Teachers of Mathematics in Public Secondary Schools' Instructional Tactics

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Abstract*— The primary focus of this study, which employed a descriptive-correlational research methodology, was on the pedagogical practices of public secondary school mathematics teachers in the SDO Urdaneta City. 38 public secondary school mathematics teachers who responded to a questionnaire were the source of the data. The solution to the specific issues raised in the study was discovered through data analysis. According to this survey, women make up the majority of PSSMT respondents, and they tend to fall into one of two age groups: 20 to 29 years old or older. In addition, the majority of them had received pertinent training at the district and division levels. It was found that the PSSMTs in the SDO of Urdaneta City effectively implemented the necessary pedagogical practices for integrating computer-based instruction and a blended education strategy to fulfill the needs of the learners and improve the performance of the students in mathematics. They have all the necessary tools to deliver effective computer-based and integrated education methods thanks to the seminars the DepEd organized for the teachers' ongoing professional development. The researcher further recommended that PSSMTs conduct training on various pedagogical practices with a focus on computer-based instruction and blended learning instruction in order to enhance teachers' capacity to deliver mathematics instruction and to achieve a parallel study on the efficacy of computer-based instruction and integrated instruction approach in enhancing students' performance in mathematics.

***Indexed Terms*— Public Secondary School, Pedagogical Practices, Mathematics Teachers, Education Strategy, Teaching Styles**

I. INTRODUCTION

Sincere educators put a lot of effort into creating safe learning environments for their pupils. They also make sure that math is a major focus in their classes and that they have high but reasonable expectations for what their pupils can accomplish. Students discover that they can think, reason, communicate, reflect on, and critique the mathematics they encounter in such an environment; their classroom interactions turn into a resource for fostering the development of their mathematical identities and skills (Anthony & Walshaw 2019). According to Usman (2019), mathematics is the rational language for communicating ideas, structures, capacities, dimensions, other changes, and vitality in the teaching process. It also clarifies the challenges facing modern society in the fields of business, academia, the economy, and engineering for lifelong learning. Without mathematics, there can be no science, modern technology, or international development (Usman, 2019). Furthermore, according to Chinyere (2016), there is no area of study offered by modern educational institutions that does not require a working knowledge of mathematics. As a result, the value of mathematics in science and technology cannot be understated. Learning and teaching mathematics are challenging issues. Thinking about how to evaluate a teacher's performance may reveal elements including instructional methodologies, teaching skills, and student achievement. Aiming for top-notch education is a driving force behind attaining sustainable growth. Therefore, if people have access to top-notch education and willpower, the curse of poverty can be lifted, which leads to a decrease in inequities, according to the United Nations Development Programme (UNDP, 2018). More people's quality of life will increase as more individuals are able to practice sustainability. Similar to this, having free,

equitable access to excellent education for all (EFA) opens the door for locals to contribute innovative answers to the major problems confronting the world. Undoubtedly, a strong entryway to sustainability is high-quality education. Today, technological advancement is a fact. Our society, notably the labor, social, and educational spheres, reflects this truth. The performance of daily chores is facilitated, strengthened, and accelerated by this technological advancement. The rise of so-called information and communication technologies (ICT) in education is a reflection of technological advancement. ICTs have a direct impact on how teaching and learning processes evolve because they encourage creative pedagogical practices and create new learning environments. Recently, a lot of attention has been focused on South Africa's subpar mathematics test results. For instance, according to the Department of Basic Education (DBE), Republic of South Africa, 2016:151, just 20% of pupils achieved 50% or better on the Grade 12 Mathematics exam in 2015. According to this, 80% of the students who took the exam could only earn a grade of less than 50%. In reaction to comments about poor math performance, concerns regarding whether mathematics training is as effective as it should be inevitably arisen. Teachers can build more capacity to change their pedagogy and increase prospects for student achievement by having a deeper awareness of what their students know and how they think. Following the findings of both national and international assessments of the student's performance, the DepEd Year-End Report for 2019 put the quality of the nation's education in the limelight, stressing Filipino students' poor performance. Further, the National Achievement Test (NAT), which was developed by the former Education Secretary Leonor Briones, revealed that Filipino students' performance "gravitates towards the low proficiency levels," particularly in Science, Math, and English. These findings show that DepEd's current reform initiatives are centered on addressing the pressing problems and gaps in achieving the country's educational standards (Philippine Information Agency, December 4, 2019). The school received a poor rating for curriculum and learning based on the results of the school-Based Management Validation of Urdaneta City Division in 2021 because the MPS in the quarterly tests had been low for the previous three years. This issue was one of many that the researcher addressed because of how it affected students' low-performance levels. The statistical power of tests is used as an example to show how spreadsheets can be used as an alternative simulation-based teaching strategy for hard mathematical topics. Because so few researchers are familiar with the idea and how it relates to choices made about research design, the power is often not revealed in research journals. The simulation gives the student a basic formula for estimating power as a planning tool and enables them to explore the design factors that have an impact on power. Students can also play with the sample size, effect size, standard deviation, alpha, and number of tails using the spreadsheet-based model. Some cutting-edge teaching strategies, like active learning techniques oriented on inquiry, discovery, cooperative learning, and simulation approaches, are more effective than focusing on traditional methods where teachers just utilize "chalk and talk" (Serbessa, 2006). The urgent need to increase the percentage of South African pupils who are sufficiently proficient in math and science has been emphasized by the Academy of Science of South Africa (Grayson, 2010). Studies have revealed that technology has a big edge in schooling. Higher-order thinking skills can be promoted in the classroom through the use of technology (Kurt, 2010). Technology improves student achievement, engagement, and motivation to learn at school (Baytak et al., 2011), as well as student collaboration (Keser et al., 2011). Technology could, in fact, provide kids with a better educational future that is less expensive but still full of fulfillment. All categories of students have received high-quality education in the Philippines. Furthermore, modifications have been developed and put into place with regard to educational services based on the geographic makeup of a certain locality remote from a developing area. In order to increase student performance, particularly in underserved and distant areas, the DepEd continues to invest in teachers' training, curriculum development, and pedagogical techniques. As a result, the researcher decided to write an academic text that would concentrate on teachers' pedagogical practices, notably in the teaching of the topic of mathematics in both junior and senior high school. All secondary instructors will gain a general understanding of adopting effective teaching approaches and styles thanks to this study.

