Pedagogical Competence of Teachers and Online Engagement of Junior High School Students in the New Normal

P. J. D. Mamacos[a], Louie Resti S. Rellon[b]
Mathematics Department, University of Mindanao, Davao City, Philippines
e-mail: [a]pmamacos@umindanao.edu.ph, [b]louie_rellon@umindanao.edu.ph

Abstract

Most students are struggling in this new learning method and their engagement in learning math is deemed to be adversely affected due to limited interactions and accessibility in an online mode of learning, thereby affecting their motivation and achievement. Hence, this study looked into the domain of pedagogical competence of teachers that significantly influence students' online engagement in the new normal. This study utilized non-experimental quantitative research design employing a descriptive-correlation technique to 100 junior high school students of the research locale identified through random sampling method. The research instrument of this study used two sets of questionnaires in accordance with its declared variables. Results of the data were analyzed using Mean, Standard Deviation, Pearson r correlation, and Linear Regression analysis. Descriptive results of the study revealed that teachers' pedagogical competence and online engagement of the respondents both obtained a high descriptive level. Furthermore, inferential results of the study suggested there is no significant relationship between teachers' pedagogical competence and online engagement of junior high school students in mathematics. Given these results, it is highly encouraged that the school must have constant teachers' professional development programs that can strengthen the abovementioned significant pedagogical competence domains affecting the students' learning engagement.

Keywords: Instructional materials, knowledge of subject matter, mathematics, new normal, online engagement, pedagogical competence, teaching style/techniques

INTRODUCTION

The COVID-19 pandemic has affected educational systems worldwide, leading to the near-total closures of schools, universities and colleges. Most governments around the world have temporarily closed educational institutions in an attempt to reduce the spread of the COVID-19 virus. With this, online learning has become a critical lifeline for education, as institutions seek to minimize the potential for community transmission. Online classes were considered the best option to continue schooling but most students are struggling in this new learning modality. Aside from the fact that there are developing countries that are having hard time managing this mode of learning due to poor internet connection, learning math has become more challenging in this new normal. Students' engagement in learning math is deemed to be adversely affected due to limited interactions and accessibility in an online mode of learning, thereby affecting their motivation and achievement.

Consequently, teachers were not also prepared in facing the challenges brought by the COVID-19 pandemic. The abrupt switch to fully online learning has been particularly stressful for many teachers who prefer in-person instruction because it is often stigmatized as a weaker option that provides a lower quality education than in-person face-to-face learning (Hodges et al., 2020). Hence, there would be more barriers that would hinder learning success such as teacher's learning communication skill, teaching style/techniques, the use of instructional materials and knowledge of the subject matter especially in adopting the new normal situation of education. Although these online methods may be an efficient method of delivering content, they are not particularly effective in promoting active learning and interest (Bates & Galloway, 2012).

Thus, this would affect students' engagement particularly in developing student's skills, emotion, participation and performance.

Globally, such negative attitudes to fully online learning were revealed by a large EDUCAUSE survey (Pomerantz & Brooks, 2017). The survey of 11,141 faculty members from 131 U.S. educational institutions found that only nine percent of faculty prefers to teach a fully online course. In other words, a whopping 91 percent of faculty do not wish to teach in a completely online environment. Students' opinions of fully online courses are not much better; a recent study survey by EDUCAUSE of more than 40, 000 students across 118 American academic institutions revealed that as many as 70 percent of the respondents mostly or completely prefered face-to-face learning environments (Gierdowski, 2019).

In the Philippines, schools in the higher education level have rushed to convert their teaching and learning to remote, online options – a massive shift that will have generational reverberations (Lederman, 2020). In the secondary level, the Department of Education (DepEd) announced the alternative delivery mode called the distance learning to cope with new normal situation. This modality has three types such as the Modular Distance Learning (MDL), Online Distance Learning (ODL), and TV/Radio-Based Instruction. Some schools in the secondary level still prefer using the ODL even though there are problems on the access of technology as well as problem in internet connection. It was added by the Manila Bulletin that audio clarity, outdated device and software, system glitch and students' short attention span are the common problems they occur during online classes (Amadora, 2020). With this, many teachers especially teaching mathematics have had to improvise quick online learning solutions (Hodges et al., 2020) in which their pedagogical competence is at risk.

With this, it has been said that a well-planned online learning lesson is markedly different from the emergency online teaching offered in response to a crisis (Hodges et al., 2020). Consequently, teachers' pedagogical competence is greatly affected due to this abrupt shift of learning modalities caused by the COVID-19 pandemic. Most teachers now especially those who are teaching mathematics are less motivated and having a hard time in using the appropriate instructional materials and in selecting the best teaching style. Mostly it is hard to communicate with the students due to unintentional reasons like poor internet connection. In order to address the problem of poor students' engagement during online mathematics classes, the researcher would like to give remedy to this issue by determining the relationship of pedagogical competence of teachers and online engagement of junior high school students in the new normal set-up.

