PHILIPPINE STEAM ASSESSMENT MODEL

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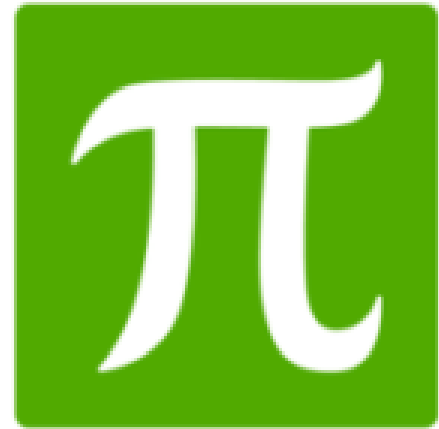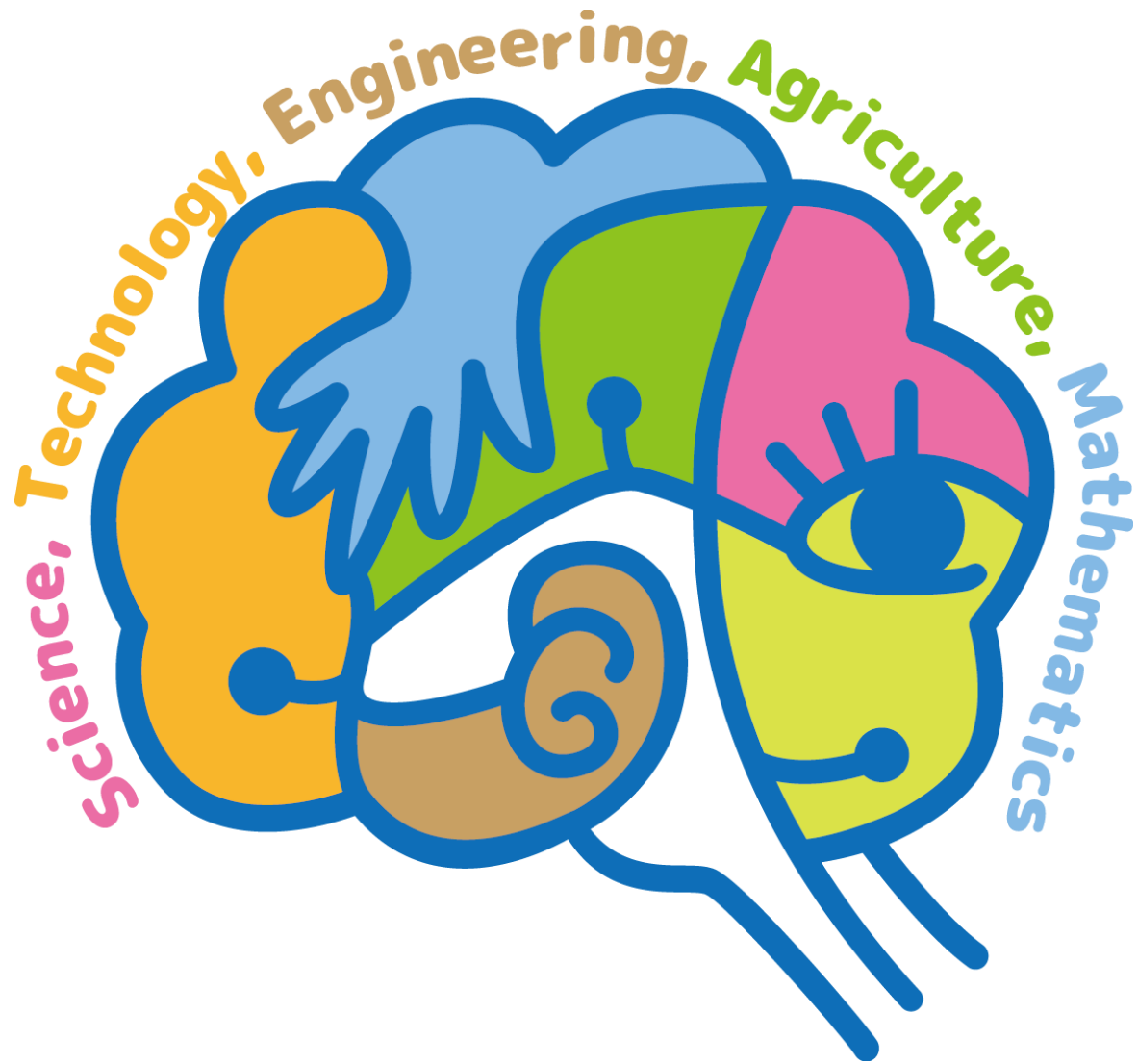Science, Technology, Engineering, Agriculture, Mathematics
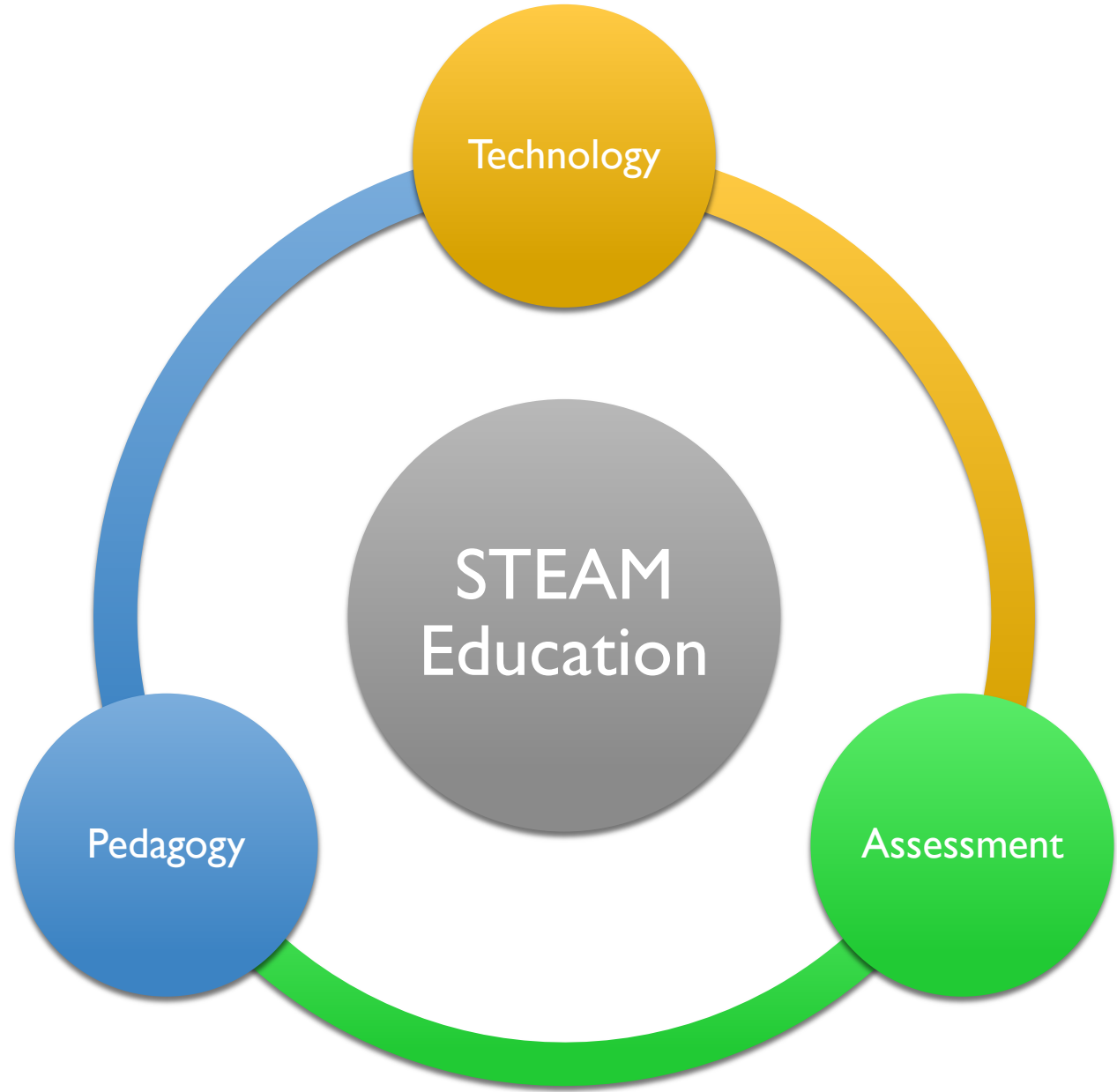
Discipline	SUCs	LUCs	OGS	Private	Grand Total
Science	57,366	9,221	1,178	183,468	251,233
Technology	217,503	29,076	537	245,084	492,200
Engineering	114,057	4,747	–	150,474	269,278
Agriculture	96,564	1,216	676	3,705	102,161
Mathematics	9,787	633	–	1,385	11,805
Grand Total	**495,277**	**44,893**	**2,391**	**584,116**	**1,126,677**