Figure 1. Paradigm of the Study

- Independent Variable

Profile of the Respondents:
a. age;
b. sex;
c. highest educational attainment;
d. no. of years in the service;
e. no. of relevant in-service trainings; and
f. prevalent style in teaching math

- Dependent Variable

Extent of Pedagogical Practices of Public Secondary School Mathematics Teachers:
A. Use of Computer-Based Instruction;
  a. Interactive Learning Software Application
  b. Productivity Tools
B. Use of Blended Instruction Approach;
  a. Preparation of Module
  b. Instructional Delivery
  c. Evaluation of Learning Outcomes

- Emergent Output

Proposed Training Matrix to Enhance Pedagogical Practices of Public Secondary School Mathematics Teachers

II. METHODOLOGY

The descriptive-correlational research methodology was employed for this study. It is a fact-finding investigation with a sufficient and correct interpretation for improved comprehension. The single-case study Ex Post Facto research design was used in this study. The design is as follows symbolically: X O where:

X= the assumed exposure of the respondents
= the measurement or observation taken in one (1) setting

The DepEd Region I Urdaneta City Schools Division public secondary school mathematics teachers (PSSMTs) who participated in the study were chosen by complete enumeration. Complete enumeration was possible with precise characteristics/traits, background, education, training, and exposure to an event or phenomenon. However, because other Mathematics professors are instructing students in subjects unrelated to their area of expertise, only the teachers teaching Mathematics subjects were chosen as responders for the study. The researchers can gain in-depth knowledge of the particular pedagogical practices, curriculum frameworks, and instructional strategies pertinent to the subject by concentrating on educators who only teach mathematics. According to the chart on the following page, the Urdaneta City Schools Division replies are:

Table I. Distribution of the PSSMTs across the Schools in the City Division

Name of School	Frequency Of PSSMTs
1. Bactad East NHS	2
2. Badipa NHS	5
3. Cabaruan NHS	3
4. Cabuloan NHS	3
5. Calegu NHS	3
6. Camabu NHS	2
7. Casabula NHS	2
8. Catablan NHS	1
9. Cayambanan NHS	1
10. Don Antonio Bongolan IS	1
11. Don Alipio Fernandez IS	2
12. Don Mariano Q. Umipig NHS	2
13. Labit NHS	1
14. Lanangin NHS	1
15. Nancalobasaan NHS	2
16. Palina West NHS	2
17. Pedro T. Orata NHS	1
18. San Jose Leet IS	2
19. Urdaneta City NHS	2
Total no. of Respondents (N)	38

The following scale and its descriptive equivalence were used to describe the content validity of the questionnaire checklist:

Weighted Mean	Descriptive Rating	Transmuted Rating
4.50- 5.00	Very High (VH)	Highly Valid (HV)
3.50- 4.49	High (H)	Much Valid (MV)
2.50- 3.49	Moderate (M)	Valid (V)
1.50- 2.49	Low (L)	Fairly Valid (FV)
1.00- 1.49	Very Low (VL)	Not Valid (NV)

The following scale was used to rate the respondent-PSSMTs' pedagogical practices:

Weighted Mean	Descriptive Rating	Transmuted Rating
4.50- 5.00	Always (A)	Very Extensive (VE)
3.50- 4.49	Often (O)	Extensive (E)
2.50- 3.49	Sometimes (S)	Moderately Extensive (ME)
1.50- 2.49	Seldom (Sl)	Slightly Extensive (SE)
1.00- 1.49	Never (N)	Not Extensive (NE)

To get results that were valid and trustworthy, the appropriate statistical techniques were used. For the statistical judgment on the hypotheses, the null

hypothesis was also evaluated at a 0.05 alpha significance level to check if it should be rejected. The researcher used percentages and frequency counts on the respondents' profile data for issue number 1. Following is the formula for calculating percentages:

$$P = \frac{f}{n} \times 100\%$$

where:

P = percentage
f = frequency
N = No. of respondents
100 = constant value

The weighted mean calculation formula is shown below.

$$WM = \frac{\sum Wf}{N}$$

where:
WM = weighted mean
Wf = weight times the frequency of the column
N = total number of cases
$\sum$ = summation

The weighted mean (WM) was used to calculate the replies of respondents to discover the most common teaching methods for mathematics. They provided the following descriptive value, which was illustrated:

Mean Scale	Descriptive Equivalent
4.50 - 5.00	Always (A)
3.50 – 4.49	Often (O)
2.50 – 3.49	Sometimes (S)
1.50 – 2.49	Seldom (Sl)
1.00 – 1.49	Never (N)

The researcher used the overall weighted mean (OWM) to address problem number 2, which concerned the respondents' level of educational methods. The extent of the respondent-PSSMTs' educational practices was addressed in Problem No. 2, and the weighted mean (WM), overall weighted mean (OWM), and grand overall weighted mean (GOWM) were utilized to address the issue. The formula was as follows:

$$WM = \frac{\sum Wf}{N}$$

where:
WM = weighted mean
Wf = weight times the frequency of the column
N = total number of cases
$\sum$ = summation