Online learning in the new normal refers to the prevailing educational approach that combines online and digital technologies with traditional in-person learning. This approach has become the standard in many educational settings due to the challenges and changes brought about by the COVID-19 pandemic. In the new normal, education is characterized by a blended or hybrid model, where a significant portion of learning occurs online. This combines in-person classes with digital resources and virtual instruction. Online learning relies on the integration of technology, such as learning management systems, video conferencing platforms, and digital content, to deliver educational materials, facilitate communication, and manage coursework. In essence, online learning in the new normal reflects the shift in education towards a more digitally integrated, flexible, and adaptable model. It has become an essential part of the educational landscape, serving both traditional students and learners of all ages, especially in the context of changing global circumstances.

The COVID-19 has inflicted havoc since its outbreak across the world and like any critical sector, education has been hit hard. Students, schools, colleges and universities have been deeply impacted since most

governments around the world have temporarily closed educational institutions in an attempt to reduce the spread of COVID-19. With this, online learning has become a critical lifeline for education, as institutions seek to minimize the potential for community transmission (Murphy, 2020). Technology can enable teachers and students to access specialized materials well beyond textbooks, in multiple formats and in ways that can bridge time and space (Reimers & Schleicher, 2020).

This situation is also true in the Philippines wherein face-to-face mode of teaching is prohibited. With this, the government through the Department of Education (DepEd) announced an alternative delivery mode and online classes to cope with new normal situation which would be adopted. This is in accordance to the recommendation of UNESCO in response to school closure caused by the pandemic to use distance learning programs and open educational applications and platforms so that schools and teachers can reach learners remotely and limit the disruption of education.

However, during the implementation of the alternative delivery mode especially those who were adopting online learning in teaching Mathematics in secondary level, many instructors have had to improvise quick online learning solutions (Sinclair, 2014). With this, pedagogical competence of teachers such as the use of instructional materials, learning communication skill, knowledge of subject matter, teachers' teaching style/techniques were greatly affected due to the fact that teachers are adjusting to the new mode of delivery implemented by the school (Khan et al., 2017).

In addition, since the current educational initiatives are in a state of abrupt shift in response to the current crisis, some results found out that the students' engagements such as presentation of their skills and performance as well as showcasing of their emotion and participation during classes were challenged (Hodges et al., 2020). Although these online methods may be an efficient method of delivering content, they are not particularly effective in promoting active learning and interest (Bates & Galloway, 2012).

In this connection, the current situation poses problem to teachers handling online learning in Mathematics in relation to students' engagement. Indeed, without any active learning activities such as peer interaction, a fully online course will feel more like an interactive book than a classroom (Sutterlin, 2018). With this, there is a need to revisit teachers' pedagogical competence to improve students' engagement using online learning in teaching Mathematics. In order to address these problems, the researcher would like to understand the relationship of pedagogical competence of teachers and online engagement of junior high school students in the new normal.

This study intended to determine the domain that significantly influences the online engagement of junior high school students in the new normal in the post-pandemic time. Specifically, this study aimed to find out the level of pedagogical competence of teachers as perceived by the junior high school students in terms of use of instructional materials, learning communication skill, knowledge of subject matter, and teachers' teaching style/techniques and the level of online engagement of junior high school students in terms of skills, emotion, participation, and performance. Also, this study finds out the significant relationship between pedagogical competence of teachers and online engagement of junior high school students' in the new normal post-pandemic period and identifies the domain of pedagogical competence that significantly influences online engagement of junior high school students in the new normal.

METHOD

This study utilized the non-experimental quantitative design employing descriptive-correlation technique. The quantitative-descriptive was used since the study involves collection of data in order to answer questions

concerning the correct status of the subject specifically the level of pedagogical competence of teachers teaching Mathematics as well as the level of online engagement of junior high school students. It is the specification of methods and procedures for acquiring the information needed and the overall operational pattern or framework of the project that stipulates what information is to be collected from which sources by what procedures.

The respondents of this study were the 100 junior high schools' students under the Science, Technology and Engineering (STE) Program in the research locale that underwent online teaching in learning mathematics. The researcher utilized the random sampling method as its sampling technique in which the respondents will be chosen equally from each grade level of junior high school. This kind of technique was used in this study in order to be unbiased in the representation of the total population of the respondents since each member of the subset carries equal opportunity of being chosen as a part of the sampling process (Creswell & Poth, 2016). The identified and selected samples were sufficient enough to statistically compute the data that was gathered in preparation for answering the questions and problems raised in this study.

In order to gather data, collect responses and accumulate information for data analysis a research instrument was to be used. This study used two sets of questionnaires in accordance with its declared variables. The research instruments in the study were adopted with slight modifications from the questionnaire on pedagogical competence of teachers and students' academic achievement in junior high school in Ashaiman, Kporyi and Arko (2021) and Evaluation of Teachers' Pedagogical Competencies and Academic Performance of Secondary School Students in Rivers State by Asuru and Ikpa (2020). Also adapted in the Development of Indonesian Teacher Competence Questionnaire by Panggabean and Himawan (2016) and Teaching Strategies Used by Mathematics Teachers in the Jordan Public Schools and Their Relationship with Some Variables by Hamzeh (2014) for the independent variable in addition to Online Student Engagement questionnaire by Dixson (2015) for the dependent variable.

