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Self-Perceived Assessment Skills and Professional Learning Priorities of Filipino Secondary Science Teachers in Flexible Instruction Delivery

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ABSTRACT

As a context-dependent process, the role of assessment in the practice of flexible instruction delivery during the onslaught of the COVID-19 pandemic paved the way to rethink teachers' assessment practices that respond to the demands of the context. This further forced teachers to capacitate themselves with the new platforms for assessing students' learning and engagement. This quantitative descriptive study utilizing a multidimensional surveys aimed to delineate 513 Filipino science teachers' perceived assessment skills and professional learning priorities and preferences in the areas of assessment in flexible instruction delivery during the onslaught of the COVID-19 pandemic. Results uncovered that they generally perceived themselves as proficient in all the surveyed assessment skills and responsibilities, having the foundation of assessment dealing with the traditional nature of assessment strategies and their purposes, as the area in which they are more skilled. Regarding professional learning priorities on assessment, they deduced moderate interest in integrating and communicating assessment practices and aligning current assessment theories, principles, and practices. This further implies that they pay interest not only in learning the contemporary approaches to assessment but still the traditional tasks and responsibilities associated with it. In the delivery of professional learning activities, professional development activities in person are still the most preferred mode.

RESUMO

Enquanto processo dependente do contexto, o papel da avaliação na prática de ensino flexível durante o ataque da pandemia da COVID-19 abriu caminho para repensar as práticas de avaliação dos professores que respondam às exigências do contexto. Isto forçou ainda mais os professores a capacitarem-se com as novas plataformas para avaliar a aprendizagem e o envolvimento dos alunos. Este estudo descritivo quantitativo utilizando pesquisas multidimensionais teve como objetivo delinear as habilidades de avaliação percebidas de 513 professores de ciências filipinos e as prioridades e preferências de aprendizagem profissional nas áreas de avaliação na entrega flexível de instrução durante o ataque da pandemia de COVID-19. Os resultados revelaram que eles geralmente se percebiam como proficientes em todas as competências e responsabilidades de avaliação pesquisadas, tendo a base da avaliação lidando com a natureza tradicional das estratégias de avaliação e seus propósitos, como a área em que são mais qualificados. Em relação às prioridades de aprendizagem profissional em avaliação, deduziram um interesse moderado em integrar e comunicar práticas de avaliação e alinhar teorias, princípios e práticas de avaliação atuais. Isto implica ainda que eles tenham interesse não só em aprender as abordagens contemporâneas da avaliação, mas também as tarefas e responsabilidades tradicionais a ela associadas. Na realização de atividades de aprendizagem profissional, as atividades de desenvolvimento profissional presenciais ainda são a modalidade preferida.

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Introduction

The COVID-19 pandemic opens various crisis-driven opportunities in the face of educational delivery. It changed the demands of the existing curriculum, which requires a flexible mode in the delivery of instruction to facilitate the continuity of the learning process. These entirely new scenarios in the teaching and learning space have many implications for assessing students' learning, which not all teachers are used to. As learners transition to the remote platforms of learning, a greater need for flexibility, understanding, and compassion to engage was deemed crucial during the health crisis (Hsu et al., 2021). Hence, educators need to consider alternative mechanisms to assess learners' performance, considering the issues raised on the validity and reliability of high-stakes tests (Tuah & Naing, 2021) and academic integrity (Gamage et al., 2020).

Torrance and Pryor (2011) framed assessment as a sociocultural endeavor in which its practices transpire in a social context and are influenced by existing policies, curriculum expectations, pedagogical directions, and communal expectations. The pandemic and flexible instruction delivery as the context connote a new perspective on how assessment should be facilitated to serve its purpose. That learning continuity must not be compromised. Crucial roles lie on the shoulders of the teachers in adapting their assessment practices to these contexts.

As a multifaceted process, teachers' assessment practice requires specific competencies and skills (Koloi-Keakitse, 2017). They control the environment in which classroom assessment is being done, such as how they assess students, the occurrence of their execution of assessments, and how they give feedback to learners. Therefore, teachers must become competent in performing their classroom assessment practices. As cited in Koloi-Keaikitse's (2017) work, teachers' competencies and skills in classroom assessment practices remain critical. They need to be competent in diagnosing the unique needs of students, motivating them, and monitoring instructional effectiveness through assessments (Ohlsen, 2007).