The following formula was used to get the overall weighted mean (OWM):

$$OWM = \frac{\sum Wf}{N}$$

where:

OWM = overall weighted mean
N = no. of cases
$\sum$ = summation of

Using the weighted mean (WM), responses of the respondents in respect to their instructional approaches were calculated. They provided the following descriptive value, which was illustrated:

Weighted Mean	Descriptive Rating	Transmuted Rating
4.50- 5.00	Always (A)	Very Extensive (VE)
3.50- 4.49	Often (O)	Extensive (E)
2.50- 3.49	Sometimes (S)	Moderately Extensive (ME)
1.50- 2.49	Seldom (Sl)	Slightly Extensive (SE)
1.00- 1.49	Never (N)	Not Extensive (NE)

Multivariate Analysis of Variance (MANOVA) was used to address problem number 3, which described the considerable mean variations in the extent of pedagogical practices of the Respondent - Public Secondary School Mathematics Teachers across the profiles. The Pearson r Coefficient of Correlation was employed to find the significant associations between the respondent-PSSMTs' level of pedagogical practices and the profile variables, which was the solution to problem number 4. The no difference and no relationship hypotheses were put to the test at the 0.05 alpha significance level. The indicator statements with the lowest WM were used to develop the proposed training matrix to improve the pedagogical practices of public secondary teachers to address problem No. 5. The study's emergent result was the suggested enhanced training matrix.

III. RESULTS AND DISCUSSION

- Age- According to Table 2, 15 out of 38 public secondary school teachers, or 39.5 percent (39.5%), are between the ages of 20 and 29. In the same vein, 15 teachers, or 39.5 percent (39.5%), fall within the 40 and older age range. Finally, only eight teachers, or 21.1 percent, are in their 30s or early 40s.

- Sex- The data shows that 25 out of 38 teachers, or 65% of all teachers, are female, while there are only 13 male teachers or 34.2% of all teachers. It revealed that female teachers dominated the SDO of Urdaneta City's public secondary mathematics classrooms.

- Highest Educational Attainment- The chart indicates that 21 of the 38 teachers, or equivalently 55.3%, have MA/MS degrees. Seven teachers, or 18.4%, have also already received their MA/MS degrees. However, four respondents, or 10.5 percent, only hold BS degrees without having completed any master's-level coursework. Similarly, four responders (10.5%) hold Ed.D./Ph.D. degrees. Finally, only 2 of them, or 5.3%, received post-graduate degrees. Additionally, teachers could be overworked with both their academic classes and extracurricular activities. Horn and Jang (2017) suggested that to raise the standard of instruction in the classroom, teachers should continue and finish their graduate studies.

- Number of Years of Teaching Experience- As it was determined, 17 of the PSSMTs—or 44.7%—had seven years or more of experience instructing mathematics. On the other side, 11.9%, or 11. out of 38, have taught mathematics for no more than three years. Last but not least, 10 out of 38, or 26.3 percent of them, had 4 to 6 years of experience teaching mathematics. This result confirms Kitchen's (2007) claim that pupils need a capable and dedicated teacher to acquire mathematics.

- The Number of Related Training Attended at the Cluster/District Level- According to the data presented, 15.5% of the 38 respondent-PSSMTs, or 15 out of 38, had participated in training that was seven or above and was held by their specific cluster or district. 14 people, or 36.8%, only attended three or fewer activities. Only 9 people, or 23.7 percent, showed up for 4–6 training.

- The Number of Related Training Attended at the
- Division Level- According to the data, 17.7%, or 17 out of 38 respondent PSSMTs, attended training for levels seven and higher that was put on by the division office. However, only 11 people, or 28.9 percent, participated in three or fewer activities. Finally, just 10 people, or 26.3 percent, showed up for 4 to 6 training.

- The Number of Related Training Attended at the Regional Level- As a result, the regional office's three and below training was attended by 27 out of 38 Mathematics instructors, or 71.1 percent (71.1%) of them. In addition, seven people, or 18.4%, participated in training from days 4 to 6. Finally, just four participants, or 10.5%, attended training for groups of seven or more.

- The Number of Related Training Attended at the National Level- According to the data, the regional office's three and below training was attended by 27 out of 38 Mathematics teachers or 71.1 percent (71.1%) of the total. A total of four to six training sessions were attended by seven people or 18.4% of the group. The number of people who attended training for seven or more was just four or equivalent to 10.5 percent (10.5%).

- The Number of Related Training Attended in the International- According to the data, 92.1 percent (92.1) of the Math teachers—35 out of 38—attended foreign training for three years or less. Only three people, or 7.9 percent, attended training from days four through six. Garcia (2021) recommended that teachers adapt their lessons to use 21st-century methods to enhance the activation of 21st-century skills.

Table II. Distribution of the Profile of the Secondary Mathematics Teachers

Profile		Frequency	Percentage
Age			
	20 -29 years old	15	39.5
	30-39 years old	8	21.1
	40 years old and above	15	39.5
	Total	38	100.0
Sex			
	Male	13	34.2
	Female	25	65.8
	Total	38	100.0
Highest Educational Attainment			
	BS Without MA/MS units	4	10.5
	With MA/MS units	21	55.3
	MA/MS Graduate	7	18.4
	Ed.D/Ph.D Units	4	10.5
	Ed,D/Ph.D Graduates	2	5.3
	Total	38	100.
Number of Years of Teaching Experience			
	3 and below	11	28.9
	4 to 6	10	26.3
	7 and above	17	44.7
	Total	38	100.0
Number of Related Training Attended in District			
	3 and below	14	36.8
	4 to 6	9	23.7
	7 and above	15	39.5
	Total	38	100.0
Number of Related Training Attended in Division			
	3 and below	11	28.9
	4 to 6	10	26.3
	7 and above	17	44.7
	Total	38	100.0
Number of Related Training Attended in Region			
	3 and below	27	71.1
	4 to 6	7	18.4
	7 and above	4	10.5
	Total	38	100.0
Number of Related Training Attended in National			
	3 and below	27	71.1
	4 to 6	7	18.4
	7 and above	4	10.5
	Total	38	100.0
Number of Related Training Attended International			
	3 and below	35	92.1
	4 to 6	3	7.9
	Total	38	100.0