Higher Education Enrollment by STEAM Discipline and Institution Type as of June 8, 2018

How do we ensure quality STEAM education?

testing

measurement

ASSESSMENT

evaluation

Evaluation

Assessment

Measurement

Tests

Measurement

Assessment

Teaching

Evaluation
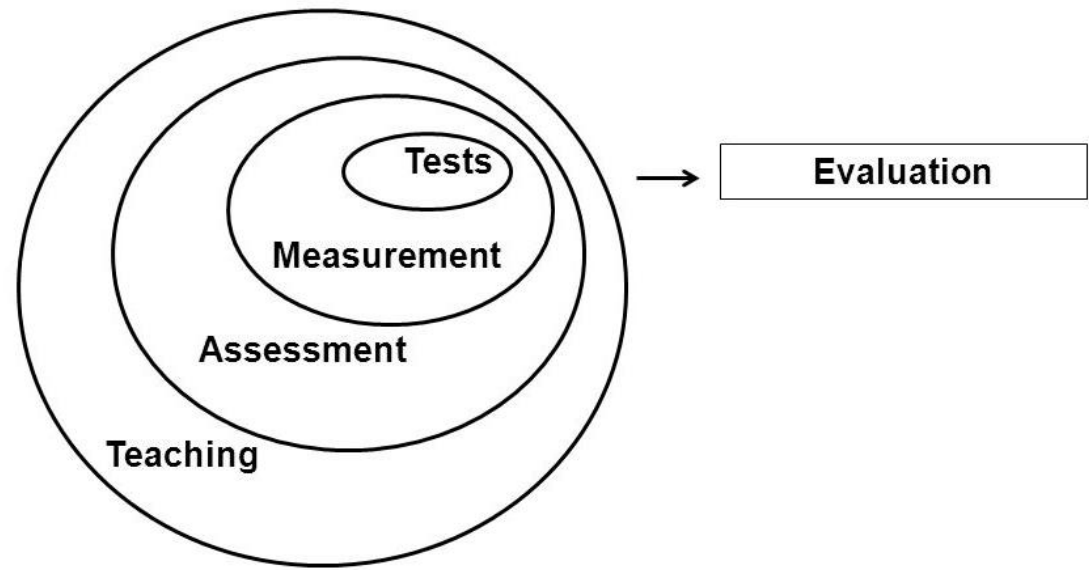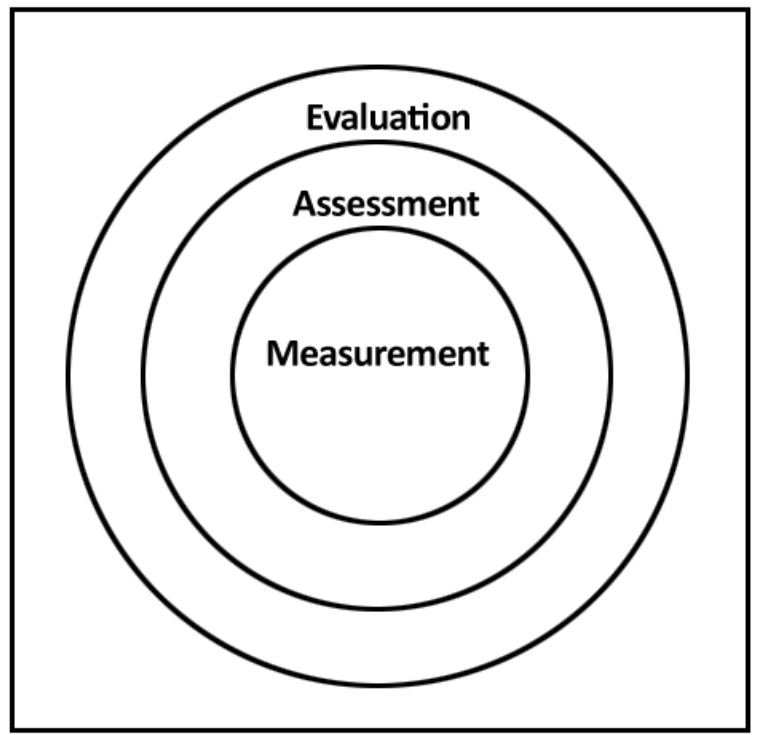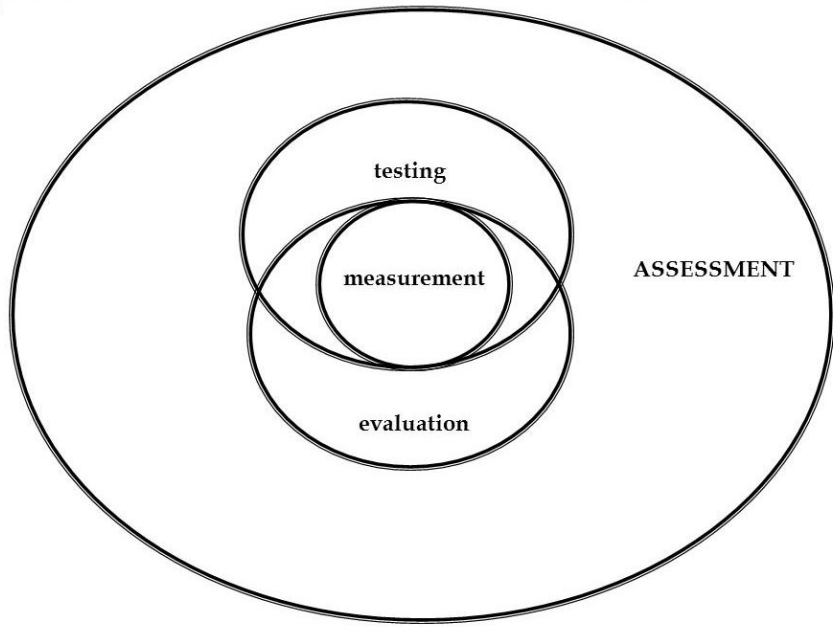
ASSESSMENT

Research demonstrates that quality assessment can have a greater positive impact on student learning than any intervention (Davies, et al., 2012). Data shows that all students benefit from quality assessment practices (William, 2011).

The primary purpose of assessment is to <u>promote learning</u>. Assessment provides evidence of how learners are progressing according to defined standards throughout a period of learning, as well as achievement at the end of the learning period.

