Faculty Readiness to Teach Mathematics in the Modern World Online

Romeo T. Quintos Jr., Ph.D.
rjtquintos@bpsu.edu.ph
https://orcid.org/0000-0002-6170-3821
Bataan Peninsula State University
Don Manuel Banzon Ave., Brgy.Poblacion, City of Balanga, Bataan 2100 Philippines

Abstract

The COVID-19 pandemic has compelled a shift to online teaching and learning in colleges and universities around the world, requiring teachers to adapt their instruction in a very short period of time—regardless of whether they were prepared. Drawing from a sample of 30 faculty and 172 students, the study investigates the teacher's level of readiness in teaching Mathematics in the Modern World in an online platform in terms of course design, course communication, time management, technical skills, and pedagogical skills and to compare the teacher and student's assessments of teacher's online teaching competencies. The study adopted the quantitative-descriptive research method. Stratified random sampling and exact population sampling were utilized. An online questionnaire was used, and the responses were analyzed quantitatively. Results revealed that teachers have a high level of ability to teach the subject online. Additionally, results showed that there is no significant difference in the assessment of online teaching as perceived by teachers and students; this infers that two groups of respondents have the same perception of faculty members' readiness to teach Mathematics in the Modern World online. Thus, a training intervention program is recommended for teachers in order to improve their competencies in instructional development, time management, technological skills, and teaching strategies.

Keywords: course communication, course design, Mathematics in the Modern World, pedagogical skills, technical skills, time management

Introduction

The operation of educational institutions is one of the highly affected divisions by the CoVid-19 Pandemic. Disruption of classes was sudden after the Philippine government ordered the halt of academic affairs of the educational sector. The situation required strategic planning and immediate action to mitigate face-to-face classes while sustaining quality education. It has challenged educators to devise various modalities and delivery options to accelerate new forms of teaching pedagogy (Tanhueco-Tumapon, 2020). Institutions across the globe decided to use the already available technical resources to create online learning material for students of all academic fields (Kaur, 2020).

Online learning, according to the US Department of Education (2010), is a transformative form of learning that takes place partially or fully over the internet. It can be highly effective in digitally advanced countries (Basilaia & Kvavadze, 2020). But to a third-world country such as the Philippines, it is a struggle. In Ookla's recent Speedtest Global Index, Philippine Daily Inquirer (2020) reported that the country falls behind to rank 110th out of 139 countries in terms of mobile data speed, having an average of 18.49 megabits per second (Mbps) as of November that year. Aside from this, a lack of academic resources due to the quick-shifting of the learning environment may lead to unsuccessful e-learning (Chua et al., 2020). Furthermore, they see that faculty members lack adequate technical skills in teaching in a virtual setup.

In the survey on student access to remote learning conducted by Bataan Peninsula State University last April 2020, it transpired that there were a number of students who struggle with internet connectivity, which particularly implies that onlan ine learning setup might not work for them. As a result, students were given a choice of whether to proceed via online or printed modular learning. The challenges of the abrupt shift to remote learning were more

visible on the part of the faculty, who are expected to keep up with technological advancements and create accessible and appropriate learning materials for virtual classrooms.

While Bawane and Spector (2009) argue that the skills required to teach online are not dramatically different from those needed to teach face-to-face, some researchers believe that teaching in the online modality is different from teaching in the classroom and that the online faculty member's role also varies (Ko & Rossen, 2017). Online faculty focuses on instructional time and space, virtual management techniques, and the ability to engage students through virtual communication (Easton, 2003).

The struggle in online teaching is especially prevailing in Mathematics classes. As a Mathematics teacher, technical difficulties in online tools and limited online activities and assessments are some of the complexities encountered in virtual classroom setup that need to be worked on. Prior research similarly reveals that mathematics instructors can have difficulty when explaining mathematical concepts visually in a blended and online distance Mathematics course (Glass & Sue, 2008). Additionally, Karal et al. (2015) believe that in an online learning environment, it is difficult to achieve sufficient interaction by showing mathematical concepts and symbols, which play an important role in mathematics education, solely through the use of a keyboard. This seems to be a burden on students and educators in the process of learning mathematics and the enhancement of skills requires enough time to achieve. Underdeveloped knowledge of how teachers' practices are impacted by the use of new technologies caused by offhand translation from face-to-face to online learning, therefore, boils down to the assessment of the faculty's readiness in teaching mathematics in a virtual classroom setup. There is a strong need to identify development areas to enhance faculty competencies in the online environment.