The indicator that the respondents teach mathematics rapidly by giving students examples and illustrating SOLUTIONS received the highest mean rating of 4.84 (Rank 1), with a descriptive equivalent of always having a transmuted value of very extensive, as shown in Table 3. According to Cardino and Cruz (2020), mastering mathematics encourages pupils to think critically and develop their thinking skills. Additionally, the indicator that respondents frequently simplify difficult mathematical concepts received a weighted mean rating of 4.76 (Rank 2) and a descriptive equivalent of always having a transmuted value of extremely extensive. Additionally, the weighted mean rating for emphasizing the worth of persistence and dedication in solving mathematical problems was 4.74 (Rank 4), with a descriptive equivalent of always having a transmuted value of very extensive.

Table III. Prevalent Teaching Styles of the PSSMTs in the SDO of Urdaneta City

Indicators	Weighted Mean	Descriptive Equivalent	Transmuted Rating	Rank
1. I teach current Mathematics lesson through lectures.	4.39	Often	Extensive	9
2. I use interactive materials in teaching Mathematics.	4.29	Often	Extensive	10
3. I use evident instructions in teaching mathematics.	4.47	Often	Extensive	8
4. I used collaborative activities in giving exercises.	4.63	Always	Very Extensive	4.5
5. I give motivational activities, before going to the lesson proper.	4.55	Always	Very Extensive	7
6. I teach Mathematics easily by providing students' examples and demonstrating SOLUTIONS.	4.84	Always	Very Extensive	1
7. I usually simplify difficult concepts in Mathematics.	4.76	Always	Very Extensive	2
8. I give relevant real-world examples in teaching mathematics.	4.63	Always	Very Extensive	4.5
9. I give immediate feedback in my prevalent teaching style in mathematics whenever possible.	4.49	Often	Extensive	6
10. I inculcate the value of perseverance and dedication when solving mathematical problems.	4.74	Always	Very Extensive	3
Overall Mean	**4.58**	**Always**	**Very Extensive**	

The researcher used computer-based instruction and a blended learning strategy to assess the level of the PSSMTs' pedagogical practices in the SDO of Urdaneta City. The teachers gave the indicator search the internet for downloadable and appropriate educational materials for the math pupils the highest weighted mean rating of 4.45 (Rank 1), with a descriptive equivalent of often having a transmuted value of extensive, as shown in Table 4 on the following page. However, the indicator that they download relevant films for the lesson and use powerpoint presentations in mathematical discussions was assessed with a weighted mean of 4.21 (Rank 2.5) and a descriptive rating of often having a transmuted rating of extensive. Additionally, a weighted mean of 4.16 (Rank 4) was assigned to the teacher's usage of Google Classroom, Facebook, Messenger, and other social media platforms for lesson posting, with the descriptive equivalent of frequently receiving a transmuted extensive rating. It was determined that the mathematics teachers in the SDO of Urdaneta City extensively used the indicators presented by the researcher to make effective use of the computer-based instruction using interactive learning software applications, as indicated by the computation of an overall weighted mean of 4.00 and a descriptive equivalent of frequently

Table IV. Pedagogical Practices of the PSSMTs on the Used of Computer-Based Instruction along Interactive Learning Software Applications

Indicators	Weighted Mean	Descriptive Equivalent	Transmuted Rating	Rank
1. Use computer-generated graphics to introduce my math lessons	3.92	Often	Extensive	7
2. Search the internet for downloadable and suitable instructional materials for my math students	4.45	Often	Extensive	1
3. Use Zoom meet, Google meet and MS Teams for virtual teaching of Mathematics	3.55	Often	Extensive	10
4. Utilize PowerPoint presentations in mathematical discussion	4.21	Often	Extensive	2.5
5. Organize online meetings and online forum for my students using my smartphone	3.68	Often	Extensive	8.5
6. Download and utilize related videos for my lesson	4.21	Often	Extensive	2.5
7. Make games using PowerPoint related to the mathematics lesson	4.03	Often	Extensive	6
8. Use DepEd LRIS to download exercises and activities based on the needs of the learner.	3.68	Often	Extensive	8.5
9. Use google classroom, Facebook, messenger, and other social media in uploading the lesson	4.16	Often	Extensive	4
10. Install math-related applications on my smartphone	4.08	Often	Extensive	5
Overall Mean	**4.00**	**Often**	**Extensive**	

According to Table 5, respondents gave Google Drive's shared instructive video lessons the highest weighted mean rating of 3.50 (rank 1), with a descriptive equivalent of occasionally receiving a transmuted rating of moderately comprehensive. With a weighted mean of 3.32 (Rank 2) and a descriptive equivalent of occasionally having a transmuted rating of quite extensive, the ability to ensure that students would still learn even if the teacher wasn't present was evaluated as important. Use To-Do-List as well, which provides customized tasks and a to-do list for time management. By enabling teachers to color-code assignments according to priority, it eased task management. The descriptive equivalent of a transmuted rating of quite extensive was given, with a mean of 3.13 (Rank 3). The secondary mathematics instructors in the SDO of Urdaneta City somewhat extensively used the productivity tools/software applications in teaching the topics of their lessons, with an overall computed mean of 2.80 and a descriptive equivalent of sometimes.