In the Philippines, the absence of precedent in facing disruptions like the COVID-19 pandemic has shaken the educational delivery on how assessment should be done, especially in maintaining its reliability and validity (Gonzales, 2023). In response, the Department of Education released interim guidelines for assessment and grading as part of the learning continuity plan during the pandemic. De Vera et al. (2023) and Lansangan and Orleans (2023) explored the assessment experiences of Filipino science teachers during the pandemic, and it uncovered recalibration on their assessment obligations, expected outcomes in assessing learners, obstacles hindering assessment practices, and opportunities brought by the new platform of assessing learning. These experiences in assessing learning vary depending on the modalities employed, such as modular distance learning (Chan et al., 2021), online learning (Lansangan, 2020; Chavez et al., 2023), and radio-based instruction (Teves, 2024).

Teachers must clearly understand their perceived assessment skills based on the changing context of classroom assessment practices. It opens opportunities for policy formulation and practice to address their needs as they struggle with their day-to-day classroom assessment engagements. Wolfe et al. (2007) proposed this self-perceived competence as a vital element in the professional development of teachers. Zhang and Burry-Stock (2003) affirmed that assessment practices and skills are two entities. The former pertains to the activities, while the latter reflects the perception of those activities. Darling-Hammond et al. (2017), as cited by Koloi-Keaikitse (2017), supported this need as it can serve as a barometer of teaching efficacy, which can help improve their motivation to teach. For instance, gathering this information about teachers' assessment profiles is vital to account for their capabilities and inadequacies, which institutions can use in conducting professional development to improve teachers' assessment competencies.

The professional development of teachers is believed to contribute to improving their knowledge and teaching practices, which cascade to better and improved student learning (Darling-Hammond et al., 2017). Indeed, practical and ongoing professional capacity-building endeavors equip teachers with the content and skills necessary to raise students' learning outcomes (Powell & Bodur, 2016). It is described as an ongoing commitment among educators to sustain and heighten their professional expertise and continually update and retool it based on the demands of the context. It is a crucial part of any educational system, mainly if it aims to develop the knowledge and skills of teachers in the assessment tasks that transcend to the development of the learners' creativity or personal growth towards competence (Lingam & Lingam, 2016). Livingstone and Hutchinson (2017) are of the idea that the very essence of being an assessment-literate teacher is being able to comprehend the content to be learned professionally, the mechanism of how students learn, strategies to promote and support that learning, and appropriate strategies to gather evidence of learning, and how to interpret these evidence for better learning. In doing so, building the capacities of teachers is not just confined to instructional duties such as assessment tasks and responsibilities but also their full understanding of its impact on other aspects of educational processes, such as the social, cultural, and professional dimensions of the context in which they work.

In the context of flexible instruction delivery brought about by disruptions like the pandemic in the Philippines, Chavez and Lamorinas (2023) affirm that there is a need for skill development in distance learning, which calls for teachers to integrate it into skill assessment strategies. In addition, a sustainable structure is also needed to address the perceived challenges of the teachers (Gonzales, 2023). Ancho and Arrieta (2021) describe teacher professional development as a melting pot of best practices and strategies that work. Through this, it helps them create their professional vision.

With the aforementioned theoretical framings, this study purported to determine the self-perceived assessment skills and professional assessment learning priorities and preferences of science teachers in light of the practice of flexible instruction delivery during the COVID-19 pandemic. Specifically, this paper describes teachers' self-assessment skills in the áreas of foundation, quality, and use of assessment. In contrast, professional assessment learning priorities and preferences regarding teachers' skills in integrating and communicating assessment practices and alignment with current assessment theories, principles, and practices were explored. This further aims to highlight which areas need to be considered in supporting teachers' assessment practices through the lens of flexible instruction delivery and pave the way for policy formulation contextualized to the study setting.

Methods

Participants and Locale

This descriptive study involved 513 science teachers in Metro Manila who are handling science subjects in Junior High Schools and practicing flexible instruction delivery during the investigation. The pool of respondents consisted of 22.03% male and 77.97% female.

Instrumentations

The quantitative measure of science teachers' self-perceived assessment skills and professional assessment learning priorities and preferences were surveyed using the multidimensional instruments developed by DeLuca et al. (2016). The instruments were designed to delineate teachers' assessment practices within accountability-driven educational systems and to reflect the current transformations in the assessment landscape in contemporary contexts (De Luca et al., 2016).

