



ASSESSMENT PRACTICES OF CHEMISTRY TEACHERS IN THE NEW NORMAL IN THE  
VISAYAS, PHILIPPINES

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**Abstract**

This study aimed to investigate the assessment practices of Chemistry teachers in the Visayas region of the Philippines, specifically in the new normal brought about by the pandemic. The research design utilized a qualitative approach, specifically narrative inquiry, to gather unique perspectives from 20 Chemistry teachers from public and private schools in the region. A semi-structured interview guide was used to collect data, and thematic analysis was applied systematically to analyze the data. The findings revealed that Chemistry teachers use pen-and-paper, performance-based, and computer-based assessments, with considerations given to alignment with curriculum standards, feasibility, and students' levels and capabilities in learning. However, challenges such as learners' behavior and cognition, school settings, and the assessment were also identified. Initiatives in classroom assessment were also identified, such as learning-teaching synergy, content delivery, and academic engagement. The impacts of assessment practices were enhanced self-esteem, low self-efficacy, and valuable information about students' learning. Overall, this study contributes to understanding the assessment practices used by Chemistry teachers in the new normal and the challenges and initiatives that come with it. The study highlights the importance of carefully designing, implementing and evaluating assessment practices to promote students' performance and achievement and create a quality curriculum. It also serves as an initial undertaking toward improving Chemistry education in the Visayas region.

**Keywords:** assessment, Chemistry teachers, new normal

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**DOI:10.48047/ecb/2023.12.7.147**

## 1. Introduction

Assessment literacy is essential for teachers to get the most out of an assessment, better instruction, and more effective responses to students' learning requirements (Pastore & Andrade, 2019). The Philippine Professional Standards for Teachers (PPST), which include a domain devoted to Assessment and Reporting (Department of Education-Teacher Education Council, 2017), specify what constitutes a high-quality teacher in the Philippine educational system. Science teachers can learn whether or not their students can effectively use their knowledge, skills, and resources to accomplish worthwhile goals by using authentic and meaningful assessment activities. Assessments in the classroom that are interwoven with the development of the learning content can aid students in reflecting on and demonstrating their thinking while also enabling teachers to spot any potential problem areas (Opataye & Erwim, 2022; National Academy of Sciences, 2023).

Learning assessment is essential for policymakers to gauge educational success, assess national educational systems, and track advancement toward Sustainable Development Goal 4. The Philippines has, however, regularly performed poorly on national and international exams like the Programme for International Student Assessment and Trends in Mathematics and Science Study (TIMSS & PIRLS, 2021). The Sulong Edukalidad program, which the Department of Education started, intends to enhance the K–12 curriculum, learning environments, teacher and school leader abilities, and stakeholder participation (Dela Cruz, 2019).

The COVID-19 epidemic has posed educational difficulties, necessitating considerable changes in teacher instructional methods (Boholano et al., 2021; Tria, 2020). To counteract the demands of unpredictability, however, creativity has emerged as a crucial tool for instructors (Lansangan, 2020). In order to adapt to shifting conditions, Lansangan's study on teaching junior high school chemistry during the pandemic emphasizes the significance of reinventing teachers' identities and practices. Although the pandemic has disrupted schooling, it has also allowed teachers to experiment with new approaches to teaching and learning.

In conclusion, improving student learning outcomes requires assessment literacy, meaningful and genuine assessments, and integration with content growth. Data on educational accomplishments and areas for development, such as in the case of the Philippines, are provided by national and international assessments to policymakers. Although the COVID-19 pandemic has posed substantial obstacles to education, it has allowed teachers to experiment with cutting-edge teaching techniques. The Sulong Edukalidad initiative seeks to address the country's educational issues and raise educational standards.

Overall, this study can contribute to a better

knowledge of the assessment techniques used by Chemistry teachers in the Visayas, Philippines, as part of the new normal and how the pandemic has impacted those practices. The study can also add to the body of knowledge on assessment literacy and offer guidance to chemistry teachers on enhancing their assessment procedures to better meet their students' educational goals. Policymakers and other stakeholders in education can use the study's findings to help further enhance the nation's educational system, especially in light of the new normal.

## Literature Review

The disruption brought on by the COVID-19 epidemic has made assessment processes in chemistry an even bigger issue for teachers. Different assessment techniques, including community-developed exams, concept inventories, and three-dimensional assessments, have been suggested and put into use to gauge student learning in chemistry. The Next Generation Standards (NGSS) and the Framework for K–12 Science Education have developed practices describing how well students do in science and engineering. Additionally, a number of studies have recommended using optimal assessment strategies, such as practical work activities, concept mapping, and context-based testing, to gauge learners' achievement in Chemistry. Alternative assessments, such as group projects and online tests, have been researched and developed to replace in-person exams in the new standard for measuring chemistry learning.