Table V. Extent of Pedagogical Practices of the PSSMTs on the Used of Computer-Based Instruction along with Productivity Tools/Software Applications

Indicators	Weighted Mean	Descriptive Equivalent	Transmuted Rating	Rank
1. Use Kahoot to enhance my students' learning by including pictures, graphics, and videos.	2.82	Sometimes	Moderately Extensive	4
2. Utilize virtual assistants. To make sure that students will still learn even if I am not available.	3.32	Sometimes	Moderately Extensive	2
3. Create my own video with EdPuzzle or use one from YouTube to get learners' interest to sustain their participation.	2.76	Sometimes	Moderately Extensive	5
4. Assess my students using Edmodo to build interactive classrooms with polls, quizzes, notes, questions, and assignments.	2.45	Seldom	Slightly Extensive	8
5. Share files to my students using Dropbox, as an effective technique for keeping privacy and securing files.	2.61	Sometimes	Moderately Extensive	7
6. Share educational video lessons through Google Drive.	3.50	Often	Extensive	1
7. Use Filmora in editing videos.	2.71	Sometimes	Moderately Extensive	6
8. Create tasks using voice commands, add tasks directly to emails, and use sophisticated date parsing for alerts and reminders through Tick Tick.	2.34	Seldom	Slightly Extensive	10
9. Use To-Do-List, which offers customizable tasks and a to-do list in managingtime. It facilitates task management by allowing me to color-code activities based on priority.	3.13	Sometimes	Moderately Extensive	3
10. Use Asana which enables me to make schedules, delegate work to various persons, and keep track of the advancement of each activity to improve and optimize the tasks.	2.39	Seldom	Slightly Extensive	9
Overall Mean	**2.80**	**Sometimes**	**Moderately Extensive**	

The teachers gave the indicator of using the curriculum guide in lesson preparation the highest weighted mean rating of 4.89 (Rank 1), with a descriptive equivalent of always having a transmuted rating of very extensive, as shown in Table 6 on the following page. The weighted mean rating for this module was 4.74 (Rank 2.5), with a descriptive equivalent of always having a transmuted rating of very extensive. It is also recommended to plan assessments before distributing materials and activities to ensure that students have acquired the necessary knowledge and skills. Additionally, list the learning objectives. Beginning with the stem "students will be able to..." and moving on to action verbs that describe quantifiable and observable behaviors were rated with a weighted mean of 4.71 (Rank 4), with a descriptive equivalent of always having a transmuted rating of very extensive. With the overall weighted mean of 4.66, which has the descriptive equivalent of consistency.

Table VI. Extent of Pedagogical Practices of the PSSMTs on the Used of Blended Instruction Approach along with Preparation of Modules

Indicators	Weighted Mean	Descriptive Equivalent	Transmuted Rating	Rank
1. Use the curriculum guide in planning my lessons;	4.89	Always	Very Extensive	1
2. Summarize the learning objectives. Start with the stem "students will be able to..." and move on to action verbs that describe measurable and observable activities.	4.71	Always	Very Extensive	4
3. Specify two to four learning goals. Use verbs of action from Bloom's taxonomy because they lack precision, the words "understand" and "know" should not be employed.	4.66	Always	Very Extensive	5.5
4. Plan for assessments before giving materials and activities make sure that students have acquired the skills and information needed.	4.74	Always	Very Extensive	2.5
5. Create or curate learning materials and activities.	4.53	Always	Very Extensive	9
6. Sequence learning materials and activities to create a learning experience.	4.61	Always	Very Extensive	7.5
7. Choose activities and exercises that best suit the learners' needs.	4.61	Always	Very Extensive	7.5
8. Contextualize the modules for the indigenous group and for students with disabilities.	4.50	Always	Very Extensive	10
9. Include activities based on real-life situations.	4.66	Always	Very Extensive	5.5
10. Put steps, tips, and due dates for the students to know when to pass their modules	4.74	Always	Very Extensive	2.5
Overall Mean	**4.66**	**Always**	**Very Extensive**	

As shown in Table 7, the teachers gave the indicator of student learning monitoring through calls, texts, or messengers the highest weighted mean rating of 4.47 (Rank 1), with a descriptive equivalent of frequently receiving a transmuted value of extensive. A further rating of 3.87 (Rank 2) was given for providing Activity Sheets for the student's extracurricular activities and quizzes, with a descriptive equivalent of frequently receiving an extensive rating. Additionally, the use of video clips to engage students in

synchronous lessons received a rating of 3.68 (Rank 3), with a descriptive equivalent of often receiving a transmuted value of extensive. The creation of synchronous and asynchronously available video lectures, however, received a mean rating of 3.66 (Rank 4). With an overall computed mean of 3.44 and a descriptive equivalent of occasionally.

