructions, accomodating the diverse learners which may be done by being more sensitive, skillful on handling students and widening my cultural aperture. All are important to make my students feel safe throughout their learning process
- Yes, especially the flipped classroom.
- In a diverse class, I want to learn a wide variety of methods and strategies to cater all types of learners.
- Utilization of different teaching strategies that can address the diverse leaning styles of the students.
- making the class more engaging by applying new techniques
- I want to implement a simple tradition gesture that my learners can also share with others. I also like to implement hook videos, I think its engaging and fun which learners really learn because they will apply it by themselves.
- Making various activities
- If there is anything that I'd try to implement in my classroom in the future, it would probably be the differentiated teaching strategies since it allows broader approaches that may fit the differences and needs of the different learners.
- I think it would really be a fun day-starter to greet students "Good morning" or "Good afternoon" in different dialects.
- Language talk. During preliminary activities, one student every day is assigned to talk, give trivia, or converse with the class in their mother tongue about science. With that, we can promote linguistic diversity towards our students, they can learn languages while learning science.
- I'd like to try using Filipino, our mother tongue, in teaching Science to the students so that if they have a hard time understanding English, they can better understand it using their mother tongue.

- "One potential implementation that could be beneficial in a classroom is the use of personalized learning approaches. Personalized learning is an approach that tailors instruction to the individual needs, interests, and learning styles of each student. It allows students to learn at their own pace, focus on topics that are relevant to their interests and goals, and receive feedback and support that is tailored to their needs.
- One way to implement personalized learning in a classroom could be to use adaptive learning technology, which uses data and analytics to provide customized instruction and feedback to students. For example, a teacher could use a software program that assesses each student's strengths and weaknesses, and generates personalized learning pathways that address their individual needs. The program could also provide real-time feedback and support to help students stay on track and monitor their progress.
- Another way to implement personalized learning could be to use project-based learning approaches, which allow students to engage in authentic and meaningful tasks that are relevant to their interests and goals. For example, a teacher could assign a project that allows students to explore a real-world problem or issue that they are passionate about, and provide them with the resources and support they need to complete the project in their own way.
- Overall, personalized learning approaches could be a powerful way to promote student engagement, motivation, and achievement in the classroom. By tailoring instruction to the individual needs and interests of each student, we can create a learning environment that is supportive, engaging, and effective.
- Inclusivity
- Inclusivity
- Practice patience

Evaluation of the Program

Direction: Please rate the activity in terms of the specified criteria.
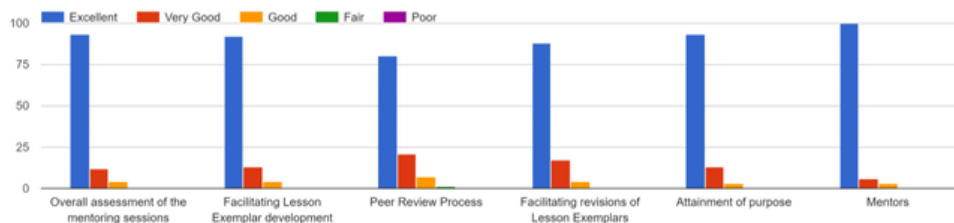
Feedback

1. What I have learned most from this program/session?

- I have learned most from the session is the good relationship of teachers to the students, which affects their confidence and their interests in learning inside he classroom.
- I learned the most is by fostering an inclusive and respectful classroom environment, we can create a positive learning experience for all students, regardless of their cultural backgrounds.
- Diversity of the learners and how I could address it.
- w
- That science is multilingual and runs across culture
- I learned that there are a lot of responsibilities that we, teachers, need to do in the future. mAnd we need to be ready with all of those
- 1
- I have learned the important viewpoints of how diverse learners are.
- I have learned about the diversity of students.
- Embrace inclusivity in classrpoom
- The importance of learning the culture of the students in teaching science
- From this session, I have learned about the value of trying to improve the learning strategies of students.
- Being inclusive amidst diversity of languages and culture, as well as effectively teaching Science in our classrooms through varying technologies.
- The way how we should approach our students. Also ,always consider that in every classroom there are different students with differen cultures.
- I have learned that there should be inclusivity in every activity that you do inside the classroom.
- Respecting the diversity of learners and developing tools and activities that would address such diversity to assist them in maximizing their learning of science.
- I learned how to make the lesson more interactive and interesting. Also I have learned some new approaches to integrate and design lesson plan.
- I have learned the proper usage of profed theories inside the science classroom, as well as how science capital benefits the country - not only the students. Furthermore, inclusivity and diversity makes everyone unique.
- Using language as the form of communication in Science
- As science teachers, we must teach students despite being diverse in culture and languange.
- I've learned the importance of integrating inclusivity in a classroom.
- The importance of cultural diversity in the classroom
- What I have learned in this program is to become a better teacher in terms of teaching sciences to learners
- Inclusivity
- How inclusivity contributes to the inquiry method of teaching STEM education.
- Inclusive education is a combination of traditional and modern approach. Moreover, learning in the present is not anymore limited to.m going to school, listening to the teacher. Thus, as teachers, we should be innovative to address the needs of our learners. This is one of the solutions for the learning poverty of the country.
- I learned what a teacher needs to do.
- Acknowledging diverse learners and be culturally responsible in addressing their needs.
- A learner-centered classroom is the key to a successful learning environment.
- Promoting Inclusivity and Respect

- Differentiate initiatives how can we cater the needs of every individual learners
- I learned that being sensitive should be a skill in a teacher when talking to the students..
- Teachers should emphasize hands-on experiences and practical experiments equips educators to foster curiosity and critical thinking among students
- The program/session has taught me the significance of implementing ESTA strategies and diverse lesson examples, integrating technology effectively, and leveraging these techniques as a science student to support students' learning experiences.
- classroom management using flipped classroom and integration with technology
- technology should be integrated in culturally diverse classroom.
- As educators, we have to learn about the differences of our students such as when it comes to culture, traditions, interest, and etc. to help us create learning activities that are engaging and not offensive to their identity.
- Technology Integration. Flipped Classroom. Widen your "Cultural Aperture".
- The students are diverse. This was an opportunity to invent a strategy that will cater our diverse learners.
- I have learned new skills and things that I believe which are very essential for me to use in the future especially in dealing with the diverse needs of my future students.
- Being a science teacher doesn't focus in one area. It also needs to know the cultural, ethnic, and personalities my future students will have.
- I learned that in this session, technology and flipped classroom are interesting topics which can be further reinforce learning to the students and to prepare a better world for them.
- As I've said, the cultural diversity.
- I learned that understanding classroom diversity leads to effective science teaching.
- the flexibility of learning pathways. I've integrated a more individualized approach to my teaching because I'm aware that kids learn at varying rates and in different ways. Offering options like project-based learning, flipped classrooms, and self-paced modules has allowed me to watch students flourish as they select the teaching strategies that work best for them. My teaching has been greatly improved by my comprehension of the stages of conceptual change. I now understand that misconceptions are common among students before they get a deeper comprehension of scientific ideas. In order to overcome this, I use focused interventions, questioning strategies, and real-world examples to lead students through these phases, resulting in more effective learning. The session provided helpful tips on how to make scientific instruction more engaging. I've been able to engage students deeply by including experiential learning, making connections between scientific and practical applications, utilizing technology and multimedia, and encouraging a culture of curiosity in the classroom.
- I have learned the most about different ways that I can improve by understanding more about my own culture and the different cultures within the country.
- The different teaching strategies as well as how can we possibly handle diverse learners.
- Addressing the needs of learners is important to create a positive environment in school.
- I've learned about how inclusivity is important in our class and we must learn how to approach diversity in the classroom.must
- Ignorance about diversity especially in language will not lead you to good path as a teacher.
- Inclusion of diverse learners.
- We must incorporate inclusive education and integrate scientific process.