Teachers must consider the subject to be assessed, how to design assessment items, and their pedagogical content expertise to create tests that best elicit student understanding of the issue. According to Schafer et al. (2020), several aspiring and working instructors chose assessment tasks or assessed a task's capacity to measure student understanding based on their familiarity with pedagogy, students, material, assessment, and curriculum. However, as numerous studies have shown, putting these recommendations into reality is complicated. Therefore, Chemistry teachers must thoroughly understand their current assessment techniques to enhance their ability to assess student knowledge and the effectiveness of learning activities.

Distance learning modalities have impacted lab work, a crucial part of studying chemistry. To maintain laboratory experience despite the pandemic, various online tools and computer-based labs have been used, including MLabs, VLCS, SPVEs, and other such labs. Additionally, split laboratory classes, also known as split-half labs, have increased student engagement and initiative while maintaining safe distance standards (D'Angelo, 2020; Morales-Cruz et al., 2021; Sanchez et al., 2021; Wijenayaka & Iqbal, 2021).

As a clincher, assessment of student learning presents difficulties for chemistry teachers in the Visayas, Philippines, under the new normal. Alternative evaluation methods and various assessment techniques have been investigated to overcome this difficulty. To increase their ability to assess students' understanding

and judge the effectiveness of learning activities, chemistry teachers must fully understand their current assessment practices.

## 2. Research Methodology

### Research Design, Environment, and Participants

This study utilized qualitative research design, specifically narrative inquiry, to uncover teachers' unique perspectives and develop a deeper understanding of the assessment practices implemented in the new normal. Narrative research or inquiry is a recent qualitative methodology based on two key components: the participants' narrative of a specific experience and the exploration of the meaning present in the participants' account (Ntinda, 2018). This approach allowed the researchers to interact with and gather firsthand information from the respondents to make sense of their assessment practices, considerations, and motivations in assessing chemistry learning in the new normal.

The study was conducted in public and private schools in the Visayas region. The significance of these schools is their potential to offer valuable insights into the assessment practices of secondary education in the respective regions. The presence of both private and public schools enables a more comprehensive evaluation of the education system in these areas.

The study's participants comprised 20 Chemistry teachers from different public and private schools in the Visayas. All of these participants were selected through a purposive sampling technique. This sampling method is conducted where each participant possesses the set criteria to become part of the study. The respondents were chosen based on the given criteria: (a) Teachers teaching in secondary schools; (b) Teachers specializing in chemistry/science; and (c) Teachers teaching chemistry for at least two years during the pandemic. Among 15 chemistry teachers, 13 of them were females, and two of them were males. Their ages ranged from 23-42.

### Research Instruments

The researchers were the primary instruments in this qualitative study. They utilized a semi-structured interview guide to determine the impact of assessment practices of chemistry teachers in the new normal. The interview guide has three parts and was patterned in the study conducted by Benette et al. (2017), Mochama (2018), and Dayagbil et al. (2021).

### Data Gathering and Analysis

The data were collected using the following steps. A transmittal letter will be sent to the School Director/School Academic Administrator through the Basic Education Principal in the private

schools and to the School Principal in the public schools requesting permission to conduct the research and interview the respondents. Upon approval, the researchers explained the study's background to the respondents. They were also given a consent form. The consent form outlined the study's objectives, data collection process, subject participation, confidentiality, withdrawal, and contact information of the researchers.

If they agreed to participate in this study, they were asked to answer questions related to the topic and given a copy of the questionnaire ahead of time so they could prepare for the topics. The in-person interviews took approximately 30-50 minutes and were audiotaped. Afterward, the interviews were transcribed. The participants were assured that all data gathered in the interview were kept confidential and that the results were only used for academic purposes. All respondents' personal information was also protected and not shared.

Thematic analysis was mostly used for the analysis of qualitative data. This study adapted Braun and Clarke's framework and applied it systematically to describe and explain the analysis process. Braun and Clark (2017) describe it with six phases for analysis. These are the following: (1) Familiarizing with the data, (2) Generating initial codes, (3) Searching for themes, (4) Reviewing themes, (5) Defining and naming themes, and (6) Producing the report.

## 3. Results and Discussion

### Assessment Practices in Chemistry

**Pen-and-Paper Assessments.** Pen-and-paper testing is a popular technique for grading Chemistry students since it is less expensive and more effective than digital exams and may be utilized with students of different developmental stages. Additionally, multiple-choice exams are suitable for evaluating higher-level cognitive abilities. Although some instructors view it as a last resort, some students could take it for granted.