Table VII. Extent of Pedagogical Practices of the PSSMTs on the Use of Blended Instruction Approach along Instructional Delivery

Indicators	Weighted Mean	Descriptive Equivalent	Transmuted Rating	Rank
1. adopt radio broadcasting delivery by accessing the DepEd Portal	2.84	Sometimes	Extensive	9
2. create video lessons that are accessible synchronously and asynchronously.	3.66	Often	Extensive	4
3. discuss the lessons through Google meet and Zoom meetings.	3.26	Sometimes	Moderately Extensive	7
4. record audio lessons for students supporting materials that are accessible both synchronously and asynchronously.	3.45	Sometimes	Moderately Extensive	5
5. create Google Classroom for the upload of the materials needed.	3.37	Sometimes	Moderately Extensive	6
6. use google forms to assess students learning synchronously.	3.11	Sometimes	Moderately Extensive	8
7. upload examinations every quarter through Canvas synchronously and asynchronously.	2.79	Sometimes	Moderately Extensive	10
8. distribute Activity Sheets for the students' supplementary materials and quizzes.	3.87	Often	Extensive	2
9. engage the learners in synchronous classes through video clips presented in the discussion.	3.68	Often	Extensive	3
10. monitor the students learning through calls, texts, or by messenger	4.37	Often	Extensive	1
Overall Mean	**3.44**	**Sometimes**	**Moderately Extensive**	

As shown in Table 8, the weighted mean for giving quarterly exams to determine if students understand the topic well was 4.79 (Rank 1), and the descriptive equivalent of consistently earning a transmuted rating of extremely extensive. Additionally, a mean of 4.47 (Rank 2.5) and a descriptive equivalent of often earning a transmuted rating of extensive were used to evaluate and score the student's performance on summative quizzes and diagnostic tests given before the start of fresh Math sessions. With an overall calculated mean of 3.95 and a descriptive equivalent of frequently, it is clear from the indicators' extensive use by secondary mathematics teachers in the SDO of Urdaneta City to meet their students' demands in assessing their learning results.

Table VIII. Extent of Pedagogical Practices of the PSSMTs on the Use of Blended Instruction Approach along Evaluation of Learning Outcomes

Indicators	Weighted Mean	Descriptive Equivalent	Transmuted Rating	Rank
1. Give quizzes through Google Classroom	2.87	Sometimes	Moderately Extensive	10
2. Assess the learners' understanding through interactive questioning during synchronous classes.	3.84	Often	Extensive	7
3. Ask the students to provide portfolios at the end of the quarter	3.89	Often	Extensive	6
4. Assess the students by giving summative quizzes.	4.47	Often	Extensive	2.5
5. Give diagnostic exams before starting new lessons in Math.	4.47	Often	Extensive	2.5
6. Give quarter exams to check if the students understand the lessons well.	4.79	Always	Very Extensive	1
7. Assign topics for collaborative output as a basis of the students' performance tasks.	4.29	Often	Extensive	4
8. Require video presentations for the students' individual performance tasks.	3.19	Sometimes	Moderately Extensive	9
9. Require oral presentation of a certain topic for the students' performance tasks.	3.95	Often	Extensive	5
10. Provide reflection paper as a basis of improving teaching strategies.	3.70	Often	Extensive	8
Overall Mean	**3.95**	**Often**	**Extensive**	

The Use of Blended Instruction along with the Preparation of Modules has the highest overall weighted mean of 4.66 (Rank 1) with a descriptive equivalent of Often having a transmuted rating of Extensive, as shown by the summary of the extent of pedagogical practice across the different areas, which was manifested in Table 9. Comparatively, Interactive Learning Software Applications with Computed-Based Instruction received a rating of 4.00 (Rank 2) with a descriptor of Always and a transmuted rating of Moderately Extensive.

Table IX. Summary of Extent of Pedagogical Practice Across the Different Areas

Area	Overall Weighted Mean (OWM)	Descriptive Rating	Transmuted Rating
1. Computer-Based Instruction along Interactive Learning Software Applications	4.00	Often	Extensive
2. Computer-based instruction along Productivity Tools/Software Application	2.80	Sometimes	Moderately Extensive
3. Use of Blended Instruction along Preparation of Modules	4.66	Always	Very Extensive
4. Use of Blended Instruction along Instructional Delivery	3.44	Sometimes	Moderately Extensive
5. Use of Blended Instruction along Evaluation of Learning Outcomes	3.95	Often	Extensive
Grand Overall Weighted Mean (GOWM).	18.85 (3.55)	Often	Extensive

- Age- The computed F-value for interactive learning was 0.019, and the table indicates that it had a significant value of 0.981, which is higher than 0.05 and supports the null hypothesis. This shows that regardless of their age, PSSMTs engage in similar pedagogical strategies for interactive learning. Additionally, the computed F-value for productivity tools is 0.714, with a significant value of 0.503 (higher than 0.05) accepting the null hypothesis that there is no significant difference between the teachers' ages in terms of how often they use productivity tools.

- Sex- The computed F-value for interaction learning
- was 0.260 in the table, with a significant value of 0.215, which is greater than 0.05 and denotes the validity of the null theory. This shows that there are not many major differences between the sexes of mathematics teachers in terms of their pedagogical approaches to interactive learning.
- Number of Years of Teaching- The table showed that, for interactive learning, the computed F-value was 0.898 and had a significant value of 0.425, which is greater than 0.05, supporting the null hypothesis. This shows that regardless of how long they have been teaching, mathematics teachers' interactive learning pedagogical techniques are to the same degree.
- In-Service Training Attended in Division- The computed F-value for interactive learning, according to the table, was 0.802 with a significant value of 0.464, which is greater than 0.05 and supports the null hypothesis. This suggests that the PSSMTs' use of interactive learning in their pedagogical practices is comparable to the level of training they received from the division.
- In-Service Training Attended in Region- The computed F-value for interaction learning was shown in the table to be 0.912, with a significant value of 0.420, which is more than 0.05, so the null hypothesis was accepted. This suggests that the PSSMTs' use of interactive learning in their pedagogical methods is on par with the training they received in the area.
- In-Service Training Attended in National- The table showed that, in interactive learning, the computed F-value was 0.006 and had a significant value of 0.994, which is greater than 0.05, supporting the null hypothesis. This shows that the PSSMTs' use of interactive learning in their pedagogical practices is comparable to the national training they received.
- In-Service Training Attended at International Level- The table demonstrated that accepting the null hypothesis resulted from the computed F-value for interaction learning being 0.818 and a significant value of 0.378, which is greater than 0.05. This shows that the PSSMTs' use of interactive learning in their educational methods is comparable to the international training they received.
- Teaching Styles- From the computed F-value in interactive learning, which was 4.207 and had a significant value of 0.055, the null hypothesis can be accepted because it is greater than 0.05. This shows that the PSSMTs' pedagogical techniques in interactive learning are comparable to one another in terms of their teaching philosophies.