Source: Teachers' Guide to Assessment, 2016
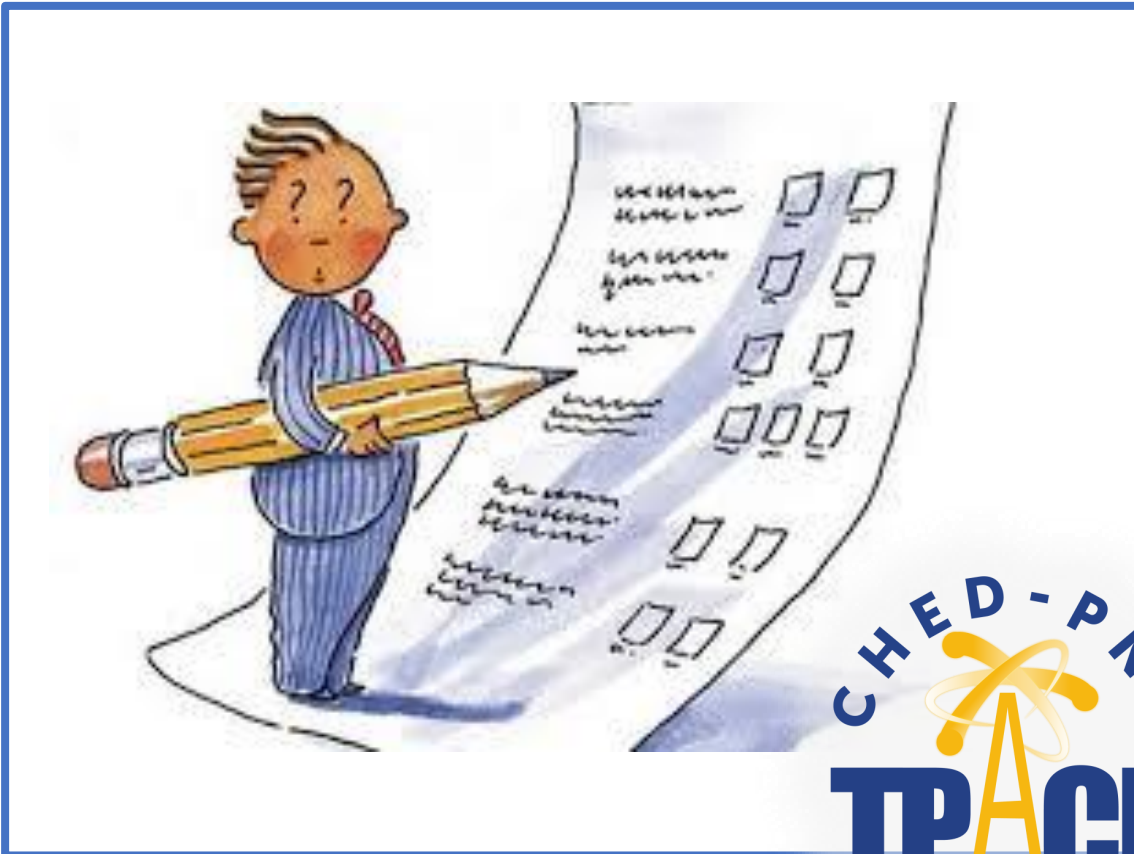
Quality assessment includes both <u>cognitive</u> and <u>affective</u> domains. It is informed, purposeful, authentic, valid and reliable.

Source: Teachers' Guide to Assessment, 2016

Willis and Cowie, refer to assessment as 'generative dance' wherein assessment is:

"re-imagined as a dynamic space in which <u>teachers learn about their students as they learn with their students</u>, and where all students can be empowered to find success and in turn develop learner agency"

Wyatt-Smitt, C., Klenowski, V., & Colbert, P. (Eds.) 2014.
Designing Assessment for Quality Learning. Springer

AIMS OF THE EXPLORATORY STUDY

- Develop the STEAM education assessment model.

- Investigate the appropriateness of the model and its alignment to the Philippine Professional Standards for Teachers (PPST) and Policies, Standards, and Goals (PSG) set by the Commission on Higher Education (CHED)

ASSESSMENT CHECKLIST

Date: August 11, 2018

Specific Area (Please check): ☐ Science ☑ Technology ☐ Engineering ☐ Agriculture ☐ Math

Directions: Please put a check mark in the box ☐ which corresponds to the technique/s you are using to assess performance of your students.

- ☐ Quizzes (print/online)
- ☐ Long Test (e.g. Mid-term, Final examination)
- ☑ Course Homework
- ☑ Class Seatwork
- ☑ Class Discussion Participation/Recitation
- ☐ Research Project
- ☑ Case Study Analysis
- ☑ Observation of Field work
- ☑ Practical Test (e.g. actual demonstration, actual assembly)
- ☑ Portfolios (working, documentary, showcase)
- ☐ Products
- ☐ Journal (e.g. reflective)
- ☑ Assessment tools which are not in the list

Time Start: 11:30 , Time End: 12:30

Address: Naga City

PART ONE: THE LESSON

SECTION A. BASIC DESCRIPTIVE INFORMATION

1. Teacher Gender: _____✓_____ :Male _____ :Female
2. Subject Observed: ___Probability___
3. Level: _____
4. Program: ___Engineering___
5. Course Title (if applicable): _____
6. Class Period (if applicable): _____

TPACK Classroom Observation Notes

This instrument includes questions clustered into the dimensions of TPACK. The observation notes is designed for use by researchers who would want to collect qualitative data on STEAM Education anchored to the TPACK framework It is not recommended that this worksheet be used by teachers to rate classroom practice of their peers or for use by administrators to evaluate teacher performance.

Dimensions	Items	Observer's Field Notes
CK	What content/topic does the teacher intend to teach?	Does the teacher possess sufficient understanding of the topic being discussed? 1. enumerate indicators of mastery of subject matter (see examples below) ☑ Uses Department's Scope and Sequence documents as appropriate ☐ Uses relevant curriculum documents specific to year/subject level ☐ Keeps abreast of new ideas and techniques through professional reading ☐ Integrates knowledge and skills in content area **(Observer may enumerate as many indicators as possible)**

PRE-OBSERVATION QUESTIONS

Observation Date: August 14, 2018   Time Start: 09:00AM   Time End: 10:30AM
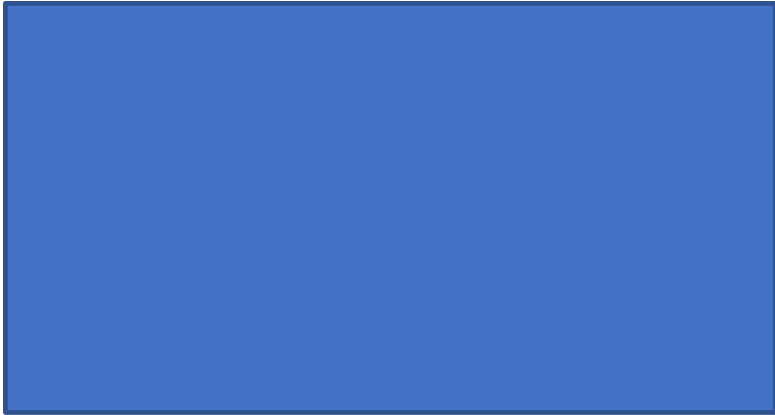
In the pre-observation session, the researcher-observer should obtain information from the pre-identified STEAM Educator concerning his or her class goals, students, and particular teaching style. An interview schedule provides a brief, structured way of obtaining such information and includes the following questions:

1. Briefly, what will be happening in the class I will observe?

    I will be giving instructions on differentiating transcendental functions and some of its applications in Physics.

Session Guide

|	
Learning Goals/Objectives	*At the end of this class session, the student is expected to be able to:* 1. find the probability density function (pdf) of a continuous random variable given its cumulative distribution function (cdf), and vice versa. 2. understand that the pdf of continuous random variables cannot be meaningfully used to find probabilities (of discrete events) and that only the cdf of continuous random variables can be meaningfully used to find probabilities (of continuous events).
Subject Matter	Lesson: the probability density function (pdf) and the cumulative distribution function (cdf) of continuous random variables (uniform and Gaussian)
	Concepts: the pdf of continuous random variables cannot be meaningfully used to find probabilities (of discrete events); only the cdf of continuous random variables can be meaningfully used to find probabilities (of continuous events)
	Skills: the use of calculus (differential and integral) to find the pdf or the cdf of a continuous random variable.