The instrument on science teachers' self-perceived skills in classroom assessment consists of 26 items representing contemporary assessment tasks and responsibilities. Teachers were asked to self-assess their perceived skills related to each task/responsibility using a five-point scale (1 = novice, 2 = beginner, 3 = proficient, 4 = competent, and 5 = expert). This instrument articulates the three domains of classroom assessment practice: foundations, quality, and use. On the other hand, science teachers' professional learning priorities and preferences in classroom assessment consisted of two parts. In the first part, teachers were asked to prioritize their interest in learning about identified aspects of classroom assessment using a five-point scale (1 = very low interest; 5 = very high interest). Items on this instrument are divided into two subscales: integrating and communicating assessment practices and alignment with current assessment theory, principles, and practice. In the second part, teachers were presented with common professional learning modes and asked to indicate their preferred modes of professional learning using a five-point scale (1 = not preferred; 5 = highly preferred).

Before the actual use of the tool, permission from the original proponent of the questionnaire was sought. The survey instrument underwent content validation and pilot testing to fine-tune the context. Content validation was done using the provided validation checklist, where five experts and five science teachers in the field were invited to scrutinize the instrument's content. This included the aspects of content and face validity of the instrument in the tool's written and digital versions. In terms of accounting for the reliability of the instruments, confirmatory factor analysis and Cronbach's alpha coefficients of the different dimensions of the instrument were obtained. For the subdimensions of self-perceived assessment skills, a Cronbach alpha coefficient of 0.961 is reported for the foundation of assessment, 0.921 for quality, and 0.956 for usage. For the subdimensions of professional assessment learning priorities, 0.934 was reported for integrating and communicating assessment practices, and 0.922 for the alignment with current assessment theory, principles, and practice.

Data Collection and Analysis

The strategies for data analysis for the quantitative aspects of the research included descriptive statistics. Completed questionnaires were extracted from Google Forms and converted into Excel for quality check and analysis. Statistical means and standard deviations were used to report the data for the science teachers' self-perceived skills in current assessment tasks and responsibilities and professional learning preferences and priorities on classroom assessment. Composite means were computed to compare the different dimensions under each variable. The quantitative results summary was presented in tables reflecting the specific dimension, the statistical figure, and the qualitative interpretation. The significant results from each variable measured were obtained by identifying the item with the highest and lowest mean score. The results were then discussed by incorporating research from the literature that supported or contradicted the current study. All the results in the different dimensions of the tool were synthesized.

Scope and Limitations

Considering the epidemiological features brought by the pandemic when the data gathering was performed, the gathered data were solely bounded by science teachers' experiences in the context of their practices, and this did not include other stakeholders related to assessment. All these collections of data were facilitated online. In exploring these variables, the analysis was limited to the patterns that emerged from the quantitative data. Despite the potential contributions of the quantitative results, several limitations were recognized. Descriptive statistics were made without the inclusion of any inferential statistics. Hence, the primary purpose is to present baseline data and map out the assessment profile of science teachers.

Ethical Considerations

Since this undertaking involved human participants, principles and ethical standards on potential ethical issues in the data collection were considered. This included requesting ethics approval and written permission from authorities to conduct the study and issuing informed consent letters to the participants. The study's overall aims and rationale were explained to the respondents before the data gathering. To preserve confidentiality, no personal information was asked from the participants. The principles of ethical behavior as enumerated by the American Counselling Association (2014) were employed: autonomy (freedom of the participants), fidelity, commitment and trust, nonmaleficence (causing no harm), and veracity (truthfulness). The questionnaires were administered to the teachers at an agreed schedule only upon the authority's approval. The survey questionnaire was administered online through Google Forms. As an online survey, informed consent was included in the first section of the survey following the recommendation of Mahon (2014), which requires participants to check a box to indicate their consent before accessing the contents of the survey.

Results and Discussion

Science Teachers' Self-Perceived Skills in Assessment

This portion of the science teachers' assessment profile provides a composite picture of science teachers' self-professed skills in the given assessment tasks and responsibilities. This utilized a self-report survey driven by the notion that they are the best source of information about their competence. Clausen (2002) affirms that teachers could justify their practices and cite reasons for acting in a specific way in a particular assessment situation. This self-report survey articulated the three assessment domains: foundations, quality, and use. The foundation aspect deals with how assessment strategies are conceptualized; the quality aspect deals with how the assessment responds to its intended purpose and dwells on how assessment is utilized in learning and teaching.