- I learned how culture influence diversity in classroom. Learners indentify and personality influence their learning process. As a teacher, we must learn how to be culturally responsive by widening our aperture.
- The importance of any factors affecting teaching and learning process
- I have learned that being a science teacher is quite since we have to simplify the topics in order for our students to retain the information and in this program we were offered some techniques on how students can be encourage to be a part of the science field.
- Science is complex to teach in general education classroom but it inclusive classroom, we should give extra effort in addressing everyone's needs to learn it.
- Integrating technology in the teaching learning process and using it as a leverage to enhance critical thinking skills.
- I learned that as a pre-service teacher we should be capable of making an an adjustment in any environment we joined. We should be flexible and knowledge enough to handle different types of students. Moreover, we should consider the capabilities of the majority and not only the student who performed excellent in the school. We should encourage every student to participate in every discussion and create a healthy environment where students are not afraid to show their true potentials.
- I learned most from this program/session is how should science teacher implement the inclusive set-up in education and utilization of technology and materials
- I have learned many things in this program but the CLD students can really affect the learning of a student but I have to be determined to bridge the gap or else I will fail my purpose as a teacher.
- I have learned to appreciate the fact that there are many opportunities in teaching Science interestingly (i.e. hook videos). But these opportunities become pointless if I would not be able to get myself a chance to know the background of my students (from demographic matters to their point of progress in their academic journey).
- The quality of an education system cannot exceed the quality of its teachers." (McKinsey, 2007)
- Since 'Science Capital' is new to me, I think this is the topic where I have learned the most from this program.
- There should be no students left behind from learning science and science is for everyone. We always think that science is for intelligent individuals but more of that, the intelligence comes within the nurture aspect of education and it is a crucial role of teachers.
- Do what you think can be done for the good and development of the learning of the children, and also consider the important factors to make the learning of the students possible and successful.
- Diversity and impletation
- In the context of education, a significant lesson I've acquired is the dual importance of valuing learners and maintaining professionalism. This insight aligns with the multifaceted approach of "Inclusive Science Education for Linguistic and Cultural Diversity Training," which encompasses promoting cultural sensitivity, accommodating linguistic diversity, designing inclusive curricula, utilizing differentiated instruction, ensuring educational equity, implementing inclusive assessment methods, cultivating cultural competency among educators, fostering community engagement, championing anti-bias education, and encouraging continuous professional development. Collectively, these principles aim to establish an inclusive and equitable learning environment that caters to the needs of students from diverse linguistic and cultural backgrounds, ultimately ensuring their success in science education and beyond.

- Culturally and linguistically varied students should not be seen as obstacles in the classroom. Educators bear the responsibility of accommodating these students, and there are various modern technologies available to improve the educational experience. Furthermore, as science educators, our duty is to impart accurate scientific knowledge about our world, space, and the universe to our students.
- How complicated a teacher's job is. The challenge isn't the lesson itself but how would you deliver it to the students and making them fully understand all of it.
- What I have learned most from this program/session include being a culturally responsive teacher. In this way, I can ensure that learners will be able to learn the lessons despite of differences or their status in life.
- What I've learned most from this program/session is the importance of student-centered learning and the value of tailoring education to individual needs.
- Contextualization and Flipped Classroom
- I've learned that every student is unique. I learned about the flipped classroom model, integrating technology in teaching, understanding self-concepts influenced by gender and culture, and the impact of chemistry self-concept on learning behavior. These topics emphasized inclusive teaching, technology use, and fostering positive self-concepts for effective science education.
- There are students who struggles a lot in which we could help
- What I've learned in this program is the importance of understanding some approaches if I am teaching science in my classroom
- As a future teacher I learned a lot on this training, what I learned the most is on how to manage and facilitate a classroom with different culture's
- Pre-service science teachers are entrusted with the duty of accommodating the varied requirements of the students enrolled in their classes. Classrooms are more diverse than ever before in the current educational environment, including students of various backgrounds, abilities, and learning styles. In order to address the requirements of this diverse students, I may implement a number of efficacious approaches as discussed in the training. I also realized that it is essential to begin by embracing inclusivity. A supportive learning environment can be produced by recognizing and valuing the socioeconomic, cultural, and linguistic backgrounds of students. By integrating a range of viewpoints, science teachings can be rendered more relevant and interesting for every student.
- In our field we will meet different kinds of learners in order for us to meet each of their needs we need to think of an effective startegies
- The contextualization of science concepts to the students' daily lives or the surroundings which could make the students appreciate science more.
- Culturally and linguistically varied students do not pose a challenge in a classroom environment, and we can employ technology to enhance their educational journey. Additionally, as educators in the field of science, it is our duty to instruct students on the significance of science and the factual aspects pertaining to our world, space, and the universe.
- I've learned a lot, not just to be a good science teacher, but understanding all the necessary when it comes in teaching.
- Embracing diversity in the classroom enriches the learning experience.
- Culturally and linguistically varied students do not pose a challenge in a classroom environment, and we can employ technology to enhance their educational journey. Additionally, as educators in

the field of science, it is our duty to instruct students on the significance of science and the factual aspects pertaining to our world, space, and the universe.

- I learned that there is in dire need to enhance and develop more the science education here in our country.
- What I have learned most in this program is that inclusivity is so close yet still so far for our education system, however with all the speakers we had from this training I have come to realize that although it is still far at least we are having small step and that's a great thing already.
- Inclusivity in class
- I have learned from this program the different strategies on how to properly organize lesson and accumulate the use of technologies for better learning
- i learned that i need to understand my students
- N/A
- I've learned that we must always accommodate students wherever they've come from
- What I've learned most about the program are the different strategies, background and ways of proper delivery of teaching science. All of which are beneficial for me. But each of these lessons is ecampusalated by how I can address different types of learners, acknowledging the fact that they are diverse and have different needs. With this, I 've come to understand more about how to become a teacher, able to deliver content and deliver the needs and accomodate my diverse students.
- I was able to know the flipped classroom which I think it is very efficient and easy to adopt. I like it because it supports flexibility, organization, and social interaction among students.
- Science subjects are hard, but with appropriate equipment and tools, it will be easier.
- I learned that it is important for teachers to know the profile of their students. So they can know how what approachable could be applicable for each one of them. Teachers can adjust their teaching strategies and class management of they have awareness of the diverse individuals in the classroom.
- The able to adjust the techniques of one teacher when handling special or inclusove students
- I learned about science capital as well as making interesting hook videos. I like how it's short but really integrate their understanding and application of knowledge.
- We all have different students inside the classroom and as teachers we should learn how to teach well
- "Diversity is inherent to human being and offering choices will benefit all", there are a lot more to learn when it comes to teaching. Teaching is not a linear experience, there are a lot of complex processes that involves needing to be open-minded to different strategies and cultures.
- I have learned so much in this 3-day training session, one thing that I always remember is the importance of recognizing the differences of students in a myriad of aspects. This would allow students to have a more self-esteem and a sense of belonging in the Learning grounds.
- The importance of giving the students the right tools and equipment in learning science in a most efficient and effective way.
- Each student is unique and the teacher's job is to ensure that each of their unique needs are are met
- I learned a great deal about the expectations and responsibilities that come with being an educator. The training program was comprehensive and focused on providing practical tools and resources that would help me become an effective and successful teacher. One of the most valuable takeaways from the training program was the importance of creating a

positive and supportive learning environment. As a teacher, I learned that it is critical to create a classroom culture that fosters a sense of belonging and encourages students to take risks and make mistakes. I also learned how to establish clear expectations and boundaries for my students, which can help them feel safe and secure in their learning environment. Another key takeaway from the training program was the role of technology in enhancing teaching practices. I learned about different tools and resources that I can use to engage my students and promote active learning. I also learned how to use technology to differentiate instruction and provide personalized learning opportunities for my students.