TECHNOLOGY INTEGRATION CHECKLIST

Specific Area (Please check): ☑ Science ☐ Technology ☐ Engineering ☐ Agriculture ☐ Math

Directions: Please put a check mark on the technology you are integrating or you have integrated in your lessons.

☑ CB — (Chalkboard/whiteboard/SMART board)

☑ OP — (Overhead Projector/Opaque Projector)

☑ PP — (PowerPoint or other digital slides)

☑ CL — (Clicker Response System)

☑ D — (Demonstration Equipment, e.g. could include Chemistry demonstrations of reactions, physics demonstrations of motion or any other material being used for the demonstration of a process or phenomenon)

☐ DT — (Digital Tablet or any technology where the instructor can actively write on a document cameras as well as software on a laptop that allows for writing on PDF files)

☑ M — (Movie, documentary, video clips, or YouTube videos)

☐ Si — (Simulations that can be digital applets or web-based simulations and animations)

☐ WEB — (Website which includes instructor interaction with course website or other online resource other than YouTube videos. This can also include using website for student responses to questions in lieu of clickers)

☐ LDEM — (Use of equipment (e.g. lab equipment, computer simulation to convey course content)

INTERVIEW PROTOCOL
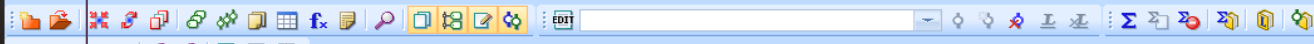
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    - MISS-ALCANTARA 41
    - Mam Mingo 58
  - Cebu Doctor's 0
  - Modelo 0

Code System 286

- Factors 0
  - Sustainability 2
    - Others 1
    - Quality 0
      - External 4
      - Internal 4
    - Research 4
    - Policies and 1
  - Institutional 3
    - Curriculum 9
    - Institutional 0
      - Facilities 1
        - Technol 5
      - Financial 0
  - Agency & 0
    - Faculty 8
    - Qualificatio 6
- Drivers 0
  - Utilizing Modality 6
    - Tools and 4
    - Types of 3
      - Forms 2
        - Authent 16
        - Traditio 4
  - Purpose 1

Document Browser: Universidad de Zamboanga Pagadian - INT\DR

we need to look is to be able to transform students into a future med tech major pharmacy so part po yon. That is why ahh yong experience nila is a right thing that we consider when we hire them because that's the thing also that they can transform their students… yong transformation okay.

1. What are your indicators that your STEAM faculty emphasizes in their teaching processes that STEAM should benefit the society (e.g. school, community)?

Answer: *Actually, mayroon kaming kuwan …meron kaming we have really a kuwan.. yong tinatawag na faculty evaluation.. kasama yong straregy ahh that would somehow inculcate some idea on the part of student to be able to render service to the community…part po yon ..yong part ahh.. ewan ko kong available pa ba yon..*
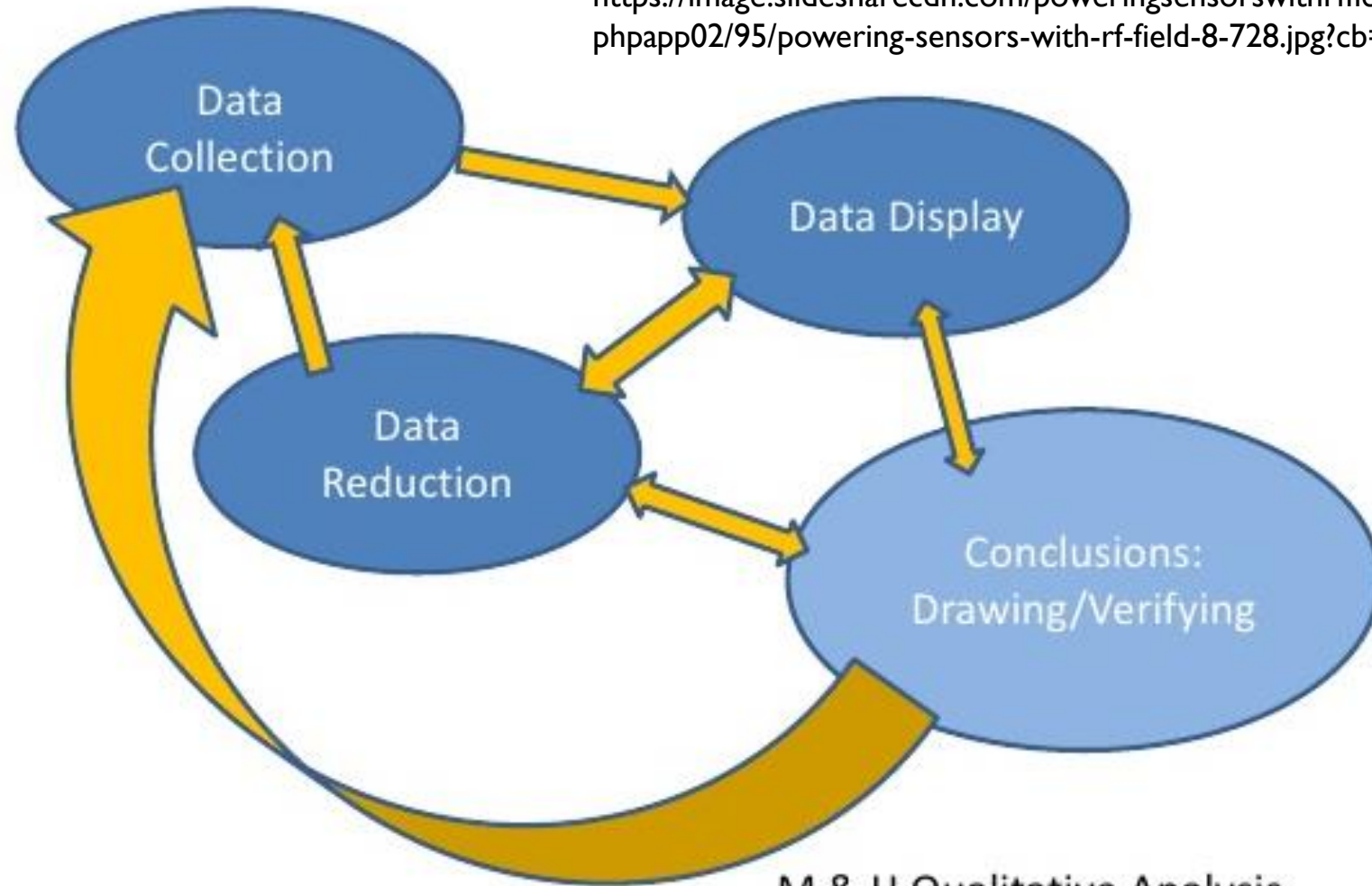
Interviewer: Is it indicated Sir in the manual, are you referring to that manual or?