Objectives of the Study

This study aimed to determine the readiness of the mathematics faculty at Bataan Peninsula State University in teaching online classes during the Second Semester of A.Y. 2020-2021. More specifically, it sought to fulfill the following objectives:

1. Determine the profile of the members of the Mathematics faculty in terms of:
   1.1 sex
   1.2 academic rank
   1.3 educational attainment
   1.4 years in teaching
2. Assess the level of readiness of the teachers in an online platform in terms of:
   2.1 course design
   2.2 course communication
   2.3 time management
   2.4 technical skills
   2.5 pedagogical skills
3. Compare the assessment of faculty and student respondents in the online teaching competencies of the teachers.
4. Propose a training intervention for faculty members to enrich the competencies of faculty members on an online platform.

Methodology

The study adopted the quantitative-descriptive research method. The respondents of the study were limited to first-year college students enrolled in Mathematics in the Modern World for the second semester of A.Y. 2020-2021 at Bataan Peninsula State University and faculty members teaching the course. The student-respondents were selected regardless of the program and campus they belong to while all faculty members teaching the course were considered. Student-respondents who participated in the study were voluntary without any additional credits to the

course grade in the subject. A letter of consent was forwarded to the respondents before they were considered as subjects.

The researcher assured that the responses remain confidential and anonymous. Data from the study were kept under lock and key and published only as a collective total. No one else except the researcher knows the individual responses to the instrument used. Moreover, the researcher asked for the help of the Mathematics Professors in disseminating the information. A total of 202 respondents which comprised 30 faculty members teaching MMW and 172 students was used as subjects.

The study applied stratified random sampling and exact population sampling. Stratified Random sampling was used to determine the proportion of student-respondents per campus while exact population sampling was utilized for faculty respondents.

The study employed a survey questionnaire to answer the research questions. This questionnaire underpinned the study of Martin, F., Budhrani, K., & Wang, C. (2019). However, a modification was made to align with the research objectives.

Various statistical tools were used to analyze the data, including percentage distribution, and weighted mean. Mann-Whitney U-test and analysis of variance.

Results and Discussion

This section presents the analysis and interpretation of data relevant to determine the faculty readiness to teach Mathematics in the Modern World online

1. Demographic Profile of the Respondents

Table 1 displays the profile of the faculty respondents in terms of sex, academic rank, educational attainment, and years in teaching. and the profile of student-respondents.

Table 1
Demographic Profile of Respondents

Faculty-Respondents			Student-Respondents		
Sex	**f**	**%**	**Sex**	**f**	**%**
Female	14	47	Female	109	63
Male	16	53	Male	63	37
Educational Attainment	f	%	**Campus**	f	%
Doctorate Degree	8	27	Abucay	8	5
Master's Degree	19	63	Balanga	44	25
Bachelor's Degree	3	10	Dinalupihan	11	6
Academic Rank	f	**%**	Main	100	59
Associate Professor	9	30	Orani	9	5
Assistant Professor	15	50	**Total**	**172**	**100**
Instructor	6	20			
Year in Service	**f**	**%**			
1–6 years	5	17			
7–13 years	4	13			
14–20 years	9	30			
21 years & above	12	40			
Total	**30**	**100**			

As seen in Table 1, 63% of student-respondents are female while 37% are male which was selected across the campuses of the university by using stratified proportional sampling. For faculty respondents, 47% of the mathematics faculty members are female while 53% are male. In terms of academic rank, 50% are Assistant Professors, 30% are Associate Professors and 20% are Instructors. Moreover, 63% are with Master's degree, 27% are with Doctorate degree and only 10% are Bachelor's degree. Furthermore, 40% of the mathematics faculty members are in the institution for 21 years and above while only 17% are serving within 1 to 6 years.