- Teachers should be passionate about learning or else they will suffer as well as their students
- Teachers need to be passionate
- Be passionate

2. What aspects of the mentoring process can I use in my class to address class heterogeneity and diversity?

- The understanding of the levels of culture. By understanding different cultural backgrounds of the students, it is more easy to give an inclusive education and treatment for everyone by being sensitive and careful with words and actions.
- Work collaboratively with other educators, su
- Being aware of there backgrounds, language and culture.
- w
- To accept diversity and be open
- 1
- by understanding the culture.
- Peer mentoring
- Equality must take a big role
- Inclusive teaching
- Attaining the purpose and making the the learning environment for inclusive and innovative.
- Identify gaps and give diagnostic tests.
- the integration of technology
- Individualized instruction
- ICT IntegratioN
- In using the proper language which can be understood by our students. Also, languages in layman's term and those that are easily understood must be applied effectively to allow our learners to understand the concepts and ideas in sciences.
- making a differentiated instruction that fits diversity of students
- All
- Develop a lesson or learning plan, be open for communication and cultivate personality growth
- Flipped Classroom, probably.
- Inclusivity
- Integrating videos to lesson.

- The culturally responsive teaching process
- Inclusive education should always be observed.
- Let's always pay attention to them so that we can get to know them completely
- Flipped classroom, technological integration, and Multiple means of REE
- All of the topics from the mentoring process are methods that I could use in my class in the future, especially the integration of technology in the classroom set-up.
- Teachers can serve as positive role models for students, showcasing respect, inclusivity, and effective communication. By demonstrating these qualities, teachers encourage students to do the same.
- Equality and Equity
- Assess the individual needs of the students, maybe even have a science capital check to know the strong and weak points of the class that I will be handling
- To address class heterogeneity and diversity, incorporate a mentoring process that includes peer-assisted learning, where students with varying strengths collaborate and support one another. Implement differentiated instruction, tailoring assignments and activities to accommodate diverse learning styles and abilities, ensuring that each student can engage at their own pace. Additionally, foster a mentorship atmosphere within the class, encouraging students to share their unique perspectives and experiences, creating an inclusive environment that values diversity.
- I implement the mentoring process by matching students with diverse abilities and backgrounds, encouraging peer learning and assistance. Moreover, tailor instruction to individual learning requirements, offer consistent feedback, and establish a secure, inclusive atmosphere where all students feel appreciated and supported.
- gender and culture impacts science learning
- Recognition of the minority and providing fair environment.
- Being aware of micro-aggresion and micro-stress that as educators we might give to the students such as stereotyping their gender, not pronouncing their names properly, etc.
- Engagement of the mentors with the students. Effective in keeping students' attention.
- Assessment of students. This action would cater what type of learners inside your classroom. This opens a huge leap in inventing a strategy that address the class and each students.
- In my classroom, I'll incorporate mentoring through peer interactions, cultural competence training, and individualized support to effectively address class heterogeneity and diversity.
- Knowing the differences of students will help me to address diversity. The teachers should be flexible at all times so that leaning sciences are fun and interactive and can easily understood by many.
- Aspects of inclusivity and interactive approach while using various pedagogies in teaching for a fair and suitable learning to happen.
- I will practice cultural sensitivity.
- Effectively addressing class heterogeneity and diversity can be accomplished by implementing differentiated instruction strategies, creating a positive learning atmosphere in the classroom, encouraging collaborative learning, and incorporating a variety of perspectives and resources. Additional help when necessary and modifying your teaching strategies to accommodate different learning styles are also beneficial strategies.
- I can choose to not be ignorant about the background of my students. By identifying the diversity in my classroom it can help me better understand their backgrounds and can develop different methods to teach them effectively.

- Incorporate various teaching strategies, providing multiple resources, and encouraging peer mentoring can help me address class heterogeneity and diversity in my classroom.
- Be inclusive to classroom sessions and highlight diversity in class.
- Be inclusive and practice cultural awareness
- Support and Motivation
- I can use different ways to make the class inclusive for all.
- To address class heterogeneity and diversity, utilize personalized guidance to accommodate varying learning styles and provide supplementary resources tailored to diverse student needs. Foster a collaborative atmosphere by promoting peer mentoring and group discussions, emphasizing the value of cultural sensitivity and inclusivity within the classroom environment.
- Knowing and being aware to students culture background.
- I think the used of our own dialect/langauage which is Iloko in explaining the science concepts or applications
- Knowing the background of the students and to let the students that everyone can learn science or be a part of the science field even if they have certain weaknesses when it comes to the STEM field.
- The use of appropriate language and adding active teaching methodologies.
- Understanding the situation of my students first then slowly but surely create a positive and inclusive learning environment
- The aspect of mentoring process I can use in my class to address heterogeneity and diversity is to respect each everyone's idea and opinions. Accept and be open, let them be heard so no one will be excluded or feel bad because of their differences.
- peer to peer learning
- Most of it, but I would like to focus on how culture and religion affects someone's perception of science but what I can do as a teacher is let them understand what really science is without having a conflict to their personal culture and religion.
- I will learn my heart to train myself in applying the regionalization of Science concepts into the local setting.
- Inclusive education
- One of the discussion during the 2nd week which talked about the things that may offend students with different culture and language from the teacher is useful in my class to address heterogeneity and diversity.
- Acknowledge individual differences of learners and let this be a strength understand backgrounds of students that influences their learning.
- I believe the aspect of asking for some thoughts or experiences from different people in order to have the word "inclusivity" in a classroom since, when you acknowledge someone's experiences, you actually give the assurance that they are accepted by many, even if they are different from the majority.
- Use varied teaching methods, support peer learning, provide individual help, celebrate achievements, offer inclusive curriculum, adapt groupings, assess regularly, and foster a supportive classroom for diverse student needs.
- To adopt aspects of the mentoring process by offering individualized support, providing regular feedback, setting customized academic goals, building positive relationships with students, promoting peer mentoring, ensuring cultural sensitivity, employing differentiated instruction, using inclusive assessment methods, fostering open communication, and

pursuing ongoing professional development. These mentoring principles can create an inclusive and supportive learning environment that caters to the varied needs and backgrounds of your diverse student population.