*"Sometimes, although it is only applicable for a few, there are learners who are not serious in answering the test. You will see them very lax, and the test is just taken for granted."* (P10)

According to a study in Bangladesh, Nepal, and Sri Lanka (Asian Development Bank, 2017), teachers frequently use pen-and-paper assessments for learning, practice, quizzes, and unit tests. However, according to a study by Mu'azu et al. (2020), where students find it helpful for expressing themselves, reading more, and understanding context, but also poses favorable conditions for cheating, their reliance on traditional assessment methods highlights the need for innovative assessment practices.

**Performance-based Assessments.** Science process skills (SPS), the capacity for addressing scientific problems, communication abilities, and scientific interest are all improved through practical science

(Deta et al., 2019; Shana & Abulibdeh, 2020). Project assignments are helpful for teamwork and autonomous learning, but they can be constrained by a lack of resources, inadequate supervision, and a lack of SPS proficiency (Rusmini et al., 2021).

*"The activities in the module are ensured to be doable at home, but there are complex activities which the learners are having difficulty understanding. Sometimes, we do not know if they can make it individually without supervision since not all parents can accommodate and spend time watching their kids doing the activity. Some of them [learners] will skip the activity despite it being required because, one, they do not understand how to do the activity and [two], they do not have the materials even though they are instructed to be creative and resourceful."* (P1)

Performance-based evaluation using practical exercises improves learning retention despite obstacles like Internet connectivity (Rusmini et al., 2021) and fosters students' creativity, curiosity, knowledge, and problem-solving skills. Contextualized science materials and home-based experiments can make performance-based assessments doable at home (Rivera & Sanchez, 2020; Sanchez et al., 2021; Picardal & Sanchez, 2022).

**Computer-based Assessments.** Computer-based examinations are increasingly being used to gauge competency. Lab simulations' simplicity and safety, as well as the capacity to administer online quizzes via Google Form, which can encourage cheating, are all benefits of computer-based assessments.

*"Because if you want to implement a laboratory activity, but the materials are unavailable, you will not proceed. So, that is why we resort to dry laboratory activities such as simulations instead of doing it [the actual activity] in the laboratory."* (P12)

CBA is so well-liked because it offers ease regarding time, place, exam variance, and feedback, promoting better focus and teaching with multimedia resources. However, the disadvantages of CBA include its high cost and inapplicability to some types of assessments (Debusse & Lawley, 2016; Erduran et al., 2020; Su & Cheng, 2019).

### **Considerations of Secondary Chemistry Teachers in the Implementation of the Assessment Practices**

**Alignment to Curriculum Standards.** A well-designed curriculum that adheres to current standards is essential for reliable assessment tools that test students' knowledge, skills, and talents. To enable teachers to acquire data about the areas of the curriculum that pupils are engaged with, chemistry assessments must be matched with content and grade-specific standards. As they aid

students in concentrating their learning efforts and guide testing and evaluation procedures, learning objectives clearly articulated in assessments are important and emphasized.

*"Learning objectives were used as a guide because we cannot just give a quiz we did not analyze if it is correct, right? Is this valid? Is this reliable? It will be useless and a waste of time."* (P10)

Participants underlined the importance of chemistry assessments' validity and reliability in achieving desired learning outcomes, ensuring the tools and methods utilized for evaluation are appropriate for their intended application, and enabling instructors to assess student performance using objective grading standards. (Schafer et al., 2020; Munna et al., 2021).

**Feasibility of the Assessment.** An assessment's practicality in terms of time, resources, and administration is referred to as its simplicity in design and application. Educators must place practicality over specific assessment requirements to ensure that the tests can be given and scored quickly, fairly, and readily. Considering available resources, class size, and time limits, teachers should ensure that the assessments are attainable and measurable.

*"The class size which the given assessment could be attainable to accomplish the task with their population and the locality of their sectioning because, in our area, we based it per barangay when distributing module. Then, when they are to be grouped, whenever I provide them with group activities, whoever sits in proximity to the learner will be grouped. Also, the maximum number of groups is 5, and the minimum is 3."* (P9)

When designing a workable exam, Kadir et al. (2019) stressed the significance of taking time, money, and administrative concerns into account. They also provided clear instructions and a scoring system.

**Students' Levels and Capability in Learning.** According to Braskamp & Engberg (2014), a good assessment should have a precise aim, involve stakeholders, and require teachers to know the materials and techniques they will employ to evaluate pupils. Along with considering their various levels and learning styles, teachers should also consider the students' readiness for the exam.