Evidently, eighty percent of the mathematics faculty members served in the institution for at least 14 years and above. In addition, ninety percent of the faculty are at least a Master's Degree Holder which allows them to have higher academic rank.

Shulsinger (2017) states that earning a master's degree helps gain specialized knowledge to advance in the field. As the workforce evolves, a graduate degree shows how employees' dedication to enhancing the industry's expertise and credibility. The benefits of a master's degree can also help build on current abilities, gain new skills, or even transition to an entirely new field. It can make it easier to transition into more senior positions, such as management and leadership. Many organizations not only recognize the benefits of a master's degree but even prefer their employees to have one.

2. Level of Readiness in terms of Course Design

Table 2 reflects the level of readiness of faculty to teach Mathematics in the Modern World online platform in terms of course design.

Table 2
Course Design

Faculty-Respondents				Student-Respondents			
Statement	Mean	SD	DE	Statement	Mean	SD	DE
1. Create an online course orientation (e.g., introduction, getting started)	3.37	.49	VHLA	1.. The teacher conducts course orientation using online platform	3.33	.53	VHLA
2. Write measurable learning objectives	3.43	.50	VHLA	2. The teacher posts measurable learning objectives	3.35	.55	VHLA
3. Design learning activities that provide students opportunities for interaction (e.g., discussion forums, wikis)	2.90	.61	HLA	3. The teacher assigns activity sets which provide opportunities for interaction (e.g., discussion forums, wikis)	3.28	.65	VHLA
4. Organize instructional materials into modules or units	3.10	.71	HLA	4. The teacher provides supplementary materials such as learning modules	3.37	.62	VHLA
5. Create instructional videos (e.g., lecture video, demonstrations, video tutorials)	2.20	.66	LLA	5. The teacher provides instructional videos (e.g., lecture video, demonstrations, video tutorials)	2.51	.63	HLA
6. Use different teaching methods in the online environment (e.g., brainstorming, collaborative activities, discussions, presentations)	3.20	.61	VHLA	6. The teacher uses different teaching methods in the online environment (e.g., brainstorming, collaborative activities, discussions, presentations)	2.62	.51	HLA
7. Create online quizzes and tests	3.50	.57	VHLA	7. The teacher conducts quizzes/examinations using google forms and/or online platforms	3.55	.56	VHLA
8. Create online assignments	3.50	.57	VHLA	8. The teacher gives assignments using online platforms	3.49	.61	VHLA
9. Manage grades online	3.43	.68	VHLA	9. The teacher gives scores/grades in tasks online	3.44	.66	VHLA
Composite	**3.18**	**.38**	**HLA**	**Composite**	**3.22**	**.34**	**HLA**

Scale of Means: 3.26 – 4.0, Very High Level of Ability (VHLA); 2.51 – 3.25, High Level of Ability (HLA); 1.76 – 2.50, Low Level of Ability (LLA); 1.00 – 1.75, Very Low Level of Ability (VLLA); SD–Standard Deviation

As shown in Table 2, the highest mean provided by the faculty-respondents is on both "Create online quizzes and tests." and "Create online assignments." with 3.50, sd=5.7 while the lowest mean is on "Create instructional videos (e.g., lecture video, demonstrations, video tutorials)" with 2.20, sd=.66. Moreover, for the student-respondents,

the highest mean is on "The teacher conducts quizzes/examinations using google forms and/or online platforms." with 3.55, sd=.56 followed by "The teacher gives assignments using online platforms" with 3.49 sd=.61 and the lowest mean is on "The teacher provides instructional videos (e.g., lecture video, demonstrations, video tutorials)" with 2.51, sd=.63.

Overall, the mean of 3.18.sd=.38 for faculty-respondents and mean= 3.22, sd=.35 for student-respondents indicates that mathematics faculty members have a high level of ability in course design.