Science teachers were asked to self-assess themselves based on assessment skills to categorize them as novice, beginner, competent, proficient, and expert. This study used the description of Dreyfus and Dreyfus's (2004) proficiency progression model. Novice science teacher assessors are considered new to the domain with minimal knowledge of assessment. They stick to the rules and follow the regulations to complete an assessment task. Beginner science teacher assessors also follow the rules and can apply them in a similar context. Though their focus is still on completing tasks related to assessment, they can also try new things but are challenged in troubleshooting. Competent science teacher assessors use deliberate planning and draw from past experiences in solving assessment dilemmas. They often make assessment decisions and accept responsibility for outcomes. Proficient assessors develop a conceptual framework and holistic view of the assessment practices. They can establish

guidelines and adapt to situations. Finally, expert assessors have more analytical approaches to unfamiliar assessment dilemmas. They also have deep intuitions in identifying and understanding conditions and addressing problems. The items where science teachers perceived themselves to be more proficient and least proficient are summarized in Table 1.

Table 1.
Summary of the Findings for the Self-Perceived Assessment Skills of Science Teachers

Subdimensions	Most Proficient	Least Proficient
Foundation of Assessment	• Dealing with the use of assessment evidence in enhancing students learning • Provision of adequate student preparation for assessment in terms of resources, time, and opportunities • Continuous engagement of students in the assessment process	• Confidence in assigning grades using multiple and well-designed assessments for each student to measure individual learning • Using methods and types of assessment to demonstrate students' learning in diverse ways
Quality of Assessment	• Responsive and respectful of the cultural and linguistic diversity of the learners • Thinking deeply about the approach to assessment	• Articulating personal philosophy of assessment that recognize its alignment and misalignment with existing policies and theory • Assessment decisions that are only influenced by factors related to the intended purposes of the assessment or the curriculum expectation being measured.
Use	• Assignment of grades and comments by teachers being grounded on the evidence collected about students' achievement of learning expectations. • Provision of adequate and appropriate information so that students and parents understand the meaning of the feedback and grades.	• Utilization of the variety of strategies to analyze test and assessment results at both students and class levels • Using student performance data to inform instructional planning and next steps for individual students and the class as a whole.

Self-perceived Skills of Science Teachers on the Foundation of Assessment

Table 2 enumerates the details of science teachers' perceived skills on the foundation of assessment. Based on the data, science teachers self-assessed themselves as proficient in all thirteen items. The top three items where teachers assessed themselves to be proficient dealing with the use of assessment evidence in enhancing students learning (3.48), implying that science teachers highly perceived the very nature of assessment as means of demonstrating proof of learning, provision of adequate student preparation for assessment in terms of resources, time, and opportunities (3.43) suggesting the importance of highlighting students' role in the process and that they need to be supported with the given factors; and continuous engagement of students in the assessment process (3.42) which again placing premium consideration of including learners' active roles in the assessment process. It can further be

noticed that these three topmost items in which teachers declared themselves to be proficient center on the learners as providers of evidence of learning derived from assessment. In the frequency tabulation, 22 science teachers assess themselves as experts on these three items.

Table 2.
Science Teachers Self-Perceived Assessment Skills Based on Foundation (n = 513)

	Assessment Skills Based on Foundation	x	SD	Q
5.	I use assessment evidence to enhance students' learning.	3.48	0.66	P
6.	I provide adequate student preparation for assessments in terms of resources, time, and learning opportunities.	3.43	0.66	P
4.	I continuously engage students in the assessment process.	3.42	0.69	P
2.	My assessment practices align with the established curriculum expectations.	3.40	0.66	P
8.	I communicate purposes and uses of assessment to parents/guardians when appropriate.	3.37	0.68	P
14.	I monitor and revise my assessment practice to improve the quality of my instructional practice.	3.37	0.66	P
1.	My practices have a clear purpose (e.g., diagnostic, formative, summative) that supports teaching and learning towards achievement of curriculum expectations.	3.36	0.64	P
7.	I use a deliberate and continuous strategy to communicate purposes and uses of assessment to students.	3.35	0.62	P
15.	I monitor and revise my assessment practice to improve my students' learning.	3.35	0.63	P
23.	Throughout units of instruction, I regularly integrate various forms of formative and diagnostic assessment.	3.35	0.68	P
24.	I engage students in monitoring their own learning and using assessment information to develop their learning skills and personalized learning plans.	3.34	0.66	P
3.	My methods and types of assessment allow students to demonstrate their learning in diverse ways.	3.33	0.64	P
13.	For each student, I use multiple, well-designed assessments to measure learning so that I am confident in the grades I assign.	3.28	0.66	P
	Composite Mean	**3.37**	**0.66**	**P**

x = mean, SD = standard deviation, Q = Qualitative Description (N – novice, B – beginner, P – proficient, C – competent, E – expert)