Answer: *Oo para syang para syang … we are evaluating the teachers with respect to teaching methodology, classroom management,classroom management, ahh yong delivery okay pero yong specific siguro pagdating don sa steam talaga yong contribution to the kuwan …parang hindi sya masyadong emphasize doon so more on classroom setting pero part po doon ang kanilang tinitignan when we do classroom observation is ahh to be able to what do you call that ano yong term ah yong parang.. yong pano nila maituturo sa student yong possible situation in the community how their learners their learning would give impact in the society. Part po yon..that is why we have what we called ahhh community service program.. part po yon ..for example.. in the blood bank*
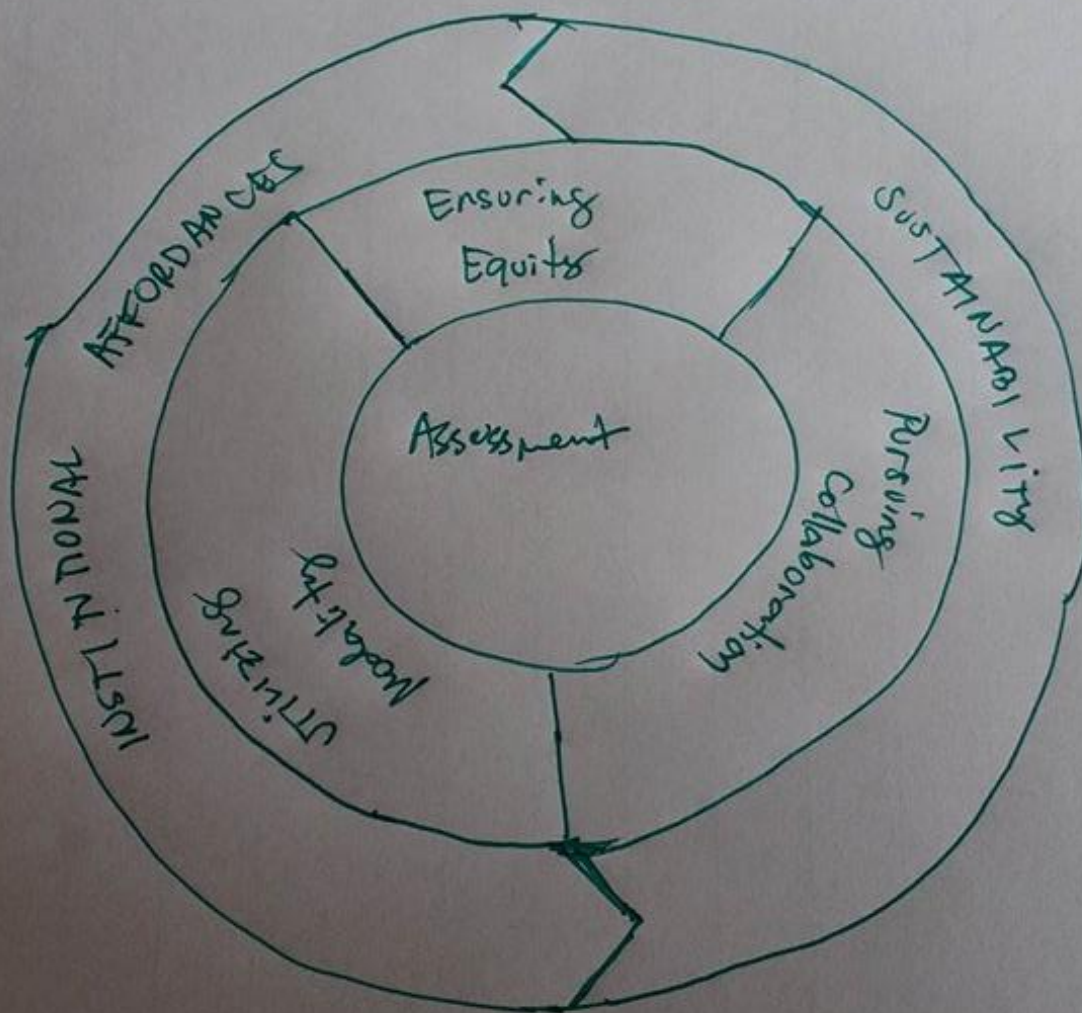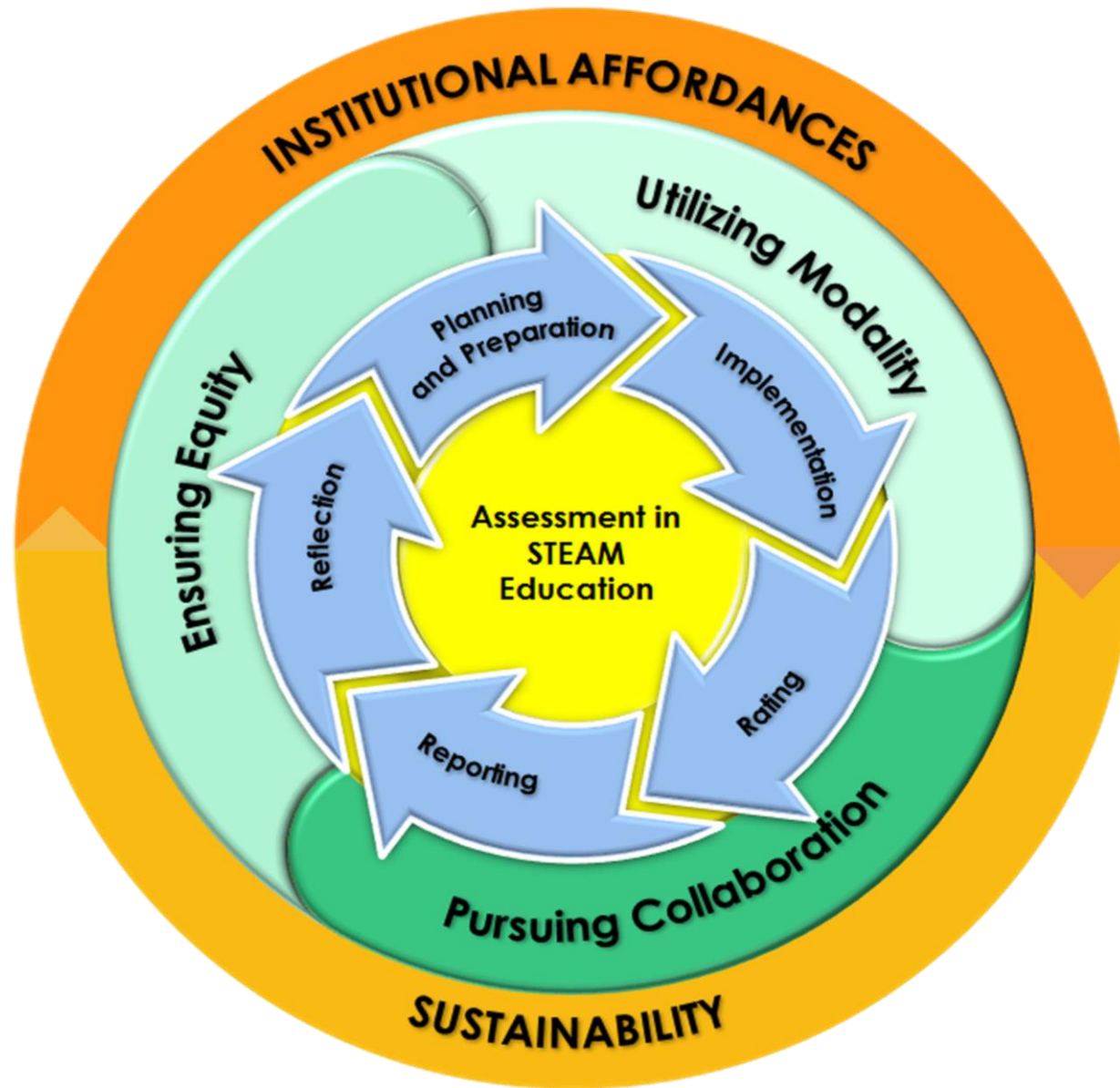
Retrieved Segments