"The nature of preparation and designing a course is of worth importance. The online Instructors must have more competencies for online teaching as compared to formal education (Kim & Bonk, 2006; Redmond, 2011). In an online course, there should be a balance of knowledge and interactivity, so that students enjoy learning within the course." as mentioned in the study of Khurshid (2020)

Osika (2009) found out that some ideas to demonstrate and promote the quality of online courses could include 1) conducting an exemplary course program that highlights the quality of the online course and showcases the faculty who have created rigorous online instructional environments for their students; 2) facilitating workshops that outline the criteria for a quality online course which is based on solid research, and 3) hosting open discussion sessions about the potential and pitfalls of online instruction, which can include panels of faculty and students who have been involved in an online course

3.   Level of Readiness in terms of Course Communication

Table 3 illustrates the level of readiness of faculty with regard to course communication.

Table 3
Course Communication

Faculty-Respondents				Student-Respondents			
Statement	Mean	SD	DE	Statement	Mean	SD	DE
1..Send announcements/email reminders to the students of the course	3.70	.47	VHLA	1. .The teacher uses email and /or online platforms to communicate.	3.65	.60	VHLA
1..Create and moderate discussion forums	2.53	.57	HLA	2. The teacher facilitates discussion forums	2.43	.64	LLA
2..Respond to student questions promptly	3.57	.50	VHLA	3. The teacher responds to questions promptly	3.38	.70	VHLA
3..Provide feedback on assignments (e.g., 7 days from submission)	2.90	.71	HLA	4. The teacher provides feedback on assignments (e.g., 7 days from submission)	3.31	.75	VHLA
4. Utilize synchronous web-conferencing tools (e.g., Zoom, Google Meet, Blackboard Collaborate, Skype)	3.57	.50	VHLA	5. The teacher uses synchronous web-conferencing tools (e.g., Zoom, Google Meet, Blackboard Collaborate, Skype)	3.60	.58	VHLA
5. Communicate expectations about student behavior in the online classes (e.g., netiquette)	3.40	.72	VHLA	6. The teacher discusses expectations about student behavior in the online classes (e.g., netiquette)	3.40	.62	VHLA
6. Communicate compliance regarding academic integrity policies	3.17	.59	HLA	7. The teacher reminds the students not to plagiarize someone else's words, ideas or data, and not to copy in the examination	3.58	.59	VHLA
7. Apply copyright law and fair use guidelines when using copyrighted materials	3.13	.43	HLA	8. The teacher acknowledges reference materials by citing the source link	3.45	.68	VHLA
8..Give emphasis on important points in information resources (in lectures, discussion, etc)	3.50	.51	VHLA	9. The teacher gives emphasis on important points in information resources (in lectures,discussionsn, etc)	3.53	.64	VHLA
Composite	**3.27**	**.38**	**VHLA**	**Composite**	**3.37**	**.44**	**VHLA**

In the Table, for faculty-respondents the highest mean of 3.70, sd=.47 is on "Send announcements/email reminders to the students of the course" and the lowest mean of 2.53, sd = .57 is on "Create and moderate discussion forums." while for student-respondents the highest mean is on "The teacher uses email and /or online platforms to

communicate." with 3.65,sd=.60 and the lowest mean is on "The teacher facilitates discussion forums." with 2.43, sd = .64.

As a whole, the mean = 3.27, sd=.38 for faculty-respondents and mean 3.37, sd=.44 for student-respondents denotes that faculty members have a very high level of ability in course communication.

As cited in Connections Academy (2020) online teacher's job is to be available when students have a question or need help. Since classes aren't held in person, teachers should provide ways to contact them and respond quickly whenever someone reaches out. Email, video conferencing, and phone calls are some of the tool's teachers use to stay connected to their students. Regular and consistent feedback becomes even more important in a virtual classroom.

4. Level of Readiness in terms of Time Management

Table 4 presents the level of readiness of faculty with respect to time management.