As it transcends their proficient perceived skills and responsibilities, it is noteworthy to underscore that amidst the contextual factors affecting their skills, the role of learners is the primary concern in their assessment decisions. Xiang *et al.* (2020) significantly associate teachers' self-efficacy with dealing with the formative assessment guided by and anchored in the existing educational policies. The lowest proficiency is observed on items dealing with confidence in assigning grades using multiple and well-designed assessments for each student to measure individual learning (3.28) and using methods and types of assessment to demonstrate students' learning in diverse ways (3.33). The latter item has the most significant number of teachers who assessed themselves as novices. Surprisingly, the two items are anchored to differentiated assessment and its usage in assessing individual students' learning achievement. Vattoy (2020) describes aspects of marking together with dialogic feedback as teachers' hidden accountability that overshadows the optimization of the formative nature of assessment.

Self-perceived Skills of Science Teachers on the Quality of Assessment

The quality aspect got the lowest composite mean score of 3.31 among the three domains of presented assessment skills and responsibilities. Nonetheless, science teachers are proficient in all six skills, as shown in Table 3. The item on the quality of assessment that is responsive and respectful of the cultural and linguistic diversity of the learners accounted as an aspect with which science teachers are more skilled (3.35). The heterogeneity of classes of learners in the context of the participants can be linked to this aspect of science teachers' experience dealing with students from varied backgrounds and with different demands. Montenegro and Jankowski (2017) argue that a culturally responsive approach is needed for the assessment to improve students' learning and realistically document what students learn and are capable of doing. In doing so, Nortvedt *et al.* (2020) point to the roles of negotiation and alignment of instructional and assessment practices in the existing classroom norms.

Table 3.
Science Teachers Self-Perceived Assessment Skills Based on Quality (n = 513)

	Assessment Skills Based on Quality	x	SD	Q
17.	I ensure that my assessments are fair, reliable, and provide valid information on student learning.	3.47	0.67	P
9.	My assessments are responsive and respectful of the cultural and linguistic diversity of students.	3.35	0.66	P
25.	I have thought deeply about my approach to assessment.	3.32	0.67	P
10.	I differentiate my assessment practices to meet the specific educational needs of all students.	3.27	0.66	P
11.	My assessment decisions are only influenced by factors related to the intended purposes of the assessment or the curriculum expectation being measured.	3.24	0.61	P
26.	I am able to articulate my personal philosophy of assessment recognizing its alignment and misalignment with assessment policies and theory.	3.22	0.68	P
	Composite Mean	**3.31**	**0.66**	**P**

x = mean, SD = standard deviation, Q = Qualitative Description (N – novice, B – beginner, P – proficient, C – competent, E – expert)

On the other hand, the lowest mean score on the quality of assessment is given to the item on articulating personal philosophy of assessment that recognizes its alignment and misalignment with existing policies and theory (3.22). Guided by policies with structured guidelines and principles implemented in the context, the restrictions and limitations of imposing personalized ways of assessing students can be regarded as factors related to this item. Melrose *et al.* (2015) agree that teachers taking reflective practice and articulating a personal philosophy could help them comprehend why they have different approaches and how their views fit into the existing context. Similarly, Hofer (2017) highlights reflection on practice as a teacher's way of questioning the foundation, assurance, consistency, and authenticity of their pedagogical decisions as teachers. In the fast-changing face of education,

teachers' varying experiences in employing assessment in different contexts can reasonably be considered a factor affecting their assessment competence.

Self-perceived Skills of Science Teachers on the Use of Assessment

Like the first two dimensions analyzed, science teachers also perceived themselves as proficient in assessment skills based on their use. Teachers' assignment of grades and comments grounded on the evidence collected about students' achievement of learning expectations got the highest mean score of 3.42 under this dimension. This can be attributed to a well-structured grading system practiced in the context. At the same time, the latter can be associated with the complexity of performing item analysis and other related strategies in analyzing assessment results. Arsyad Arrafii (2020) identifies performance and cognition, the process of learning and effort, and external factors like the teacher's consideration in assigning grades grounded in the evidence of learning.