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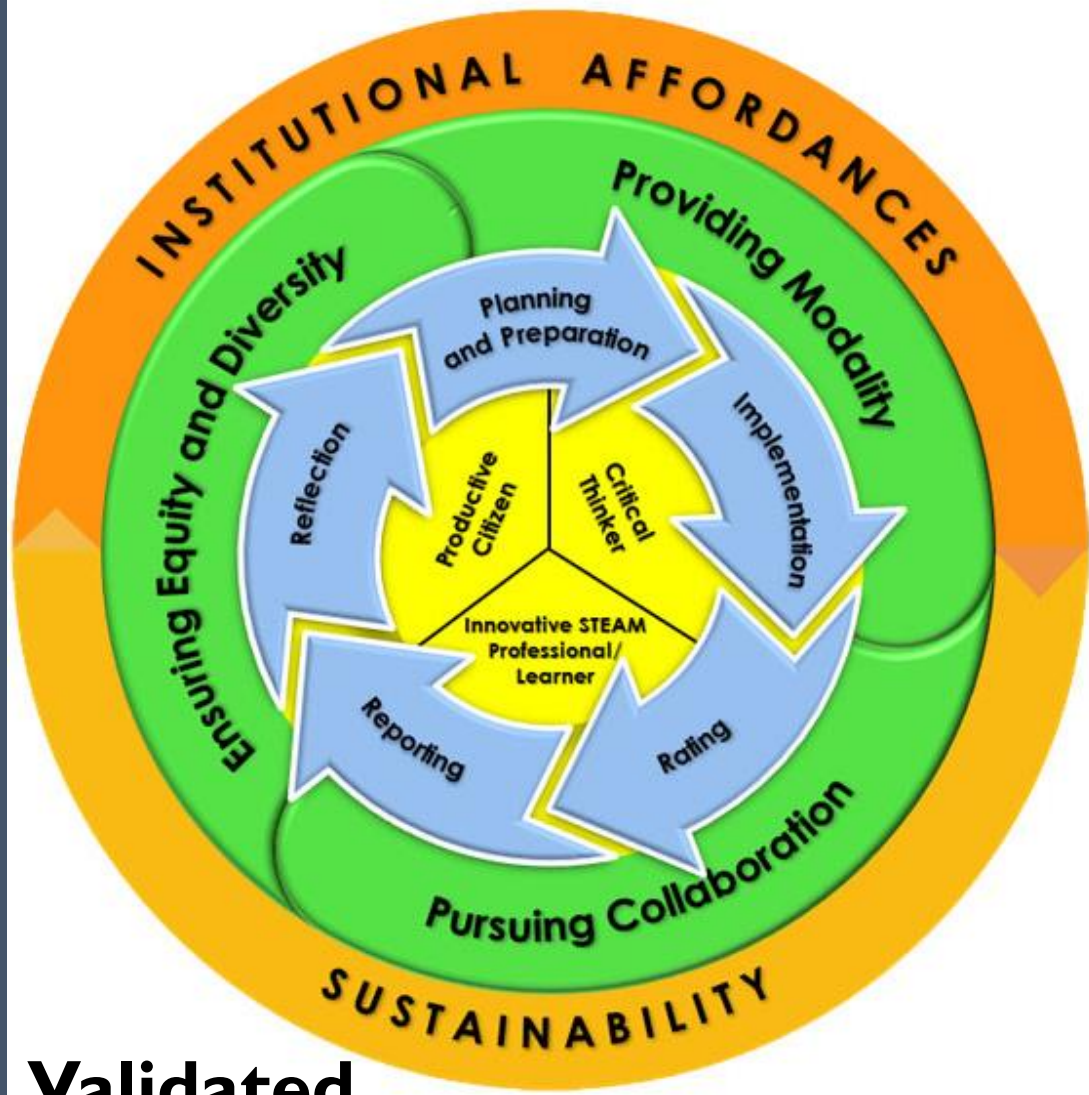
Data Collection

Data Display

Data Reduction

Conclusions: Drawing/Verifying

M & H Qualitative Analysis Process,

Data analysis

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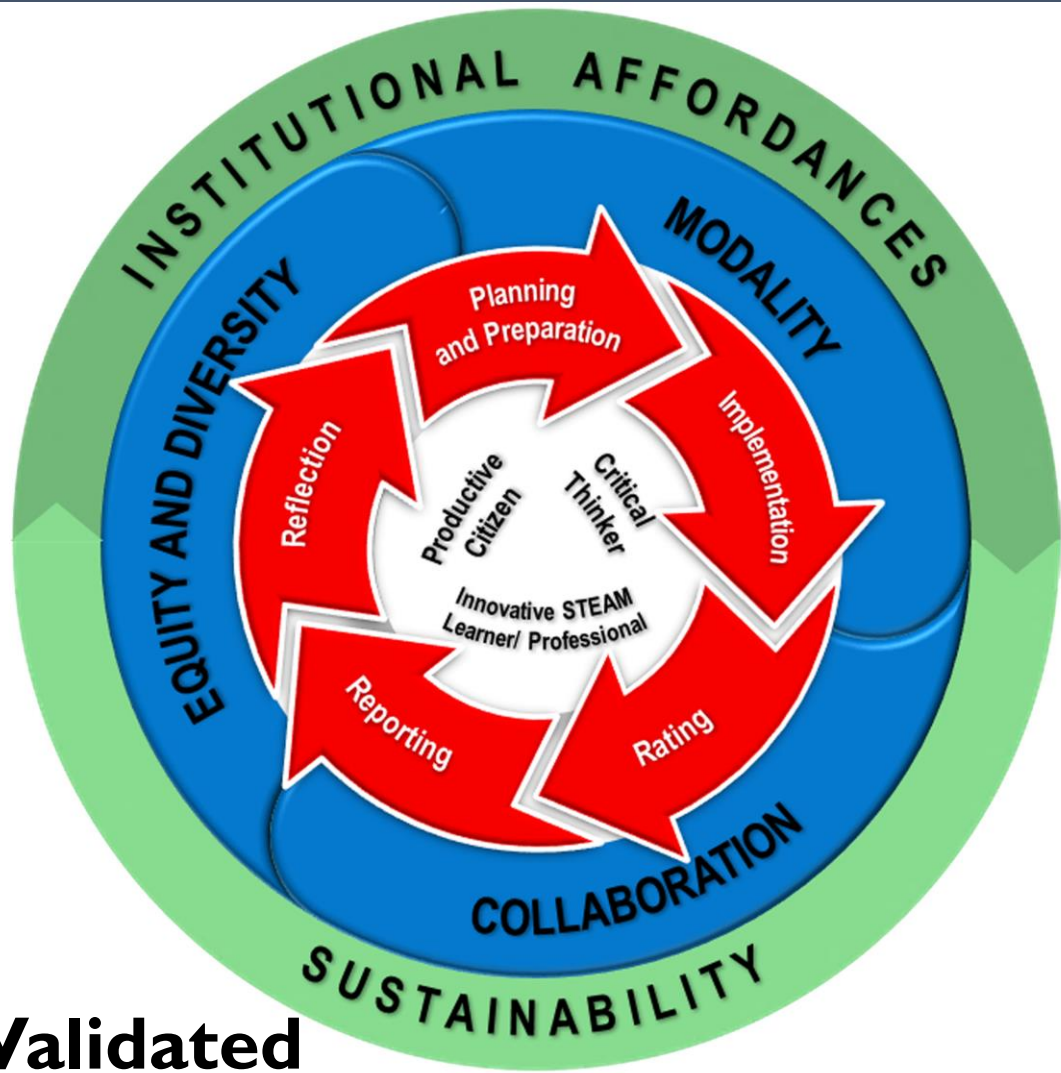
Validated