Table 4
Time Management

Faculty-Respondents				Student-Respondents			
Statement	Mean	SD	DE	Statement	Mean	SD	DE
1. Use features in learning management system in order to manage time (e.g., google calendar)	2.37	.62	LLA	1. The teacher schedules learning sessions using google calendar	2.65	.54	HLA
2. .Use facilitation strategies to manage time spent on the course (e.g., discussion board, collective feedback, etc.)	2.30	.75	LLA	2. The teacher uses different strategies such as discussion board and the likes to manage time spent on course	2.46	.67	LLA
3. Spend weekly hours to grade assigned tasks	2.93	.58	HLA	3. The teacher sends score/grade on the assigned tasks within a week	3.28	.76	VHLA
4. Course syllabus is available for students at the beginning of term	3.57	.57	VHLA	4. .The teacher posted the course syllabus at the beginning of term	3.55	.62	VHLA
5. Assignment due dates and submission instructions are clear and provide adequate advanced notice	3.63	.49	VHLA	5. .The teacher assigns due dates and clarifies submission instructions and provides adequate advanced notice	3.48	.60	VHLA
6. .Conduct the course according to the expectations and schedule presented in the syllabus	3.30	.65	VHLA	6. The teacher conducts the course according to the expectations and schedule presented in the syllabus	3.44	.63	VHLA
7. .Make self–available and schedule time for consultation	3.47	.51	VHLA	7. .The teacher is easy to communicate and allot time for consultation	3.35	.70	VHLA
8. Allocate time to learn about new strategies or tools	3.07	.52	HLA	8. The teacher explores different features of an online platform	3.34	.67	VHLA
9. .Provide additional support materials and references ahead of the scheduled lesson	3.03	.56	HLA	9. The teacher provides supplementary materials and support references are accessible ahead of the scheduled lesson	3.38	.63	VHLA
Composite	**3.07**	**.32**	**HLA**	**Composite**	**3.21**	**.41**	**HLA**

Based on Table 4, the highest mean for faculty-respondents is on "Assignment due dates and submission instructions are clear and provide adequate advanced notice" with 3.63, sd=.49 and the lowest mean is on "Use facilitation strategies to manage time spent on the course (e.g., discussion board, collective feedback, etc.)" with 2.30, sd=.75. For student-respondents, the highest is on "The teacher posted the course syllabus at the beginning of term." with 3.55, sd=.62. and the lowest is on "The teacher uses different strategies such as discussion board and the likes to manage time spent on the course." with 2.46, sd=.67.

The composite mean = 3.07, sd=.32 for faculty-respondents and mean=3.21, sd=3.2 for student-respondents shows that faculty members have a high level of ability in time management.

Wingo et.al (2017) pointed out that issues of time commitment and workload were viewed as barriers to teaching online as well. Seaman 2009 as mentioned in the study of Simon (2012) stated that teachers who have not been trained to teach online often assume that online teaching takes less time than face-to-face teaching. On the other hand, teachers with online teaching experience often comment on the fact that online teaching takes more time than face-to-face teaching. He also added that studying the way teachers talk about time management is thus a way to assess their level of engagement with this modality Meanwhile, Batbaatar (2021) found out that online learning has a significant influence on the time management of undergraduate students due to pandemic.

5. Level of Readiness in terms of Technical Skills

Table 5
Technical Skills

Faculty-Respondents				Student-Respondents			
Statement	Mean	SD	DE	Statement	Mean	SD	DE
1. Complete basic computer operations (e.g., creating and editing documents, managing files, and folders)	3.43	.73	VHLA	1. The teacher uses computer conferencing to develop overall critical thinking skills	3.30	.64	VHLA
2. Navigate within the course in the learning management system (e.g., Google Features Apps, Quizizz, Schoology, etc.)	2.97	.62	HLA	2. The teacher uses different features available in the online platforms	2.63	.53	HLA
3. Use online collaborative tools (e.g., Google Drive, Dropbox)	3.03	.77	VHLA	3. The teacher uses online collaborative tools (e.g., Google Drive, Dropbox)	3.24	.70	HLA
4. Create and edit videos (e.g., iMovie, Movie Maker, etc.)	2.30	.47	LLA	4. The teacher creates and edits videos using online application	2.59	.64	HLA
5. Share open educational resources (e.g., learning websites, Web resources, games and simulations)	2.90	.71	HLA	5. The teacher shares open educational resources (e.g. learning websites, Web resources, games and simulations)	3.37	.67	VHLA
6. Utilize different gadgets such as laptop, desktop, tablet, mobile phone	3.43	.57	VHLA	6. The teacher utilizes different gadgets such as laptop, desktop, tablet, mobile phone	3.44	.59	VHLA
7. Demonstrate prerequisite technology skills in hardware, software, and website use	3.00	.53	VHLA	7. The teacher demonstrates prerequisite technology skills in hardware, software and web site use	3.23	.69	HLA
8. Provide additional resources to assist students in meeting assignment expectations.	3.07	.37	HLA	8. The teacher provides additional resources as assistance to comply with assignment expectations	3.28	.71	VHLA
9. Create major examination/assessment instruments through google forms and other online platforms.	3.33	.71	VHLA	9. The teacher uses google forms and other online platforms in major examination or quizzes.	3.48	.59	VHLA
Composite	**3.05**	**.33**	**HLA**	**Composite**	**3.17**	**.40**	**HLA**