Table 4.
Science Teachers Self-Perceived Assessment Skills Based on Use (n = 513)

	Assessment Skills Based on Use	x	SD	Q
21.	My grades & comments are grounded in the evidence I have collected about student achievement of learning expectations.	3.42	0.67	P
12.	I provide adequate and appropriate information so that students and parents understand the meaning of the feedback and grades I give.	3.40	0.64	P
22.	My reports are based on a sufficient body of evidence and provide a summary of student learning toward meeting curriculum expectations.	3.39	0.68	P
19.	I provide useful feedback to students to improve their learning.	3.38	0.66	P
18.	I provide timely feedback to students to improve their learning.	3.36	0.66	P
20.	I use student performance data to inform instructional planning and next steps for individual students and the class as a whole.	3.31	0.65	P
16.	I can use a variety of strategies to analyze test and assessment results at both student and class levels.	3.29	0.67	P
	Composite Mean	**3.36**	**0.66**	**P**

x = mean, SD = standard deviation, Q = Qualitative Description (N – novice, B – beginner, P – proficient, C – competent, E – expert)

The utilization of various strategies to analyze test and assessment results at both student and class levels has the lowest mean score of 3.29. This finding is consistent with the study made by Koloi-Keaikitse (2017), where teacher respondents perceived themselves to be more skilled in the process of assessment construction than the practices that include analyzing assessment results and using them to make informed decisions in the process of learning and teaching.

Science teachers generally perceived themselves as proficient in all assessment skills and responsibilities. The Philippine Professional Standards for Teachers (PPST) domain on

assessment and reporting describes proficient teachers' characteristics in assessing learning. First, in terms of the design, selection, organization, and utilization of assessment strategies, proficient teachers must perform the tasks on the nature of formative and summative assessments consistent with the curriculum requirements (DepEd, 2017). This is reflected in items 1, 2, 3, 11, and 22. Second, proficient teachers must use learner attainment data to monitor and evaluate learner progress and achievement. This area is stipulated on items 14, 15, 23, and 24. Third, proficient teachers must provide timely, accurate, and constructive feedback to improve learner performance. Items from the survey that fall under this strand are 12, 18, and 19. Fourth, proficient teachers promptly communicate learners' needs, progress, and achievements to stakeholders, including parents/guardians. Items 7 and 8 are consistent with this strand. Lastly, proficient teachers utilize assessment data to enhance teaching and learning practices and programs. Items 5, 10, 16, and 20 are anchored on this strand.

Science Teachers' Professional Learning Priorities in Assessment

This portion of the study inquired science teachers about their professional learning priorities for assessment or aspects of assessment in which they want to learn and be trained. Science teachers were surveyed to prioritize their interests and preferences in learning the listed aspects of classroom assessment. Avidov-Ungar and Herscu (2020) point to the significance of mapping out professional learning directly to the needs of the teachers to understand their professional development preferences. Table 5 summarizes the professional learning priorities of science teachers on assessment.

Table 5.
Summary of the Findings for the Professional Learning Preferences of Science Teachers

Subdimensions	Most Preferred	Least Preferred
Professional Learning Priorities based on Integrating and Communicating Assessment Practices	• Disclosing accurate information about assessments. Protecting the rights and privacy of students that are assessed. • Cultivating fair assessment conditions for all learners, with sensitivity to student diversity and exceptional learners.	• Understanding psychometric (i.e., technical) properties of assessments (e.g., reliability and validity).
Professional Learning Priorities based on the Alignment with Current Assessment Theories, Principles and Practices	• Constructing assessments in alignment with current assessment theory, principles, and practices. • Understanding current reporting and grading policies and theories.	• Interpreting and using assessment information in alignment with current assessment theory, principles, and practices. • Scoring assessments in alignment with current assessment theory, principles, and practices.

Comparing the two dimensions, science teachers deduced similar moderate interest between the two. The composite means 3.40 for integrating and communicating assessment

practices and 3.39 for aligning with current assessment theories, principles, and practices. This suggests that science teachers are interested in learning about contemporary approaches to assessment and the traditional tasks and responsibilities associated with assessment.

Science Teachers' Professional Learning Priorities in Integrating and Communicating Assessment Practices

Among the given items in Table 6, disclosing accurate information about assessments and protecting the rights and privacy of the learners appeared to be the areas in which science teachers are interested in learning most (3.44) while understanding the psychometric properties of assessment as the least (3.32). These observations are consistent with the previously discussed assessment approaches and science teachers' beliefs. The former can be connected to the differentiated approach to the assessment being the most preferred and believed approach. At the same time, the latter is a manifestation of the low mean scores given to the different approaches of measurement theory, which deal with the psychometric properties of assessment.