Table X. Significant Difference in the Extent of Pedagogical Practices of the PSSMTs Across Their Profiles

Profile	Dependent Variable	F/ t-value	Sig.	Decision
Age	Interactive Learning	0.019ns	0.981	Accept H_o
	Productivity Tools	0.714ns	0.503	Accept H_o
	Preparation of Modules	5.261ns	0.016	Reject H_o
	Instructional Delivery	0.279ns	0.760	Accept H_o
	Evaluation of Learning Outcomes	0.702ns	0.509	Accept H_o
Sex	Interactive Learning	t=2.546ns	0.128	Accept H_o
	Productivity Tools	t=3.580ns	0.075	Accept H_o
	Preparation of Modules	t=0.007ns	0.932	Accept H_o
	Instructional Delivery	t=1.293ns	0.270	Accept H_o
	Evaluation of Learning Outcomes	t=1.351ns	0.260	Accept H_o
Highest Educational Attainment	Interactive Learning	0.366ns	0.829	Accept H_o
	Productivity Tools	1.028ns	0.420	Accept H_o
	Preparation of Modules	1.202ns	0.344	Accept H_o
	Instructional Delivery	0.281ns	0.886	Accept H_o
	Evaluation of Learning Outcomes	0.817ns	0.531	Accept H_o
Number of Years of Teaching Math	Interactive Learning	0.898ns	0.425	Accept H_o
	Productivity Tools	0.745ns	0.489	Accept H_o
	Preparation of Modules	1.582ns	0.233	Accept H_o
	Instructional Delivery	0.130ns	0.879	Accept H_o
	Evaluation of Learning Outcomes	0.748ns	0.488	Accept H_o
Relevant Inservice Training Attended in District	Interactive Learning	0.331ns	0.722	Accept H_o
	Productivity Tools	2.571ns	0.104	Accept H_o
	Preparation of Modules	1.490ns	0.252	Accept H_o
	Instructional Delivery	0.975ns	0.396	Accept H_o
	Evaluation of Learning Outcomes	0.310ns	0.737	Accept H_o
Relevant Inservice Training Attended in Division	Interactive Learning	0.802ns	0.464	Accept H_o
	Productivity Tools	2.731ns	0.092	Accept H_o
	Preparation of Modules	3.612*	0.048	Reject H_o
	Instructional Delivery	1.807ns	0.193	Accept H_o
	Evaluation of Learning Outcomes	1.697ns	0.211	Accept H_o
Relevant Inservice Training Attended in Regional	Interactive Learning	0.912ns	0.420	Accept H_o
	Productivity Tools	0.900ns	0.424	Accept H_o
	Preparation of Modules	2.784ns	0.088	Accept H_o
	Instructional Delivery	1.436ns	0.264	Accept H_o
	Evaluation of Learning Outcomes	0.055ns	0.947	Accept H_o
Relevant Inservice Training Attended in National	Interactive Learning	0.006ns	0.994	Accept H_o
	Productivity Tools	0.072ns	0.931	Accept H_o
	Preparation of Modules	1.391ns	0.274	Accept H_o
	Instructional Delivery	1.016ns	0.382	Accept H_o
	Evaluation of Learning Outcomes	2.018ns	0.162	Accept H_o
Relevant Inservice Training Attended International	Interactive Learning	0.818ns	0.378	Accept H_o
	Productivity Tools	0.005ns	0.946	Accept H_o
	Preparation of Modules	0.002ns	0.961	Accept H_o
	Instructional Delivery	0.025ns	0.876	Accept H_o
	Evaluation of Learning Outcomes	0.206ns	0.655	Accept H_o
Teaching Styles	Interactive Learning	4.207ns	0.055	Accept H_o
	Productivity Tools	0.414ns	0.528	Accept H_o
	Preparation of Modules	2.061ns	0.168	Accept H_o
	Instructional Delivery	0.317ns	0.580	Accept H_o
	Evaluation of Learning Outcomes	0.483ns	0.496	Accept H_o

*Significant at 0.05 alpha level of significance
ns = Not significant at 0.05 alpha level of significance

- Age- It can be deduced that the null hypothesis is accepted because the estimated r in interactive learning was 0.082 with a significant value of 0.625, which is greater than 0.05. This shows that there is no correlation between the age of the mathematics teachers and the depth of their pedagogical approaches in terms of interactive learning.
- Sex- As shown, the computed r for interactive learning was 0.260, accepting the null hypothesis, with a significant value of 0.215, greater than 0.05. This shows that there is no correlation between the PSSMTs' level of pedagogical techniques in interactive learning and their sex.