Emerging

Graphics by Prof. Brando Palomar

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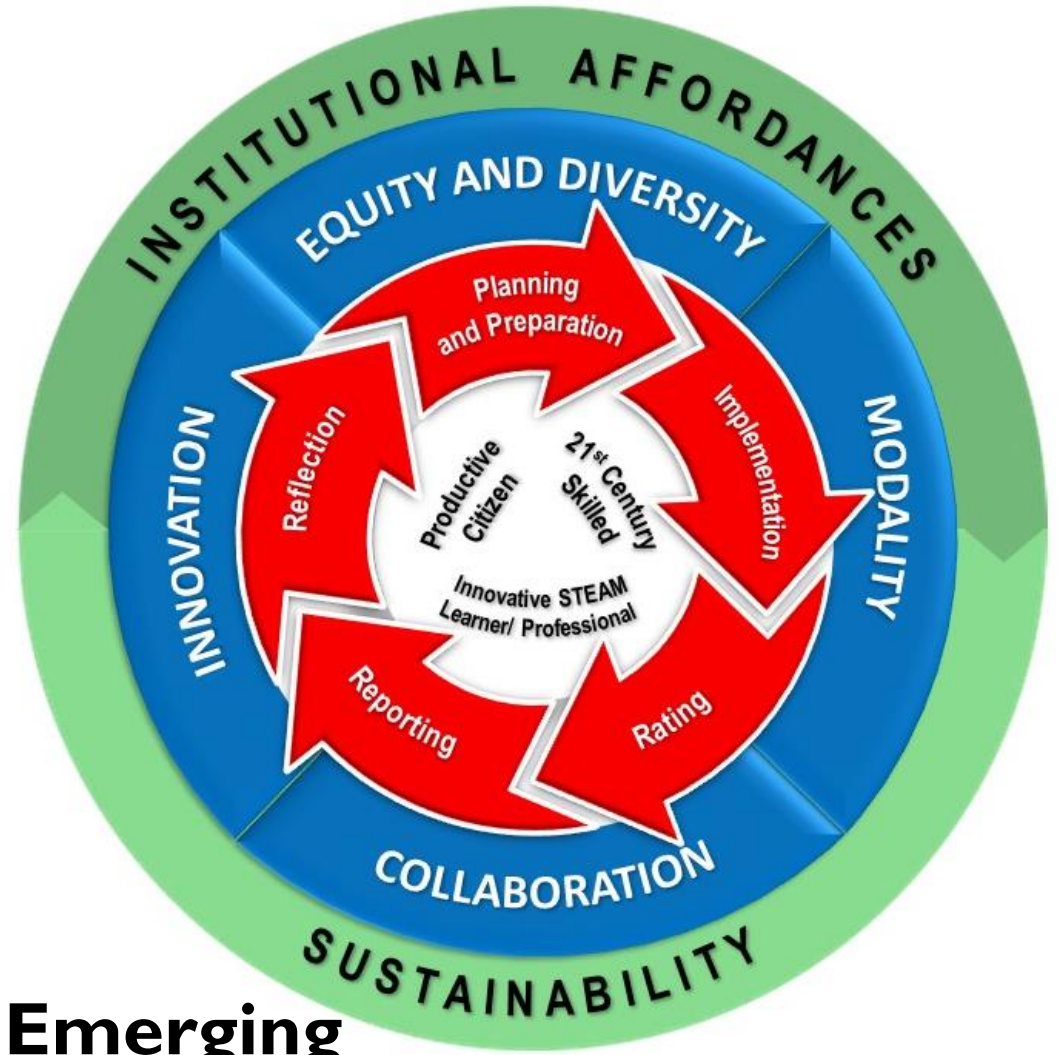
VARIABLES OF STEAM ASSESSMENT

- **Enablers of STEAM Assessment:** The capabilities, forces, and resources that contributes to the success of the assessment process.

- **Drivers of the STEAM Assessment:** Enumerates the key factors and main considerations in the STEAM assessment process and direction.

- **Process of STEAM Assessment:** Describes the procedure and progression of STEAM teachers practices in conducting assessment.

- **STEAM Outcomes:** Very specific statements or phrases that describe exactly what a STEAM learner will be able to do in a measurable way.

(A) ENABLERS OF STEAM ASSESSMENT

(A.1) Institutional Affordances

- (A.1.1) Curriculum Development
- (A.1.2) Institutional Identities
- (A.1.3) Agency and Empowerment

(A.2) Sustainability

- (A.2.1) Quality Assurance
- (A.2.2) Research Undertakings
- (A.2.3) Policies and Programs

(A.1) INSTITUTIONAL AFFORDANCES: Refers to the properties or facilities of educational institutions or an aspect of its environment and policies that aids the STEAM assessment process.

- **(A.1.1) Curriculum Development:** The various approaches followed by institutions in continuously updating their curriculum for improvement.

- **(A.1.2) Institutional Identities:** The unique characteristics and features that defines an institution.

- **(A.1.3) Agency and Empowerment:** Purposeful initiatives and actions of institutions that empowers those that are involved in the assessment process.
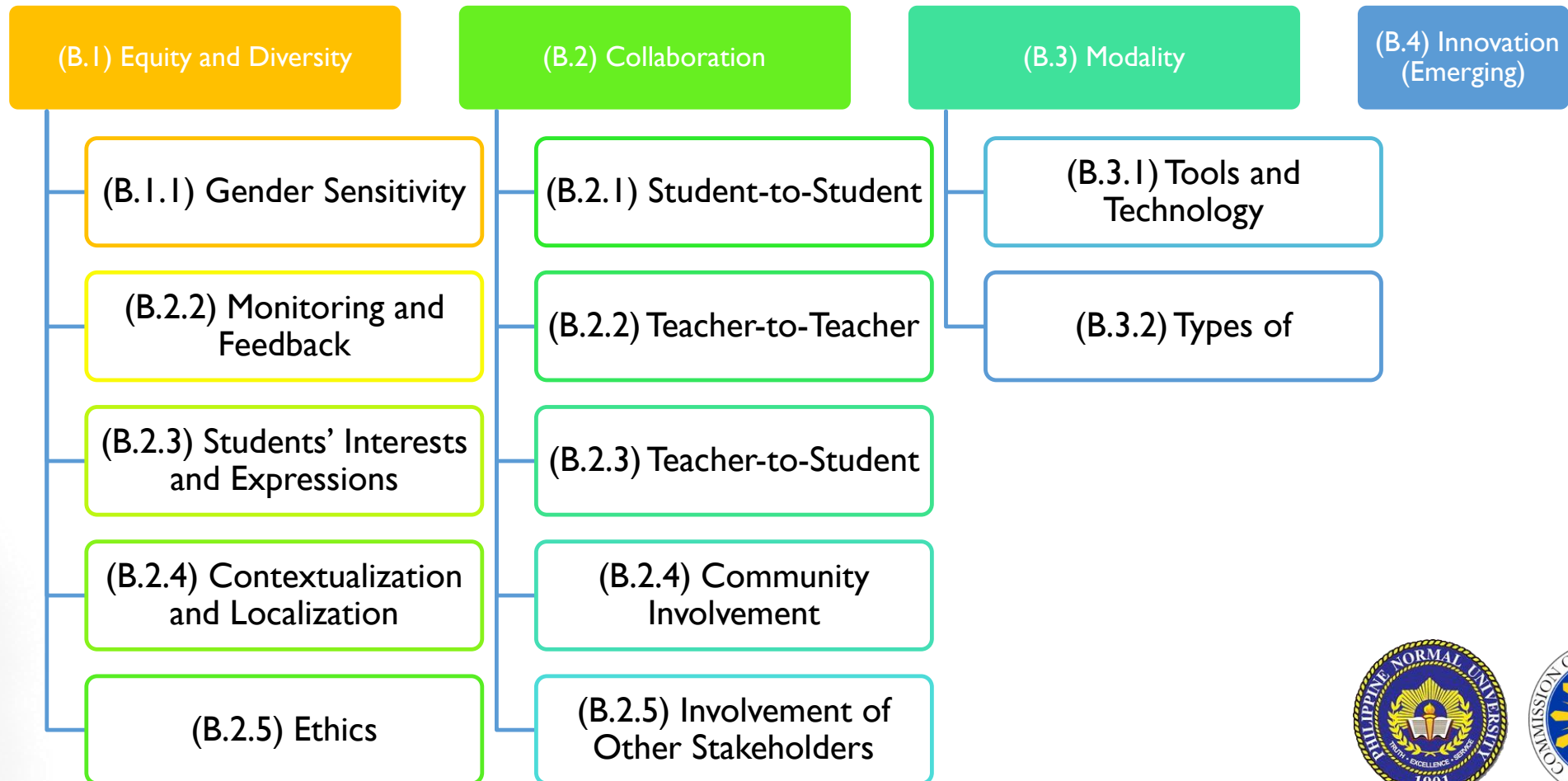
(A.2) SUSTAINABILITY: Efforts exerted to secure, maintain, and improve the quality of the STEAM assessment process.