Table 6.
Science Teachers Professional Learning Priorities in Assessment Based on Integrating and Communicating Assessment Practices (n = 513)

	Professional Learning Priorities based on Integrating and Communicating Assessment Practices	x	SD	Q
9.	Disclosing accurate information about assessments. Protecting the rights and privacy of students that are assessed.	3.44	0.56	M
12.	Integrating formative assessment (including assessment for and as learning) during instruction to guide next steps in teaching and learning.	3.42	0.56	M
1.	Choosing the appropriate purpose of assessment (e.g., diagnostic, formative, summative) based on instructional goals and assessment policies.	3.42	0.54	M
8.	Cultivating fair assessment conditions for all learners, with sensitivity to student diversity and exceptional learners.	3.41	0.56	M
11.	Analyzing and using assessment information to guide instructional decisions and support student learning.	3.41	0.56	M
7.	Communicating assessment purposes, processes, and results to students, parents/guardians, and other stakeholders.	3.40	0.58	M
10.	Understanding psychometric (i.e., technical) properties of assessments (e.g., reliability and validity).	3.32	0.61	M
	Composite Mean	**3.40**	**0.57**	**M**

x = mean, SD = standard deviation, Q = Qualitative Description (VL = very low interest, L = low interest, M = moderate interest, H = high interest, VH = very high interest)

School Science Teachers' Professional Learning Priorities on the Alignment with Current Assessment Theories, Principles, and Practices

Specified in Table 7, which outlines traditional assessment activities, constructing assessments aligned to current assessment theory, principles, and practices, and understanding current reporting and grading policies and theories are the most preferred professional learning of science teachers, with a mean score of 3.41. This can be associated with

the influence of the context of the science teachers where their locale is currently adapting a new platform of instructional delivery during the time that the respondents were surveyed. In their study, Czerniawski et al. (2018) conveyed that teachers' most influential factors determining their preferred professional learning are those currently associated with their teaching and learning engagements. The lowest mean score of 3.36 is assigned to the item on interpreting and using assessment information aligned with current assessment theory, principles, and practice. Consistently, this is the least preferred item regarding the skills of science teachers in utilizing assessment results.

Table 7.
Science Teachers Professional Learning Priorities in Assessment Based on Alignment with Current Assessment Theories, Principles, and Practices (n = 513)

	Professional Learning Priorities based on the Alignment with Current Assessment Theories, Principles, and Practices	x	SD	Q
1.	Constructing assessments in alignment with current assessment theory, principles, and practices.	3.41	0.55	M
8.	Understanding current reporting and grading policies and theories.	3.41	0.56	M
2.	Administering assessments in alignment with current assessment theory, principles, and practices.	3.39	0.56	M
4.	Scoring assessments in alignment with current assessment theory, principles, and practices.	3.37	0.54	M
6.	Interpreting and using assessment information in alignment with current assessment theory, principles, and practices.	3.36	0.54	M
	Composite Mean	**3.39**	**0.55**	**M**

x = mean, SD = standard deviation, Q = Qualitative Description (VL = very low interest, L = low interest, M = moderate interest, H = high interest, VH = very high interest)

Science Teacher's Professional Learning Preferences on Assessment

Science teachers were asked about their preferred mode of professional learning platforms. Table 8 shows that professional development activities in person are still the most preferred mode of science teachers, with a mean score of 3.90. For the online platform, one-on-one is preferred (3.88) over those facilitated in groups such as webinars or series of assessment courses (3.71).

Table 8.
Science Teachers Professional Learning Preferences in Classroom Assessment (n = 513)

Professional Learning Preferences	x	SD	Q
Online Learning			
10. Webinars	3.97	0.88	P
7. Blended learning courses (online with face-to-face)	3.82	0.92	P
6. A series of short online assessment modules working with cohort of practicing teachers	3.73	0.85	P
5. A series of short online assessment modules offered as independent studies	3.71	0.87	P
4. Online full-length assessment course working with cohort of other practicing teachers	3.58	0.91	P
3. Online full-length assessment course working independently	3.46	0.96	MP
Composite Mean	**3.71**	**0.90**	P
Face – to – Face Group Learning			