Table 5 displays the level of readiness of faculty with technical skills. The statements "Complete basic computer operations (e.g., creating and editing documents, managing files, and folders)" and "Utilize different gadgets such as laptop, desktop, tablet, mobile phone." both obtained the highest mean of 3.43, for faculty respondents while "Create and edit videos (e.g., iMovie, Movie Maker, etc.)" has the lowest mean= 2.30, sd=.47. In addition, "The teacher uses google forms and other online platforms in major examination or quizzes." has the highest mean

of 3.48, sd=.59 and the lowest mean of 2.59, sd=.64 is obtained on "The teacher creates and edits videos using the online application.". for student-respondents.

Overall, for faculty respondents with a mean=3.05, sd=.33, and for student-respondents with a mean=3.17,sd=.40 implies that faculty members have a high level of ability in technical skills.

Teachers with rich technical experience and ability in areas such as instructional technology application have helped students in need of advancing computer literacy via technology and using technology as a teaching tool (Jou & Wu, 2012) as cited by Yu Li & Lee (2016).

6. Level of Readiness in terms of Pedagogical Skills

Table 6 depicts the level of readiness of faculty in terms of pedagogical skills.

Table 6
Pedagogical Skills

Faculty-Respondents				Student-Respondents			
Statement	Mean	SD	DE	Statement	Mean	SD	DE
1. Provide continuous feedback throughout the semester, at any point within the course	3.13	.68	HLA	1. The teacher provides continuous feedback throughout the semester, at any point within the course	3.34	.66	VHLA
2. Assessment tool is appropriate to the instructional activity and the desired outcome or objective	2.90	.51	HLA	2. The teacher selects an appropriate assessment tool that is parallel to the instructional activity and the desired outcome or objective	3.36	.50	HLA
3. Develop a rubric for each activity. a rating scale that identifies students' level of mastery within each criteria	3.27	.58	VHLA	3. The teacher allows the students to use rubrics as a guide to complete an assignment/activity such as group projects, problem-solving, presentations, and performances	3.26	.71	VHLA
4. Design and develop digital-age learning experiences and assessments	2.53	.61	HLA	4. The teacher provides learning resources, information and evaluates learning output by using online platform	2.62	.65	VHLA
5. Implement appropriate instructional strategies such work collaboration, presentation and performances	2.80	.41	HLA	5. The teacher implements appropriate instructional strategies such work collaboration, presentation and performances	2.85	.45	HLA
6. Motivate students and show enthusiasm by turning on face camera during discussion	3.63	.49	VHLA	6. The teacher motivates student and show enthusiasm by turning on face camera during discussion	3.30	.53	VHLA
7. Organize asynchronous-synchronous including video, non-video, and peer learning communities	3.50	.57	VHLA	7. The teacher organizes asynchronous-synchronous including video, non-video, and peer learning communities	3.31	.56	VHLA
8. Encourage collaborative problem solving and brainstorming	3.37	.62	VHLA	8. The teacher allows collaboration of student ideas in problem-solving methods	3.28	.64	VHLA
9. Permit students to use chat to participate during discussions. Remind students that the quantity and the quality of the chat comments contribute to the participation grade	3.23	.43	HLA	9. The teacher permits student to use chat to participate during discussions and remind students that the quantity and the quality of the chat comments contribute to the participation grade	3.37	.62	VHLA
10. Use criterion-based assessment to evaluate individual and group performance/presentation	3.53	.51	VHLA	10. The teacher uses criterion-based assessment to evaluate individual and group performance or presentation	3.33	.78	VHLA
Composite	**3.19**	.21	HLA	**Composite**	**3.20**	**.31**	**HLA**