*"I must ensure they are prepared before giving the assessments. And then also I have to make sure that the skills they need to learn for this topic are reached before I give them these assessment practices."* (P3)

By providing a choice of evaluation techniques appropriate for different types of students, instructors may assist each student's learning and respond to their requirements. Driana et al. (2021) underlined the significance of establishing assessment tools that test higher-order thinking skills and diversity questions based on students' ability levels to ensure that all students achieve the minimum competency criterion.

### Challenges Faced by Chemistry Teachers

**Learner's Behavior and Cognition.** Due to their student's behavior and cognitive level, chemistry professors need help evaluating their students' learning. Participants in a study noted that the main hurdles to their assessment techniques included students' behavior, attitude toward the subject, diversity of learning styles, and intellect level. Along with managing the classroom population, teachers must also deal with students who need to be proficient in the fundamentals.

*"For me, the challenges that I have encountered in implementing these assessment practices is how to manage my students in the classroom, how they answer the assessment, and how they really understand the instruction given to them and also it is a challenge for me because I have many students, so I cannot cater them one by one."* (P6)

Additionally, a learner's conduct and cognition significantly impact how much they learn. According to Kirkpatrick (2019), low test scores in a particular academic subject may indicate conduct problems in class. Prior knowledge and learning experiences are also essential in determining whether or not learning is facilitated.

**School Setting.** Chemistry professors confront difficulties from both students and the school environment. Class size, the lab environment, the school climate, time limits, and the availability of resources were all mentioned by study participants as difficulties in administering evaluations.

*"For me, the challenge is time constraints in preparing assessment tools. It would eat so much time in the construction. Then, students cannot finish the assessment even when you designed the questions for their level that can be answered within 1-2 minutes. At times, they really cannot finish it on time. Another is the availability of resources, as I mentioned, and then the location of the classroom."* (P12)

These difficulties are not specific to their school but are also present at many other establishments. Ayeni and Olowe (2016) discovered that big class numbers result in lousy classroom management, ineffective student control, poor planning, and poor evaluation, while Wang and Calvano's study from 2022 indicated that students perceive lower levels of teacher interaction and satisfaction in more extensive courses. Maffea (2020) emphasized the fact that a shortage of resources in the classroom can be upsetting for both students and teachers and limit their ability to learn.

**The Assessment Itself.** As meaningful assessments are crucial to the success of the teaching and learning process, they provide a difficult task for teachers. In this study, the teachers stated their skepticism over the validity and conformity of their exams to the standards,

the lengthy time required to create them, and the propensity of students to turn to websites for assistance.

*"Well, the challenges that I encountered is if my assessments could really [be] answered by students if the assessment would cater to all multiple intelligences of my students, and if my assessment aligns with MELC of the DepEd."* (P5)

Mufidah et al. (2021) state that teaching experience and training significantly impact teachers' performance. As a result, it is crucial to raise the caliber of teachers through workshops, seminars, and training programs. In general, time management, a lack of assessment training, crammed classrooms, and guaranteeing the psychometric features of assessment instruments are the main obstacles teachers encounter while administering assessments, according to Hussain et al. (2019).

### Initiatives of Chemistry Teachers in Classroom Assessment

**Learning-Teaching Synergy.** By constantly considering how their students learn and utilizing this knowledge to make educated judgments regarding instructional strategies, teachers who adopt a student-focused approach to teaching and learning develop a learning-teaching synergy. To better appreciate the connection between their students' learning experiences and the teaching strategies used, they must first become learners of learning itself. To accurately measure student learning, it is essential to experiment with various assessment methods. This synergy also enables teachers to modify their pedagogical strategies.

*"Information about student learning can be assessed through their homework/assignments, quizzes, exams, hands-on problem-solving in the field of calculations to measure their performance and level of understanding."* (P4)

This paradigm, which shows the dynamic interplay between assessment and learning processes for instructors and students, highlights the value of CA and covers the complete range of goals, from planning to evidence summing. Chen and Bonner (2020).

**Content Delivery.** The shift to online teaching due to the COVID-19 pandemic has posed challenges for educators in creating practical online lessons quickly. Hew et al. (2020) suggest using cloud-based video conferencing apps to support the transition to fully online classes.

*"...as much as we have modules and we have tried our best to make the modules as easiest possible, and we have conducted virtual classes."* (P20)

Online pre-class work and virtual meetings can be used instead of in-person classes. Meanwhile, social media has become a popular tool to promote collaboration, knowledge sharing, and communication in classroom assessment, as

highlighted by Bosman and Zagenczyk (2011).