- Highest Educational Attainment- Accept the null hypothesis because, as shown in the table, the computed F-value is 1.947, which is significantly greater than 0.05 with a significant value of 0.168. According to this, there is no discernible difference between the instructors' use of the evaluation procedures in the SDO of Urdaneta City and their greatest level of education.
- Number of Years of Teaching- The computed r for interaction learning, as shown in the table, was 0.071 with a significant value of 0.673, which is larger than 0.05, accepting the null hypothesis. This shows that there is no correlation between the PSSMTs' level of pedagogical practices in interactive learning and the number of years they have been teaching. Additionally, the computed r for productivity tools is 0.289 and has a significant value of 0.078, which is greater than 0.05, accepting the null hypothesis that there is no significant correlation between the teachers' number of years of teaching and how much they use productivity tools.
- In-Service Training Attended in District/Cluster- The table shows that the computed r for interaction learning was 0.169, with a significant value of 0.311, which is greater than 0.05, and therefore accepting the null hypothesis. This shows that there is no correlation between the quantity of PSSMTs' interactive learning pedagogical practices and the number of training sessions they attended in the district.
- In-Service Training Attended in Region- The estimated r for interactive learning, as shown in the table, was 0.005 with a significant value of 0.976, which is higher than 0.05 and accepts the null hypothesis. This shows that there is no correlation between the number of training sessions attended in the area and the degree of the PSSMTs' pedagogical practices in interactive learning.
- In-Service Training Attended in International- The computed r in interactive learning, as shown in the table, was 0.156 with a significant value of 0.349, which is greater than 0.05, accepting the null hypothesis. This shows that there is no correlation between the PSSMTs' level of interactive learning pedagogical methods and the number of foreign trainings they have attended.

Table XI. Relationship in the Extent of Pedagogical Practices of the PSSMTs and their Profiles Variables

Profile	Variable	r	Sig.	Decision
Age	Interactive Learning	0.082	0.625	Accept H_o
	Productivity Tools	0.428	0.007	Reject H_o
	Preparation of Modules	0.191	0.250	Accept H_o
	Instructional Delivery	0.494	0.002	Reject H_o
	Evaluation of Learning Outcomes	0.186	0.271	Accept H_o
Sex	Interactive Learning	0.260	0.215	Accept H_o
	Productivity Tools	0.317	0.053	Accept H_o
	Preparation of Modules	0.013	0.940	Accept H_o
	Instructional Delivery	0.182	0.363	Accept H_o
	Evaluation of Learning Outcomes	0.258	0.123	Accept H_o
Highest Educational Attainment	Interactive Learning	0.253	0.126	Accept H_o
	Productivity Tools	0.076	0.650	Accept H_o
	Preparation of Modules	0.021	0.900	Accept H_o
	Instructional Delivery	0.297	0.071	Accept H_o
	Evaluation of Learning Outcomes	0.246	0.142	Accept H_o
Number of Years of Teaching	Interactive Learning	0.071	0.673	Accept H_o
	Productivity Tools	0.289	0.078	Accept H_o
	Preparation of Modules	0.090	0.591	Accept H_o
	Instructional Delivery	0.303	0.064	Accept H_o
	Evaluation of Learning Outcomes	0.138	0.416	Accept H_o
Relevant Inservice Training Attended in District	Interactive Learning	0.169	0.311	Accept H_o
	Productivity Tools	0.167	0.315	Accept H_o
	Preparation of Modules	0.085	0.611	Accept H_o
	Instructional Delivery	0.325	0.047	Reject H_o
	Evaluation of Learning Outcomes	0.095	0.577	Accept H_o
Relevant Inservice Training Attended in Division	Interactive Learning	0.186	0.263	Accept H_o
	Productivity Tools	0.318	0.052	Accept H_o
	Preparation of Modules	0.060	0.720	Accept H_o
	Instructional Delivery	0.575	0.000	Reject H_o
	Evaluation of Learning Outcomes	0.148	0.382	Accept H_o
Relevant Inservice Training Attended in Regional	Interactive Learning	0.005	0.976	Accept H_o
	Productivity Tools	0.069	0.683	Accept H_o
	Preparation of Modules	0.123	0.462	Accept H_o
	Instructional Delivery	0.193	0.246	Accept H_o
	Evaluation of Learning Outcomes	0.000	1.000	Accept H_o
Relevant Inservice Training Attended in National	Interactive Learning	0.066	0.695	Accept H_o
	Productivity Tools	0.017	0.920	Accept H_o
	Preparation of Modules	0.231	0.163	Accept H_o
	Instructional Delivery	0.197	0.235	Accept H_o
	Evaluation of Learning Outcomes	0.122	0.474	Accept H_o
Relevant Inservice Training Attended International	Interactive Learning	0.156	0.349	Accept H_o
	Productivity Tools	0.027	0.871	Accept H_o
	Preparation of Modules	0.199	0.231	Accept H_o
	Instructional Delivery	0.148	0.374	Accept H_o
	Evaluation of Learning Outcomes	0.151	0.374	Accept H_o
Teaching Styles	Interactive Learning	0.282	0.086	Accept H_o
	Productivity Tools	0.058	0.731	Accept H_o
	Preparation of Modules	0.345	0.034	Reject H_o
	Instructional Delivery	0.081	0.631	Accept H_o
	Evaluation of Learning Outcomes	0.086	0.612	Accept H_o

CONCLUSION

The PSSMTs are well-qualified to teach one of the fundamental tool subjects that students require for pursuing higher education, Mathematics, as they are in their peak years of productivity, experienced with many years of effective teaching, and having attended pertinent in-service training at all levels. However, a lot of people are still working on their mathematics master's degrees. Secondly, computer-based instruction and blended learning are also areas where PSSMTs have extensive pedagogical experience. Third, the teaching practice of the PSSMTs has shown them to be a homogeneous group that is not notably distinct from one another. Fourth, the degree of effective pedagogical practice is influenced by several factors, including the PSSMTs' maturity, the district-level relevance of their in-service training, and their teaching methods. Lastly, there is a solid foundation for the Proposed Training Matrix for Improving the Pedagogical Practice of Public Secondary School Mathematics Teachers.

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