As seen in Table 6, "Motivate students and show enthusiasm by turning on face camera during discussion." has the highest mean of 3.63,sd=.49, and "Design and develop digital-age learning experiences and assessments" has the lowest mean of 2.53,sd=.61 while for student-respondents the highest mean is on **"**The teacher permits the student

to use chat to participate during discussions and remind students that the quantity and the quality of the chat comments contribute to the participation grade." with 3.37,sd=.62 and the lowest is on "The teacher provides learning resources, information and evaluate learning output by using an online platform." with 2.62,sd=.65.

In all, the mean=3.19, sd=.20 (faculty-respondents) and mean=3.20, sd=.31 (student-respondent) implies that faculty members have a high level of ability in terms of pedagogical skills.

Effective online pedagogy is one that emphasizes student-centered learning and employs active learning activities. "Interactivity, faculty, and student presence are essential in an effective online learning environment" (O'Neil et al.2020).

7. Summary of the Level of Readiness

Table 7 summarizes the level of readiness of faculty to teach Mathematics in the Modern World online platform as perceived by faculty and student-respondents.

Table 7
Summary of the Level of Readiness of Faculty to Teach Online

Statement	Faculty-Respondents			Student-Respondents		
	Mean	SD	DE	Mean	SD	DE
Course Design	3.18	.38	High Level of Ability	3.22	.35	High Level of Ability
Course Communication	3.27	.38	Very High Level of Ability	3.37	.44	Very High Level of Ability
Time Management	3.07	.32	High Level of Ability	3.21	.41	High Level of Ability
Technical Skills	3.05	.20	High Level of Ability	3.17	.31	High Level of Ability
Pedagogical Skills	3.19	.33	High Level of Ability	3.20	.40	High Level of Ability
Composite	**3.15**	**.24**	**High Level of Ability**	**3.23**	**.29**	**High Level of Ability**

As reflected in Table 7, among the parameters of the level of readiness the highest mean provided by the two groups of respondents is on course communication with mean=3.27, sd=.38 for faculty and mean=3.37,sd=.44 for students On the contrary, the lowest mean obtained both for two groups is on technical skills with mean=3.05,sd=.20 for faculty and mean=3.17,sd=.31 for students.

Overall, the mean=3.15,sd=.24 for faculty-respondents and mean=3.23,sd=.29 for student-respondents reveals that faculty members have a high level of ability to teach Mathematics in the Modern World online.

In-school help and support are also critical. Working online means teachers have 'to adapt to new pedagogical concepts and modes of delivery of teaching for which they have not been trained' (Schlichter 2020) as cited by Winter (2021).

Munoz (2013) in the study of Sherer (2021), showed that more experienced "online" teachers also have higher self-confidence in their pedagogical competencies to teach online. A recent study by Martin (2019) on teachers' perceptions of their readiness for OTL showed that experience from teaching online impacts online course design and facilitation, that is, aspects of teaching practice and presence.

In addition, Martin (2019) for course design, course communication, and technical, the faculty rated the perception of importance higher than their ability whereas for time management their perception of ability was rated higher than their attitude on importance

8. Comparison Between the Assessments of Faculty and Student Respondents

Table 8 reveals the comparison between the assessment of faculty and student respondents on the level of readiness of faculty members to teach Mathematics in the Modern World online. The comparison was carried out using the Mann Whitney U Test which is the non-parametric version of the independent samples t-test. Though these tests yield similar results in the initial testing, the non-parametric version is more appropriate considering that the

assumption of the t-test on normality was not met. The mean ratings were not used for the comparison since the data did not comply with this assumption. Hence, mean ranks were utilized for comparison.