- The use of technology and taking advantage of the current applications and tools to deliver activities and lessons.
- Learning some of their experiences outside the school. Because this reflects on their behavior and performance.
- To address heterogeneity and diversity in class, as a teacher I should promote collaboration in the classroom. This may include allowing students to work in groups and create dialogues towards their fellow students.
- To address class heterogeneity and diversity, consider implementing personalized learning plans, fostering open communication, and utilizing peer mentoring or group work to support students.
- Setting goals for my students, providing individualized attention, and encouraging interaction.
- To address class heterogeneity and diversity, personalize support, encourage peer mentoring, promote inclusive teaching, respect cultural differences, offer flexible assignments, use varied assessments, provide constructive feedback, ensure accessibility, incorporate culturally relevant teaching, and stay open to continuous learning and adaptation.
- none
- One of the mentoring process that i can use in my class to address class heterogeneity and diversity is about the topic about the science teaching approach, the three foundation that can be use to address class heterogeneity and diversity
- Peer mentoring, which my students will mentor each other. Culturally responsive teaching, where there is a respect in cultural diversity
- Differentiated instruction techniques enable me to accommodate a wide range of learning requirements. Supply an assortment of educational resources, tasks, and evaluations. Permit pupils to select initiatives or subjects that correspond with their individual interests. Students are guaranteed to interact with the material in a manner that corresponds to their individual learning styles and capabilities.
- The consideration of the science capital since all students are unique and have different levels of exposure and interest and knowledge in science-related activities, personalities and events.
- The use of technology in teaching can significantly improve the learning experience of a diverse class. Using relevant websites to connect with learners and remove barriers such as language. However, as educators we have to be aware of some possible implications of over reliance to technology.
- I will give them study material and always less expectation from them but instead understand and teach them nicely.
- Include diverse perspectives and cultural references in teaching
- Provide them multiple opportunities
- The use of technology in teaching can significantly improve the learning experience of a diverse class. Using relevant websites to connect with learners and remove barriers such as language. However, as educators we have to be aware of some possible implications of over reliance to technology.
- Inclusivity
- The aspect that I can thin that I can use in my class is knowing the students prior knowledge especially this is science we are talking about and as Dr. Brando Palomar

has mentioned awhile ago, knowing the prior knowledge of your students is very important in various aspects.

- Multiple intelligences
-
- There are various mentoring process that you can use in your classroom to address class diversity such as peer mentoring, group work , cultural sensitivity, inclusive curriculum, and so on.
- N/A
- To create a more better neutral examples on every approach
- I can address class heterogeneity and diversity first by proper preparation. Proper preparation includes getting to know the backgrounds of my students, their diverse needs, interest, etc which would allow me to better anchor my teaching methods and content. This is followed by setting goals and expectations for my students, ensuring that it is both challenging and attainable. With this headstart I can now move on to the different strategies and ways which I can apply the skills that I've learned such as differentiation, giving feedback, providing content that are useful for students in their everyday lives and that they can relate to, being sensitive with my words and actions, and overall keeping an inclusive safe space for my learners even in the smallest actions that I do as a teacher.
- I think, in order to address heterogeneity and diversity, we have to consider there culture and beliefs as a person.
- Being patient and accepting, be open to new things.
- The teachers should do profiling of the students, plan of different teaching strategies, and contextualize the lessons.
- open communication and accessibilty
- instill values and respect to different cultures. Also, by having differentiated activities where their interest and needs can be considered and catered.
- Promoting self regulation and improving class standing by encouraging them to participate in the class
- I can use the differentiated teaching strategies to address heterogeneity and diversity.
- The approach of the teacher is very important aspect of recognizing diverse learners and this must be well thought to be able to address the different learning process of the students that would lead to a equitable quality education
- Talk correctly and efficiently, tell them to take up space in the classroom.
- The mentoring program taught us various strategies to promote diversity in class and these strategies should be used to address heterogeneity and diversity inside science classrooms.
- The mentoring process can be an effective tool for pre-service teachers to address class heterogeneity and diversity. One key aspect of mentoring that can be applied in the classroom is the use of differentiation strategies. By tailoring instruction to meet the diverse needs of students, teachers can create a more inclusive and equitable learning environment. Pre-service teachers can use a variety of differentiation strategies to address class heterogeneity and diversity. For example, they can use flexible grouping to ensure that students are working with peers who are at a similar level of understanding. This can help prevent students from feeling overwhelmed or under-challenged, which can negatively impact their engagement and motivation in the classroom. Another strategy is to use multiple modes of instruction and assessment to meet the diverse learning needs of students. For example, pre-service teachers can use visual aids, hands-on activities, and technology-based resources to supplement traditional

instruction. They can also provide students with a range of assessment options, including written assignments, oral presentations, and visual projects. In addition to differentiation strategies, pre-service teachers can also use cultural responsiveness practices to create a more inclusive learning environment. This includes recognizing and valuing the diverse backgrounds and experiences of students, incorporating multicultural perspectives into instruction, and creating opportunities for students to share their own cultural experiences and perspectives.

- Listening to the students
- Patience and perseverance
- Many

3. How can I utilize or implement what I have learned about culture and language integration in my field/practice?

- I will practice what I have learned by embodying these training; by setting good relationship to my future students in teaching demo and eventually in my own class, by practicing inclusive treatment for everyone that no one is left behind because of their differences.
- Be mindful of cultural sensitivity inside the classroom. Avoid stereotypes and cultural biases in teaching materials and interactions.
- By integrating it in my lesson plan.
- w
- By integrating it to the Lesson Plan
- I can implement this in my classroom so that there will be equal opportunity and learning to all of my students
- 1
- by being open minded and sensitive enough
- I can utilize this by doing these strategies such as peer mentoring to my class.
- Practice or seek for a mentor
- Inclusive teaching
- I can utilized the knowledge that I have gained from this program to make my students understand science and the different topics that goes with it.
- Making sure that I use mother tongue, as well as implement differentiated learning in our classroom.
- I think in my demo teaching I can apply this integration.
- Assessing the students first before utilizing the culture anf language integration.
- I will make use of multi-lingual medium of communication of ideas
- By considering the needs and backgrounds of students I can effectively design teaching approaches and activities that can be integrate in the teaching and learning process.
- I will be more respectful in every students I encounter, as well as I will try to understand them with more empathy. Lastly, their science learning may be linked to their cultural and diversity backgrounds which is our duty to address.
- By keeping in mind that students are diverse and as a teacher I should create discussions that will help them learn and enjoy science
- Assess and learned students background on cultural and language diversity
- Always consider the background of the students