**Academic Engagement.** To ensure students' success, it is imperative to comprehend the variables that affect academic engagement. Cognitive, metacognitive, affective, social, task-related, communicative, and language-related aspects can all be included in this list, and they interact with one another.

*"It is also necessary to implement differentiated instruction activities to cater to students' learning styles and hone their skills, knowledge, scientific literacy, and attitude. Moreover, from research studies it is reported that hands-on activities significantly improve the students' learning retention and academic performance."* (P13)

Alonso-Tapia et al. (2022) emphasize the importance of figuring out how learning settings and their connections to potential moderator variables like motivation, self-efficacy, emotion self-regulation, and stress affect engagement and its modalities. This information is provided through classroom assessment activities, encouraging student participation in class and academic performance.

#### **Impact of Assessment Practices on Students' Learning**

**Enhanced Self-Esteem.** Academic attainment, motivating beliefs, classroom teaching activities, and student's ability to regulate their emotions can all be strongly impacted by the assessment techniques teachers use in the classroom. An individual's self-esteem can be boosted by constructive criticism, and monitoring progress through assessments can have a positive impact (Acar-Erdol & Yldzl, 2018). The feedback that is situational, immediate, and nonjudgmental is essential to boost motivation and concentrate on students' key themes. Regular self-evaluation and explicit performance standards can also encourage pupils to perform better and help the growth of their self-esteem.

*"The positive impacts are (1) improved students' motivation. Of course, if their scores are high, the more that they get motivated to do their best because they discover they are good and they know. Another is improved attainment and achievement. It inspires the students, especially if feedback is timely given to them. And then improve students' confidence. Some students are shy to answer, stand, and express themselves. However, I found out that some students were encouraged to speak and voice their ideas with the assessment I used. So their confidence and cooperation, and teamwork are developed, especially in group activities. It encourages teamwork and collaboration within the students."* (P10)

To raise students' self-esteem and academic achievement, teachers must offer helpful feedback

and chances for self-evaluation.

**Low Self-Efficacy.** Regular grade-based examinations, particularly for low-achieving students, can negatively affect students' motivation for learning and self-esteem.

*"On the other hand, it is negative because they are already burdened. They seem burned out since they have too many to comply with. As I said, we are required to give them weekly assessments. Moreover, how many subjects every week ask for outputs due for the same week?"* (P9)

According to Dweck (2001, as referenced in Muho & Taraj, 2022), assessments that place a single emphasis on grades might leave pupils feeling despondent. Arekkuzhiyil (2021) again underlines how educational testing may be socially harmful because it can label a child, harm their self-esteem, and demotivate them. According to chemistry teachers, some assessment procedures also lower pupils' self-efficacy.

#### **Valuable Information about Students' Learning.**

The importance of assessment in education is seen in how it affects students' learning experiences. According to McMillan (2015), referenced in Acar-Erdol & Yldzl (2018), it gives teachers the precise information they need to make wise decisions about their lesson plans. It inspires students to participate in the learning process. Students can focus on areas that require improvement by using assessments to determine their strengths and weaknesses, and teachers can adapt their lesson plans based on the learning preferences of their pupils.

*"It allows you to measure or track students' progress and then potentially improve your instruction as necessary."* (P11)

However, tests may not correctly reflect student development if they are not used effectively (Acar-Erdol & Yldzl, 2018). The assessment also fosters accountability and transparency in the educational system by making teachers accountable for their instructional strategies and strongly emphasizing high academic standards.

#### **4. Conclusion and Recommendations**

There is no doubt that assessment practices by chemistry teachers have a considerable impact on students' learning. Therefore, assessment practices must be carefully designed, implemented, and evaluated so that the performance and achievement of the students are promoted and a quality curriculum is brought out. However, chemistry teachers need help because they need a well-established process for planning, designing, and evaluating their assessment practices to improve their teaching-learning experience and, eventually, the student's performance. This study serves as an initial undertaking of this approach to chemistry education.

It is advised that Chemistry teachers in the Visayas

region of the Philippines investigate and include different evaluation approaches in their teaching practices in light of the study's findings and recommendations. They should consider the practicability, student learning capacity, and alignment of the assessment techniques to the curriculum requirements. They should also consider the difficulties they might experience in putting the assessment techniques into effect, such as the behavior and cognition of the students, the educational environment, and the assessment itself. By implementing activities that support content delivery, learning-teaching synergy, and academic engagement, teachers can overcome these difficulties. Chemistry professors can raise students' self-esteem and self-efficacy while giving them helpful feedback on their learning through enhancing assessment procedures. Overall, this study can help Chemistry teachers create a well-defined strategy for organizing, creating, and analyzing their assessment procedures to enhance their students' teaching-learning process and performance.

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