Table 8
Comparison between the Assessments of Faculty and Student Respondents

Readiness	Group	N	Mean	Mean Rank	Mann Whitney U-value	Sig. Value	Remarks
Course Design	Faculty	30	3.18	100.38	2546.5 [ns]	.909	Do not reject Ho
	Students	172	3.22	101.69			
Course Communication	Faculty	30	3.27	82.35	2005.5 [ns]	.051	Do not reject Ho
	Students	172	3.37	104.84			
Time Management	Faculty	30	3.07	80.20	1941.0 [ns]	.079	Do not reject Ho
	Students	172	3.21	105.22			
Technical Skills	Faculty	30	3.05	96.78	2041.5 [ns]	.121	Do not reject Ho
	Students	172	3.17	102.32			
Pedagogical Skills	Faculty	30	3.19	83.55	2438.5 [ns]	.630	Do not reject Ho
	Students	172	3.20	104.63			
Overall	**Faculty**	**30**	**3.15**	83.87	2051.0 [ns]	**.073**	**Do not reject Ho**
	Students	**172**	**3.23**	104.58			

**significant at 0.01 level, ns – not significant at 0.05 level.

Based on Table 8, taken singly, each parameter of the faculty readiness to teach Mathematics of the Modern World online posted a non-significant difference as shown by the corresponding sig. values of greater than .05. Likewise, the overall result of the comparison on the assessment of the two groups of respondents also posted a non-significant difference.

This infers that the perception of both faculty and student-respondents are the same on the level of readiness of faculty members to teach Mathematics in the Modern World online.

Faculty and students encountered challenges such as technology, workload, digital competence, and compatibility. They concluded that education would become hybrid, face-to-face, and online instructions (Adedoyin and Soykan, 2020) as mentioned by Almahasees (2021).

Kulal & Naiyak (2020) in their study reveal that students are comfortable with online classes and are getting enough support from teachers but they do not believe that online classes will replace traditional classroom teaching. It also finds that teachers are facing difficulties in conducting online classes due to a lack of proper training and development for doing online classes. Technical issues are the major problem for the effectiveness of the online classes.

9. Proposed training intervention for faculty members to enrich the competencies of faculty members in an online platform

The study revealed several points that could be enhanced in improving the capabilities of faculty members to deliver quality education. The enhancement, delivery, and, development of course materials shall be given emphasis in the program.

Table 9 presents the matrix of the proposed intervention program.

Table 9
Proposed Training Program

Topic	Objectives
Instructional materials development	This will help participants in converting course content into educational materials.
Content delivery in Flexible Learning	A basic idea of all the common techniques used for transmitting an online lesson
Various Modes of Assessment	This program will introduce participants to a variety of learning assessment methods, with a focus on flexible learning.
Workshops	This will guide the participants in developing their course materials such as course, packets, activity sheets and learning assessments.

According to OECD's Teaching and Learning International Survey (TALIS 2018) 40% of teachers had no professional development in technology use and almost 20% saw a high need for more training. Younger teachers were found to use technology more frequently than older colleagues as were teachers who had in-service training. The National Literacy Trust (Picton 2019) found that most teachers supported using technology but cited lack of training as the major barrier. Almost a quarter (23.3%) had no training in using technology in literacy teaching. Research shows that training is essential if teachers are going to integrate technology successfully (Hepp, Fernandez, and Garcia 2015). Teachers must know how and when to use technology which, when used appropriately, is an important tool in the classroom (Hollebrands 2020). Teachers' levels of technological skills and capacity to adapt both the quality and quantity of curriculum are essential for success" as mentioned by Winter (2021).

Teachers will need significant professional development and training opportunities to learn not just how to teach remotely effectively, but also how to assist students learning remotely who may not have used these platforms and technologies before (Sargard 2020).

Conclusion

Based on the indicated findings the following conclusions were drawn:

1. Faculty members have a high level of ability to teach Mathematics in the Modern World Online in terms of course design, time management, technical skills, and pedagogical skills while very high level of ability in course communication.

2. There is no significant difference between the faculty and students' perception of the level of readiness of faculty to teach MMW.

Recommendation

Findings revealed that faculty members have a high level of ability to teach online. However, there were some areas that need to enhance. As a result, the following recommendations were made.

1. Provide more opportunities for faculty members to participate in different webinars that will contribute to enhancing the teaching capabilities online.
2. Conduct future research focusing on the academic performance of students.

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