- Apply it regularly.
- Through customizing it based on the population sample i have
- I will promote and implement inclusive education in my future classroom.
- Let's just teach and share it so we can teach the students.
- By applying what I have learned from this training into my teaching practice.
- By being open about diversity and accepting the differences of my student.
- Establish partnerships with local communities or organizations that represent diverse cultural and linguistic groups. This can provide opportunities for real-world integration and understanding.
- Through instilling this in class and fostering also or can be in an advocacy or projects
- I will utilize it by trying different methods on learning and not just sticking to a teacher-centered classroom environment.
- To address class heterogeneity and diversity, incorporate a mentoring process that includes peer-assisted learning, where students with varying strengths collaborate and support one another. Implement differentiated instruction, tailoring assignments and activities to accommodate diverse learning styles and abilities, ensuring that each student can engage at their own pace. Additionally, foster a mentorship atmosphere within the class, encouraging students to share their unique perspectives and experiences, creating an inclusive environment that values diversity.
- What I've learned about culture and language integration by incorporating diverse perspectives into your teaching materials, fostering a culturally inclusive classroom environment, and using language-sensitive teaching methods that accommodate various linguistic backgrounds. This approach can enhance student engagement and create a more inclusive learning atmosphere.
- integrate what I learned into practice
- Recognition of the local science contributors and the emerging contribution of the minority in giving contextual content.
- Implement a lesson exemplar that contains learning that are fun, interactive, and diverse just like how students are different from one another. As educators, we have to explore, create, and implement variety of teaching strategies that also recognizes the learning needs as well as the identity of each learners.
- By starting with myself. I would be respectful and be made aware of the needs of people with diverse backgrounds so I can effectively serve with excellence.
- Always acknowledge their cultural beliefs and language used. It allows the implementation of teaching methods to be modify to cater your diverse learners. It will strengthen your teaching capabilities and your approaches in handling different type of the students.
- As a future teacher, I can apply my understanding of culture and language integration by creating a classroom environment that respects and celebrates diverse backgrounds. Incorporate culturally diverse content and teaching materials, encourage open discussions about different perspectives, and be sensitive to language proficiency variations among my students.
- By developing different learning materials based on my mother tongue/s, biology will be introduced to them and maybe make them interested about this branch of science.
- Through understanding about culture and language integration, learning is at the optimal performance. Students can engage freely and I can utilize various pedagogies without leaving anyone behind. Inclusivity is the name of the game.
- I will use to it to teach my students in the future and also to make a lesson which covers what my students need.
- I will incorporate diversity in my lesson plans and IMs.

- "Recognize the cultural nuances present in my school. Respect different communication styles, cultures, and customs. Avoid prejudice and stereotypes and encourage an inclusive environment.
- For those who struggle with the predominant language of education or conversation, offer linguistic assistance. This can be accomplished through bilingual materials, translators, or language assistance programs. And I will also incorporate the inclusivity in my lesson plan."
- I can utilize it to help me better understand the diversity inside the classroom and to ensure that each culture is respected and accepted.
- I can utilize what I learned by incorporating cultural and language considerations into my field/practice through adapting my communication, strategies, and processes to be culturally sensitive and inclusive.
- By knowing the culture of everyone to incorporate diversity in class.
- I'll consider diversity in making instructional materials as well as in making lesson plan to make the lesson more inclusive.
- Show genuine support and care for my future CLD students
- I can use different ways to make the class inclusive for all.
- By actively engaging in cross-cultural dialogue and incorporating diverse language expressions within the context of my field, I can create a dynamic and inclusive learning environment that not only fosters cultural appreciation but also encourages a deeper understanding of the subject matter through a global perspective.
- I must first learn about the learners diversity. From there on, I will design learning and teaching processes that are aligned and catered their individual needs.
- Through implementing teaching strategies such as collaborative activities, I will utilize what I learned about culture and language integration.
- I guess I can implement what I have learned in this program by applying it in when I already start my practice teaching and the most important of it is that we should be able to know the background of our students for them to be feel equal and belong with the other students.
- Motivating everyone in more interactive and collaborative activities.
- By studying first and understanding different cultures and then try to encourage individuals to respect different cultures
- I can utilize or implement what I have learned about culture and language integration in my field by applying it in everyday life. By simple applying it through making a conversion with anyone, and accepting their differences.
- By developing culturally responsive curriculum materials that reflect the diversity of your students. Incorporate culturally relevant examples, case studies, and content into your teaching or services to make them more relatable and engaging.
- I can utilize or implement what I have learned by creating lesson plans and activities that tailors the culture and language of the students. It should always be sensitive and inclusive.
- I think that by knowing well the stories of your students in the class, as well as my immersion into their way of living in the society that they are on, I would address their needs in learning Science by appropriating their day-to-day lives as examples/analogies in explaining scientific phenomena.
- By applying my learnings throughout the four day training while considering the context
- From my experience during my first demo teaching this semester, the utilization of my mother tongue (Iluko/Ilocano) as a medium during discussions should be limited since there is a tendency that not all of my students can understand what I am discussing when I use my mother tongue when explaining and giving instructions. However, when or in case that

I untintenionally use my mother tongue, I can and should translate it to Filipino or English so that the students who can't understand Iluko will not be left behind.

- In my future class to handle, I will ensure that everyone is well-represented by the things they like and backgrounds. It will not be neglected so that in the delivery of lessons and lesson planning, I will be able to know the approach I will utilize to help CLDs learn meaningfully.
- Through getting to know them first in order to avoid any unexpected scenarios
- Integrate diverse cultures and languages in teaching materials, encourage multicultural discussions, incorporate multilingual resources, and respect students' cultural backgrounds to create an inclusive and supportive learning environment.
- By embedding cultural sensitivity, linguistic diversity accommodation, and inclusivity into my teaching practices. This involves valuing and respecting the diverse linguistic and cultural backgrounds of my students, infusing culturally relevant content into my science curriculum, implementing differentiated instruction to cater to varied learning styles, ensuring equal access to educational resources, adopting inclusive assessment methods, and promoting cultural competency and anti-bias education. By doing so, I'll create an inclusive and equitable science learning environment that not only fosters academic success but also empowers students from diverse backgrounds to thrive in science and beyond, ultimately contributing to a more inclusive and globally connected scientific community.
- I aimed to incorporate modern technology into my classroom, as I believed that leveraging applications, websites, and online platforms could enrich students' learning. Tasks such as quizzes could be facilitated through web-based tools. Employing technology, I anticipated bridging certain communication gaps between me and my students.
- Since I would be teaching in Luzon where Tagalog is the dominant language, I should not fully use English as a medium. I should try to relate the subject to what the students are familiarized about.
- I can utilize what I have learned about culture and language integration in my field/practice through being a culturally responsive teacher. I will respect and acknowledge that the beliefs/practices of my students are different from mine so that we will be able to develop a positive classroom environment.
- Integrating culture and language into your field or practice can greatly enhance your effectiveness. Begin by recognizing the cultural diversity among your students or colleagues and understanding how this influences their perspectives and communication styles.
- By establishing a culturally inclusive environment for my students
- Incorporate cultural and language integration by promoting diverse perspectives in your field/practice. Encourage multilingual communication, adapt services to various cultural norms, offer language support, and foster inclusive policies to engage effectively with diverse communities.
- Through communication
- I can utilize the learning in my future field and practices as a science teacher is by having taking down notes and observing
- By actively integrating culture and language awareness into my field or practice, I can create a more inclusive and effective environment, better serving a diverse range of individuals and promoting understanding and respect across cultural boundaries
- By effectively incorporating language and culture, I can establish a science classroom that is not only enlightening but also inclusive and culturally sensitive. By adopting the methodologies and strategies I have learned, I will not only enrich my students' educational journey but also equip

them with the necessary skills to thrive in a global society where cultural sensitivity is an indispensable trait.