- **(A.2.1) Quality Assurance:** The verification procedures implemented whether internally or externally that ensures that the desired level of quality in the assessment process is met.

- **(A.2.2) Research Undertakings:** The different research initiatives that aims to oversee and improve the assessment process.

- **(A.2.3) Policies and Programs:** The system of principles implemented by the institution as a procedure or protocol that guides the STEAM assessment process.

(B) DRIVERS OF STEAM ASSESSMENT

(B.1) Equity and Diversity

- (B.1.1) Gender Sensitivity
- (B.2.2) Monitoring and Feedback
- (B.2.3) Students' Interests and Expressions
- (B.2.4) Contextualization and Localization
- (B.2.5) Ethics

(B.2) Collaboration

- (B.2.1) Student-to-Student
- (B.2.2) Teacher-to-Teacher
- (B.2.3) Teacher-to-Student
- (B.2.4) Community Involvement
- (B.2.5) Involvement of Other Stakeholders

(B.3) Modality

- (B.3.1) Tools and Technology
- (B.3.2) Types of

(B.4) Innovation (Emerging)

(B.1) EQUITY AND DIVERSITY: Ensuring inclusion of all learners and making certain that each student has a fair and equal opportunity during assessment process.

- **(B.1.1) Gender Sensitivity:** Understanding and taking into account gender equality in the assessment process.

- **(B.1.2) Monitoring and Feedback:** Practices in checking the result, progress, and quality of the assessment and providing constructive information for improvement.

(B.1) EQUITY AND DIVERSITY (Cont.)

- **(B.1.3) Student Interests and Expressions:** Considerations in observing the behavior, expressions, and response of students that might affect the assessment process.

- **(B.1.4) Contextualization and Localization:** Factors undertaken in placing and adjusting the assessment process to accommodate the context and locale of the students

- **(B.1.5) Ethics:** Moral principles that governs the assessment process

(B.2) COLLABORATION: Dynamics that exist between the various key players in the assessment process

- **(B.2.1) Student-to-Student**
- **(B.2.2) Teacher-to-Teacher**
- **(B.2.3) Teacher-to-Student**
- **(B.2.4) Community Involvement**
- **(B.2.5) Involvement of Other Stakeholders**

(B.3) MODALITY: Describes the variety of tools used and methods applied in the assessment process

- **(B.3.1) Tools and Technology:** Various technological tools used in each dimension of the assessment process

- **(B.3.2) Types of Assessment:** Different assessment tools or methods used in STEAM for various purposes

(B.4) INNOVATION (Emerging): The incorporation of creativity and problem solving skills in utilizing and maximizing resources in the STEAM learning-teaching discourse
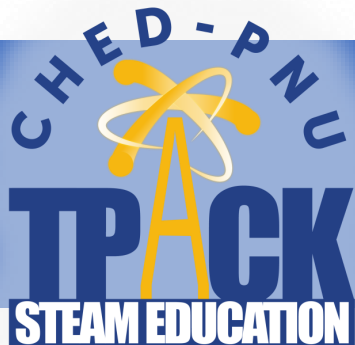
PROCESS OF STEAM ASSESSMENT

(C) PROCESS OF STEAM ASSESSMENT

- **(C.1) Planning and Preparation:** Practices and guidelines observed during the preparation for the assessment process

- **(C.2) Implementation:** Practices during the actual execution of the assessment process

- **(C.3) Rating:** Processes of marking students' performance, outputs and tests, as well as, manner of analyzing the results
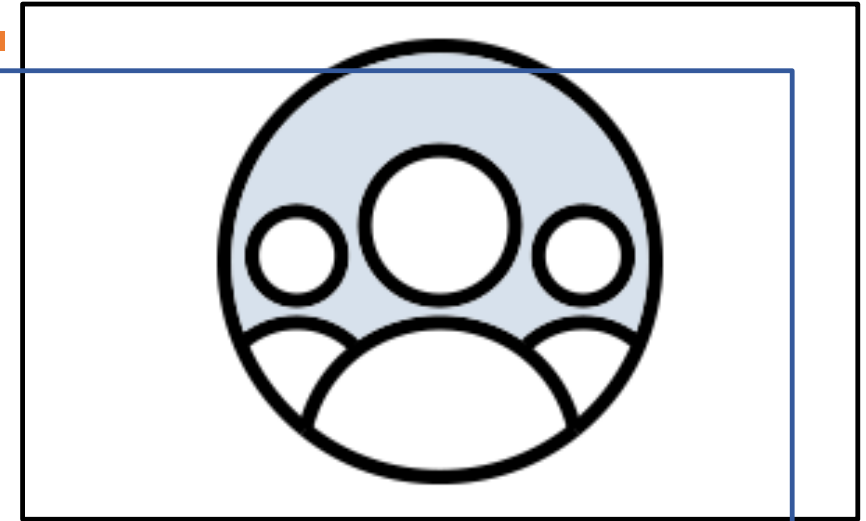
(C) PROCESS OF STEAM ASSESSMENT (Cont.)

- **(C.4) Reporting:** Communicating the results of the assessment process to target clientele

- **(C.5) Reflection:** Impressions and actions considered after the analysis of the results of the assessment process
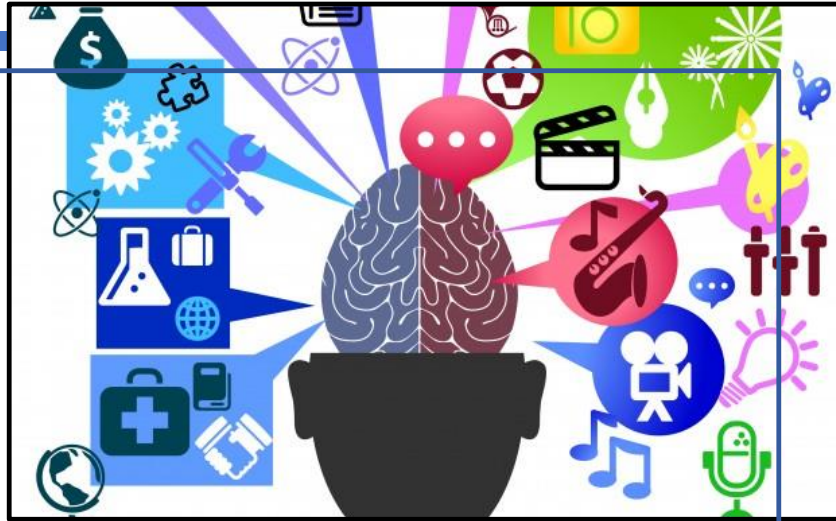
(D.1) Critical Thinker / 21st Century Skilled (Emerging)

(D.2) Productive Citizen

(D.3) Innovative STEAM Learner/Professional

(D) STEAM OUTCOMES

Assessment, Monitoring Learning and Feedback System

- **Beginner:** They possess knowledge of the use of assessment strategies, monitoring and evaluation, and feedback system consistent with the curriculum requirement.

- **Proficient:** They exhibit effective use of assessment strategies, monitoring and evaluation, and feedback system consistent with the curriculum requirement; They manifest capability of using assessment data to address challenges in implementing effective teaching and learning practices

Assessment, Monitoring Learning and Feedback System (Cont.)

- **Highly Proficient:** They participate and cooperate in a collective, complete, and sensible planning, selecting, implementing and monitoring assessment and evaluation of student learning, feedback system and designing of assessment-based programs and plan of actions for better progress in student learning.

- **Distinguished:** They model, exemplify, and mentor planning, selecting, implementing and monitoring assessment and evaluation of student learning, feedback system and designing of assessment-based programs and plan of actions for better progress in student learning.

Assessment is today's means of modifying tomorrow's instruction.

Carol Ann Tomlinson