8. Classroom-embedded collaborative learning/inquiry working an expert	4.05	0.78	P
7. Classroom-embedded collaborative learning/inquiry working with colleagues	4.03	0.81	P
1. Face-to-face full-length assessment course with a cohort of other practicing teachers	3.79	0.99	P
2. Face-to-face short assessment module with a cohort of other practicing teachers	3.74	0.94	P
Composite Mean	**3.90**	**0.88**	P
One-on-One Learning			
11. One-on-one mentoring with peer teacher	3.85	0.86	P
12. One-on-one mentoring with a support teacher	3.91	0.87	P
Composite Mean	**3.88**	**0.87**	P

x = mean, SD = standard deviation, Q = Qualitative Description (NP – not preferred, SP – somewhat preferred, MP – moderately preferred, P – preferred, HP – highly preferred)

Specifically, the top three most preferred modes of professional learning delivery include classroom-embedded collaborative learning/ inquiry working with an expert (4.05), classroom-embedded collaborative learning/ inquiry working with colleagues (4.03), and webinars (3.97). This differs from the study by DeLuca et al. (2019), where webinars appeared to be the least preferred mode of professional learning delivery. The good response of science teachers in using webinars as platforms for professional development is brought by the context where they have experienced attending a series of webinars during the pandemic, the time when these data were gathered. The positive response of teachers towards it was documented by Sharma (2020, and Compen (2021).

Indeed, the emergence of digital platforms during the pandemic has provided a new opportunity for teachers to participate in professional development activities as manifested by their preferences. Ancho and Arrieta (2021) pointed out that opportunities being attended by teachers do not only include seminars and training on teaching, pedagogy, technology, assessment, and classroom management but also mental well-being - most especially during this COVID-19 pandemic.

Conclusions and Recommendations

This study purported to determine the self-perceived assessment skills and professional assessment learning priorities and preferences of science teachers in light of the practice of flexible instruction delivery during the COVID-19 pandemic. Specifically, this paper describes teachers' self-assessment skills in the áreas of foundation, quality, and use of assessment. In contrast, professional assessment learning priorities and preferences regarding teachers' skills in integrating and communicating assessment practices and alignment with current assessment theories, principles, and practices were explored.

Science teachers generally perceived themselves as proficient in all the assessment skills and responsibilities surveyed concerning the context of flexible instruction delivery. The foundation of assessment, which deals with the traditional nature of assessment strategies and their purposes, accounted as the area in which science teachers perceived themselves to be more skilled. On the prioritization of professional learning on assessment practices, science teachers deduced similar moderate interest in integrating and communicating assessment practices and professional learning on the alignment of current assessment theories, principles, and practices, suggesting that they pay interest not only in learning the contemporary approaches to assessment but also the traditional tasks and responsibilities associated with assessment. In the delivery of professional learning activities, professional development activities in person are still the most preferred mode of science teachers, but with consideration to an online platform if executed on one-on-one interaction with a mentor.

Based on the findings and conclusions of this study, it is recommended that the demographic profile of the teachers in the context be considered as a variable in exploring their assessment skills and professional learning preferences, and the correlation of the variables should be established by exploring inferential statistics.

Implications

With the context-dependent nature of assessment practices, science teachers' perceived skills and professional learning preferences must be considered in redirecting the assessment culture to flexible learning platforms. These aspects can be in the conceptualization of the training and professional development of the assessment that is suited to the teachers' competence and preferred mode of professional learning. When education leaders from various institutions use these profiles of the teachers to guide them in the recalibration of their assessment practices, the transition towards the maximization of the flexible delivery of instruction vis a vis the needed forms of assessment, the professional learning becomes consultative, and contextualized thereby building a shared understanding from both teachers and the demands of the existing curriculum.

One of the goals of the K to 12 Science Curriculum in the Philippines is to provide Filipino learners with a repertoire of competencies in the world of work and knowledge-based society by developing the domains of scientific knowledge, skills, and values. In attaining such, science teachers employ appropriate instructional episodes to provide the learners with a space that leads to optimum science learning. However, the approaches to the curriculum and instruction in any discipline are integrally linked and driven by the assessment practices of its key players, the teachers. As the limitations of the traditional mode of the school system to accommodate the diverse contexts of the learners become evident, the role of flexibility in the

mode of learning increases in importance and urgency. In this case, assessment, considered a fabric of teaching and learning and the thread that creates the seams and stitches that give meaning to the learning experiences and the outcomes of the curriculum, must adapt to the context. Hence, responding to teachers' assessment skills and professional learning priorities and preferences is crucial in developing a more contextualized and sustainable assessment of learning that addresses not only teachers' versatility in using various learning modalities but, more importantly, in ensuring that learning outcomes are attained.

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