- By engaging my students in group activities where they can interact with each other and share their thoughts and knowledge to one another about a specific science concept that the class is taking. In this way, the class can look at each other's perspective and have the chance to find connection/s or misconception/s which will be debunked by the teacher from the class's shared ideas.
- I can utilize the things that I have learned by developing comprehensive lesson plans that will accommodate the individual needs of my students. Developing activities that disregard the diversity of the learners and teaching the concepts in a manner that my students could understand.
- For me, is to adjust everything, or learn more about it. For me to be a good teacher in the future.
- Tailor teaching methods that will accommodate the diverse learning abilities of my students
- Knowing my students individually to be able to address problems regarding such.
- I can utilize the things that I have learned by developing comprehensive lesson plans that will accommodate the individual needs of my students. Developing activities that disregard the diversity of the learners and teaching the concepts in a manner that my students could understand.
- In my future classroom, I will encourage inclusivity among my learners to eradicate possibilities of discrimination. This will creative a warm and safe space for my learners and learning will be conducive.
- I can utilized what I've learned from this training is being culturally aware for me to not be able to offend any culture backgroundns of my future students.
- Through fostering and instilling these practices
- By building a diverse team, because it will give you the idea of being sensitive to other cultures, embrace their differences, and are able to learn about the different cultures trough this teams
- N/A
- Making sure that I've accommodated every student while still following the curriculum
- "Integrating culture and language considerations into teaching allows me to better connect with my students. Not only for fostering diversity and inclusivity but also for overall effectiveness of my students learning. Culture and language is a big part of the learning process, if students cannot understand the language and teacher doesnt have any cultural background knowledge about the student, it would be hard to deliver messages and build connection. It may only end with misunderstanding or possible misconceptions. When students feel that their cultural identities and languages are respected and acknowledged, they are more likely to engage actively in the learning process.
- Moreover, recognizing the significance of culture and language in education highlights the interconnectedness of these factors with overall academic achievement. When language barriers are reduced, students can more easily grasp the scientific concepts and ideas I present, resulting in a deeper understanding of the subject matter. Therefore it is important that I develop my skills on addressing diverse learners, delivering inclusive scientific communication, widden my knowledge about different languages and cultures or widening my cultural apperture, being respectful and sensitive to my students. All of these must be paired with hardwork and best of efforts to be done, In this way, I can help students overcome linguistic challenges and ensure that they receive the education they deserve."
- Through applying it to my future endeavors.
- Be accepting and hold no prejudice.

- I can utilize the teaching strategies that I learned from the discussions that are able to make science interesting to learn for students. I will try my best to contextualize, localize, or even indiginize my lessons based on things that are common to my students. I will do it so they can relate to our discussions, because I believe that making personal connection will help them appreciate more the topics.
- by applying them in different case scenarios in classrooks
- Aside from speaking the universal language, I also would like to implement having differentiated activities as well as not limiting them with language. I want to make them feel that a classroom is a safe space where they can freely express themselves.
- By helping students and teaching
- It would be best to experience diverse classroom setup to utilize and implement the learnings.
- First is to get to know your students by recognizing their identity and utilize different strategies in order for them to understand the lessons. This would really help them to build confidence in them and create rapport between their peers and the teacher.
- By creating interactive preliminary activities that both support culture and science education.
- Being a science teacher is a challenging profession and using different strategies to make sure students of different cultures and backgrounds learn what they need to learn might prove to add more to the challenge. Using a strategy that fits my and my students' personalities and capabilities will be vital to ensure their needs are met.
- "As a pre-service teacher, the knowledge and skills gained from learning about culture and language integration can be applied in my field/practice in several ways.
-
- Firstly, I can implement culturally responsive teaching practices in my classroom to create a learning environment that is inclusive and values diversity. This can include incorporating diverse perspectives and cultural references in my curriculum, using culturally relevant instructional materials, and fostering positive relationships with students and their families that reflect an understanding of their culture and language.
- Secondly, I can use my understanding of culture and language integration to help students who may be English language learners (ELLs) or come from diverse cultural backgrounds. I can use differentiated instruction that takes into account the students' language proficiency levels and cultural backgrounds, and provide additional support and resources to help them succeed in the classroom.
- Thirdly, I can collaborate with colleagues to develop and implement effective strategies that promote cultural and linguistic integration in the school and community. This can include engaging in professional development opportunities, sharing best practices, and partnering with community organizations to support student success."
- By being patient and observant
- Listen to students
- Many

Please provide comment(s), additional feedback or suggestions:

- I would like to have a more engaging session that will tap students attention more than listening and watching the presentation
- N/A
- I appreciate this training and the speakers for taking time in sharing their knowledge. Thank you.
- w
- none
- none
- 1
- the seminar should be more collaborative.
- n/a
- It was very excellent and informative
- N/A
- N/A
- Excellence!
- N/A
- None as of the moment.
- None
- Thank you for the teachings and tips ma'am and sir
- Thank you for this wonderful workshop. It was a great help for us, future teachers.
- The best seminar I ever had.
- None
- On-site trainings
- N/A
- It was a very good learning experience and I enjoyed it a lot!
- N/A
- Synchronous sana para mas engaging.
- I would like to commend PNU for this opportunity for every science educators, you just gave as an avenue to be more proficient teachers in the future
- It was great to learn about in just four days of our training. I hope they give this opportunity to more students next time.
- The training was superb. Hoping I can join more trainings in the future that will help me grow as a pre-service teacher.
- none so far
- Organizing cultural events or inviting guest speakers from diverse backgrounds can provide students with valuable real-world insights and experiences.
- Thank you ESTA!
- Thank you for 4 weeks (weekly training) ESTA. It widens my teaching and learning aperture.
- Informative and Insightful!
- n/a
- The training workshop helped me to adapt new learning and skills.
- The mentors are great. They convey these information with clarity and professionalism. I learned many things in this training and it will be applied to my profession in the future.
- None

- I can't think of any
- I learned quite a lot and enjoyed the seminar. Thank you!
- Thank you for this training. I've learned a lot.
- The set of webinars were very insightful and the speakers were able to convey substantial information about the importance of every topic that was discussed.
- None because everything goes smoothly and successful.
- All good, everything was perfect I learn a lot, thank you fr this opportunity.
- Thank you I've learned a lot, even though Im having problem in joining the meeting due to internet connectivity, it is a pleasure to invited in this kind of training.
- All good
- Some parts become boring.
- This seminar was indeed a great!
- I am grateful to be part of this training. Thank you for giving me this opportunity.
- None
- None
- None
- The sessions were fun and entertaining and it was organized and the chosen speakers were also very good.
- I honestly find it helpful for me as a pre-service teacher, this training will help me to widen my knowledge about teachings and handling a different types of students. To sum it up, this training will help each of us to get to know our skills and attitudes which will be helpful in handling our future students. I, myself have difficulties joining the zoom because of the weak signal but still managed to join the zoom and learn from it. Thank you very much for this opportunity.
- none
- ESTA program is a great program, I really enjoyed attending the lectures because it gives me advices and ideas as a pre-service science teacher.
- I would like to say thank you to all the mentors we had so far for this journey we've gone through to make Science education a better place for our learners and for us, pre-service teachers doing the teaching soonish. ☐
- On-site trainings
- I want to ask the ESTA mentors/speakers the (gusto ko pong hingin sa mga ESTA mentor/speaker ang) PPT presentations used during the training, if it is okay po. Thank you po for shaing your knowledge about the cultural and language diversity of learners in a Science classroom to us po!
- Thank you very much for this opportunity! It is a well-done training for science preservice teachers like me.
- I commend the excellence and effort of each of the speakers, especially those who asked for participation and insights from the audience.
- The training was excellent, as expected all speakers are exceptional professionals. I can't suggest anything.
- None so far
- The online training is a good way to enhance the skills of science teachers. However, I think it would be more fun to conduct a face-to-face workshop, even for at least a day, so that we could be able to see and hear the guests and speakers physically. It may be disadvantageous for participants from faraway regions, but if it is only possible, that is my only suggestion.

- Please continue such training. As someone who started their field study course, I can certainly use the tips and lessons I got from this webinar series. I also how you also practice what you preach. We felt how you wanted us students to be engaged by checking us from time-to-time. Congratulations and Thank you ESTA!
- This training helped me to learn to be an effective teacher someday. I can use all the tips or suggestions from our speakers to be able to provide a good quality of education to my students.
- I want to extend my sincere gratitude for the valuable lessons I've gained through this seminar. The insights and knowledge I've acquired have been instrumental in my personal and professional growth. Thank you for your guidance and support. God bless ESTA ♥
- None
- None
- N/A
- N/A
- N/A
- I hope that this training would continue to happen to educate, enlighten and inspire pre-service Science teachers to promote an inclusive learning environment.
- The training was substantial and is truly beneficial for in-service and pre-service science teachers in the Philippines.
- I am very satisfied with the training, and I could not refer any more suggestions. But if the is one thing, it is to have a face-to-face sessions.
- N/A
- The training was a remarkable experience that offered insightful advice and practical tactics for fostering an inclusive learning environment. We learned a lot from the varied viewpoints and useful strategies that were presented during the seminar, and they will surely improve our capacity to interact with kids from different linguistic and cultural backgrounds.
- I am very satisfied with the training, and I could not refer any more suggestions. But if the is one thing, it is to have a face-to-face sessions.
- None so far.
- Overall, the training is very helpful for us future educators as we learn directly from educators who have already gone through the experiences that we will encounter in the future.
- Indeed Pnu has more a lot to offer, and I would like to commend this great avenue for every science educators. Thankyou , Pnu!
- ESTA pre service training allows me to see a better version of teaching sciences, especially on dealing with different group of learners.
- N/A
- N/A

Erasmus+
Enriching lives, opening minds.
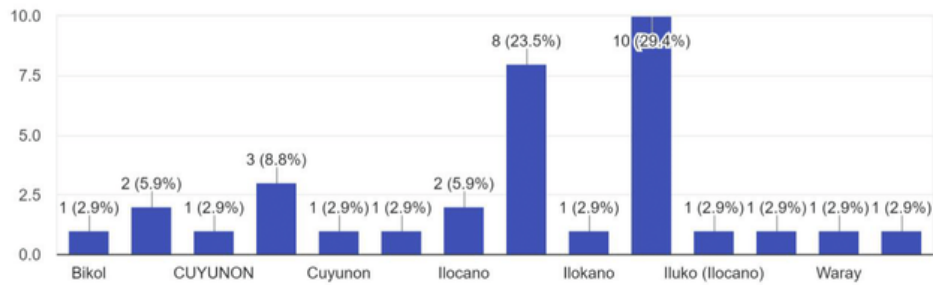
PH Ludwigsburg
University of Education

Is Filipino your mother tongue

No, but_____

34 responses

Other Regional Dialect

Please specify

41 responses
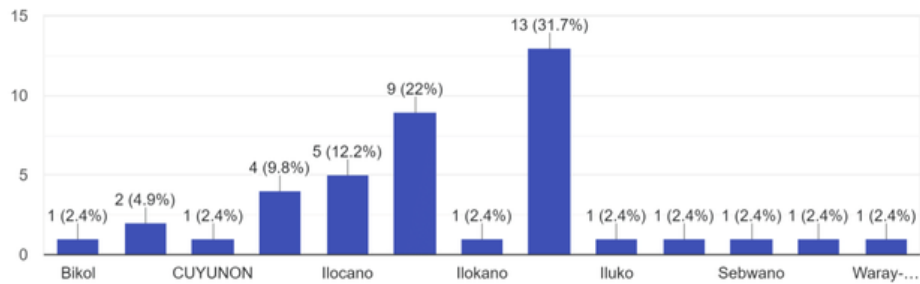
Languages spoken at home

0 responses

Analysis

In summary, the pre-service teachers rated the training as good to excellent. Specifically, the following constructs were rated by the participants as very good to excellent: overall assessment of the mentoring sessions, facilitating lesson exemplar development, peer review process, facilitating revisions of lesson exemplars, attainment of purposes, and mentors. These exemplar ratings in each construct were verified and validated through the verbatim responses of the participants in each of the open-ended questions. The succeeding paragraphs present the summarized comments by the participants in each question.

In terms of what they particularly liked about the training, their responses underscored diversity of learners, trends and new concepts in science education (e.g., science capital), and lesson exemplars as arsenal in addressing concerns on classroom management that may be utilized by science teachers in their individual classrooms to achieve a positive learning environment.

When asked what aspects of the mentoring process they can use in their class to address class heterogeneity and diversity, the pre-service teachers emphasized the importance of inclusivity, technological integration, peer mentoring, flipped classroom, lesson exemplars, technology integration, innovating teaching strategies to accommodate diverse learners ensuring their engagement and participation.

In the aspect of how they can utilize or implement what I have learned about culture and language integration in their field/practice, the pre-service teachers' responses can be clustered into three constructs: contextualization, inclusive teaching, and culture and language integration.

Finally, their overall very good to excellent rating are verbalized in the other comments commending the team for a remarkable experience through a training that enriched their knowledge and insights on achieving inclusive science education.

Statistical Analysis of Data

Evaluation by the Participants of the Pre-Service Science Teachers Training

Effect of customized pre-service teacher training on inclusive science education for linguistic and cultural diversity in terms of

1. Teachers' Attitudes towards Valuing Students' Culture and Languages
2. Teachers' Expectations of CLD Students' Academic Performance
3. Negative Attitudes Towards Inclusion of CLD Students in Subject Area Classes
4. Positive Attitude towards Inclusion of CLD Students in Subject Area Classes
5. Teachers' Beliefs about CLD Students Enrolled in their Subject Area Classes
6. Teachers' Attitudes towards CLD Students' Needs

Table 10

Effect of Customized Pre-Service Teacher Training on Inclusive Science Education for Linguistic And Cultural Diversity

No.	Constructs	Chi-square value	df	p-value	Cramer's V
	Teachers' Attitudes towards Valuing Students' Culture and Languages	23.24	4	.000112873613*	.08755353126ᵃ
1	Knowing the background and experiences of culturally and linguistically diverse (CLD) students substantially impacts their learning performance.	11.92	2	.002570631862*	.1663530413ᵃ
2	Every student in my class is a unique combination of his/her cultural background, language, home, and experiences.	6.03	1	.01408142079*	.1181248846ᵃ
3	My students' identities bring richness to my classroom through language and culture.	9.68	2	.00790845218*	.1498618574ᵃ
4R	CLD students should be encouraged to modify their behavior to adapt to the mainstream culture.	6.09	2	.04748708537*	.1182304058ᵃ
5	My own culture influences my understanding of students.	2.21	2	.330398528411	.07127462366ᵃ
6	Science teachers should respect and value CLD students' primary languages and dialects.	12.00	2	.0024777798199*	.1664794398ᵃ
7	The science teachers are responsible for utilizing students' first languages and dialects as vehicles for helping CLD students to learn standard English.	3.44	2	.17915316158	.0890170125ᵃ
	Teachers' Expectations of CLD Students' Academic Performance	12.32	4	.015102847547*	.0752199485ᵃ
8	The more I expect from CLD students academically, the more they are likely to achieve.	9.25	2	.009792561158*	.1456735739ᵃ
9	I expect all students in my science classes can and do have the potential to learn regardless of their diverse cultures or languages.	16.25	2	.000296649525*	.1934760749ᵃ
10R	Students who don't put forth enough effort usually fail in my science class; likewise, students who work hard and put forth effort usually succeed.	0.29	2	.865115045278	.02578072502ᵃ
11R	No matter what I do, some students will not attend my science class.	3.02	2	.2203637622	.08329442731ᵃ
12	Teachers' high expectations of CLD students enable them to develop positive attitudes, perceptions, and a high self-efficacy of academic ability.	7.001	2	.03012034932*	.1267547346ᵃ
	Negative Attitudes Towards Inclusion of CLD Students in Subject Area Classes	8.34	4	.07972946266	.07978293937 ᵃ
14	Having CLD students in my science classes increases my workload.	0.322	2	.8508951852	.02721527538 ᵃ
15	Having CLD students in my science classes requires more of my time than other students require.	3.71	2	.1568402251	.09218369341 ᵃ
16	Having CLD students in my science classes slows the entire class's progress.	1.382	2	.5009658837	.05611642943 ᵃ
	Positive Attitude towards Inclusion of CLD Students in Subject Area Classes	15.07	4	.004556615637*	.1315403487 ᵃ
13	Having CLD students in my science classes benefits all students.	3.90	2	.1424238101	.09455225457 ᵃ
17	Having CLD students in my science classes creates a positive educational environment.	3.92	2	.1405565032	.09498083807 ᵃ
	Teachers' Beliefs about CLD Students Enrolled in their Subject Area Classes	43.50	4	8.14E-09*	.1412637904 ᵃ
18R	Regardless of cultural differences, all students should be taught in the same way.	1.31	2	.518780708	.05486739699 ᵃ

22R	Science teachers need more time to deal with the needs of CLD students.	5.83	2	.0541035821	.115672245 [a]
23R	CLD students should not be allowed to use their home language in science classes.	7.10	2	.02874940008*	.1275948717 [a]
24R	CLD students should only enroll in general education classes once they attain a minimum level of standard English proficiency.	3.94	2	.1396950627	.09502035889 [a]
25R	CLD students in my science class participate less than other students.	4.99	2	.08223676704	.107048664 [a]
	Teachers' Attitudes towards CLD Students' Needs	35.09	3	1.17E-07*	.1266939394 [a]
19	Knowing the background and the experiences of CLD students is a significant element to increasing their learning achievement.	15.04	2	.000543214842*	.1863469864 [a]
20	It is part of my responsibility as a teacher to use different teaching instruments (formal, symbolic, and media), to help convey important information, values, and actions about cultural and linguistic diversity.	26.19	2	.000002050432*	.2442734587 [b]
21	Meeting the individual needs of all my students is an important part of my science lesson plans.	6.18	2	.04544654025*	.1189430682 [a]
26	Science materials help students understand how people from various cultures and groups have contributed to the development of scientific knowledge.	6.09	2	.04739918416*	.1186753341 [a]
27	Science materials should help students to understand how assumptions, perspectives, and problems within these fields are often culturally based and influenced.	5.94	2	.05139679493	.1156294848 [a]

*p-value<.05, [a] CV<=.2, weak association, [b] (.2<CV<=.6, moderate association), [c] CV>.6, strong association

Table 10 shows that all constructs present a significant difference in responses before and after the training. In other words, the responses before the training are not independent of those after the training. This could suggest that the training affected the responses. However, all constructs present Cramer's V close to 0, suggesting weak associations. Only item 20 (*It is part of my responsibility as a teacher to use different teaching instruments (formal, symbolic, and media) to help convey important information, values, and actions about cultural and linguistic diversity.*) presented a moderate association of responses.

Table 11

Abstracted Take-Aways of Participants

What is your take-home message?

Sample responses	Codes	Themes
Inclusivity will be implemented	Inclusive science education	Inclusivity in Science Education
I have learned that CLD students must be catered by their science teachers for them to be able to cope and learn a lot of things in the class.	Respective and acknowledging CLD	
Never get tired of learning	Lifelong learning	
Technology will never replace educators. Thus, technology in the hands of a good educator will promote transformative learning that will alleviate the situation of our country, in general.	Role of Technology	Teacher competencies, skills, and attitudes
To be an effective teacher, I realized the importance of carefully planning the lesson, the benefits of using flipped classroom, and technological integration in teaching.	Role of Lesson Planning	
Teachers are not just mere teachers, they are creative and explorers.	teacher creativity, open mind, and sense of curiosity through training	
We will make Science a more interesting and interactive one.		
Be passionate	Attitude towards teaching science	
Let us make our classroom more inclusive. Let us make science inclusive and accessible	Goal of science education	Goal and nature of science education
Students came to school to learn and not to have fun	Nature of learning science	

Based on the coded and abstracted participant responses in the open survey (Table 11), they benefitted from the training in terms of acknowledging inclusive science education, CLD students and their states, and the importance of lifelong learning which are themed inclusivity in science education. The participants also realized that teachers' skills, knowledge, and attitudes are vital in implementing an inclusive science classroom. They could now connect all these realizations to the goals and nature of science education. In

addition, Table 12 presents the themes generated from the coding and abstraction of the participants' responses regarding how they will implement what they have learned in the training.

Table 12

Teachers' Implementation of their Learning in the Training

Is there anything you'd like to try implement to your classroom? How?		
Sample responses	**Codes**	**Themes**
Inclusivity. By building healthy and respectful environment I would like to implement the flipped classroom to help students more excited in learning Science	Inclusivity	Inclusive Science Education
I want to implement a classroom setting which can help the students to grow, to develop and improve their skills. I will also intend to employ what I learned from these sessions.	Sensitization	
I would allow my students to explain their answer using their mother tongue (to help them elaborate their ideas, as well as their classmates could also learn their language.)	Culture-based approach	
I would like to implement using different languages inside the classroom. I can do this by trying to identify my CLD learners and try to communicate with them using their mother tongue.	Language-based approach	
Giving challenge to students may help in making them use their critical thinking and collaborative skills.	Skill-based teaching	Addressing the nature of science learning
I would aim to introduce interactive learning methods and diverse perspectives into the curriculum, possibly by incorporating multimedia resources, promoting group discussions, and integrating case studies that highlight a range of cultural backgrounds. This approach is intended to boost student engagement and comprehension.	Experiential learning with technology	
Differentiation technique, by giving activities differently suiting the capabilities of learners	Differentiation	Appropriate teaching approaches for Inclusive and Engaging Science Learning
Teaching as telling and learning as listening is not anymore the trend today. Hence, I should implement Educational Technology in my classroom that also fits the context of the community. Yes, about the Technology integration. In every part of the lesson, technology can be utilized for better and productive learning.	Technology integration	
A good communication in a class is the most important to me.	Communication	
If there is something I would like to implement inside my classroom is the use of online interactive learning applications. I will use it during my discussions to help them analyze the topic more and at the same time they will be engaged and be able to participate actively inside the classroom.	Teaching Strategies	

The pre-service science teachers saw that it was important to implement several aspects of what they have learned in the training in their science classes. The coding process shows that these participants would want to implement inclusive science education through sensitization and using culture- and language-based approaches. They also claim that in addressing the nature of science learning, the following are very important factors: skill-based teaching, experiential learning with technological applications, and utilization. Finally, they deem it important to use appropriate teaching approaches for inclusive and engaging science learning. These may be implemented through differentiation, technology integration, communication, and appropriate teaching strategies.