With this, the developed instruments were validated by the panel members and technical experts in research with the corresponding results of 4.3 (see appendix F). The adopted questionnaire was subjected also for reliability testing. There were 20 grade 9 students that served as respondents during the reliability testing. The said respondents during the reliability testing were not included in the 100 respondents during the conduct of the study. The Cronbach alpha of the independent variables was equal to 0.941 and the dependent variables was equal to 0.799 (see appendix E). The reliability analyses for both variables were all higher than the 0.05 set alpha level which means that the instrument used in this study is reliable.

There were 32 total questions for the independent variable with five questions under the use of instructional materials, and learning communication skills, 8 questions about knowledge of subject matter, and 14 questions under the teacher teaching style/techniques while a total of 22 questions for the dependent variable having five questions under skills, emotion and six questions under participation and performance. In the process of interpreting the data, both the two variables used a five-point Likert Scale based on the instrument author's prescription with the researcher's slight modifications having five (5) as the highest and one (1) as the lowest.

The study used the respondents' collected data for analysis. Descriptive Statistics such as Mean and Standard Deviation as well as Inferential Statistics such as Pearson *R* test and Linear Regression Statistics were used as the statistical treatment analysis of the study.

Mean. This is commonly used to measure the central tendency. Central tendency

identifies a single value as representative of an entire distribution. It also provides an accurate description of the entire data. In this study, mean was used to determine the level of pedagogical competence of teachers teaching Mathematics as well as the level of online engagement of junior high school students.

Standard Deviation (*SD*). This is a measure of how dispersed the data is in relation to the mean. Low standard deviation means data are clustered around the mean indicating that the values tend to be close to the mean of the set while a high standard deviation indicates that the values are spread out over a wider range.

Pearson *r* test. This is one type of inferential statistics. It is used to determine whether there is a significant relationship between the means of two groups (Creswell & Poth, 2016). This study used this type of analysis as hypothesis testing to determine the relationship between pedagogical competence of teachers and online engagement of junior high school students in the new normal.

Linear Regression. This is a predictive analysis which is used to explain the relationship between one continuous dependent variable and two or more independent variables. In this study the regression analysis was used to determine if the domain of pedagogical competence significantly influenced online engagement of junior high school students in the new normal set-up.

RESULTS AND DISCUSSION

The purpose of this study was to determine the relationship of pedagogical competence of teachers and online engagement of junior high school students in mathematics during new normal addressed four main issues, one of which was to describe the level of pedagogical competence of teachers as perceived by the students in terms of use of instructional materials, learning communication skill, knowledge of subject matter, and teachers' teaching style/techniques. As shown in Table 1 the analysis of the level of pedagogical competence of teachers in mathematics as perceived by the junior high

school students. This pedagogical competence is the ability of teachers to manage the education of students (Ubulom & Ikpa, 2019). The analysis yielded an overall mean which is equal to 4.03 indicating a descriptive level equal to high. This means that the teacher's pedagogical competence in mathematics during the new normal set-up is oftentimes evident as perceived by the students. This is in support to the idea that the success of any curriculum to be implemented needs teachers who are competent (Wamala & Seruwagi, 2013).

Table 1. Summary of the Level of Pedagogical Competence of Teachers as perceived by the Junior High School Students in the New Normal

Indicators	*SD*	Mean	Descriptive Level
Use of instructional materials	0.52	3.80	High
Learning communication skill	0.56	3.89	High
Knowledge of subject matter	0.23	4.25	Very High
Teachers' teaching style/techniques	0.22	4.20	Very High
Overall	0.26	4.03	High

Moreover, the overall mean obtained a standard deviation of 0.26 indicative of average distance of all data points to the said overall mean which suggests that there is just a small variation in the analysis or the responses of the respondents are just clustered around its mean. This is also true to each standard deviation values of each indicator. They were tiny values, implying a minimal variance in the analysis, or the replies of the respondents were grouped around the mean.

Furthermore, two indicators garnered the very high descriptive level which means that the teacher's pedagogical competence is always evident. These indicators were the knowledge of subject matter with a mean score of 4.25 and *SD* equal to 0.23, and the teachers' teaching

style/techniques with a mean score of 4.20 and *SD* equal to 0.22. Many authors believed that a teacher that masters his subject matter teaches very well since the teacher is able to perform his duty efficiently and effectively (Eina & Ajayi, 2018). It was in line with the idea of Odiri (2011) that the mastery of relevant knowledge is one of the most important attributes of the teacher. With this, teachers can help students relate lesson content to their own backgrounds which would include students' prior knowledge in understanding new concepts (Liberante, 2012) since facilitating the learning process is considered the primary aim of teaching (Ramsden, 2013) and understanding the learning behavior of students is considered to be a part of this process (Mountford, Jones, & Tucker, 2009).

On the other hand, the two remaining indicators were perceived by the junior students to be in high descriptive level which means that the teacher's pedagogical competence is oftentimes evident. Specifically, the use of instructional materials indicator obtained a mean score of 3.80 and *SD* equal to 0.52, and the learning communication skill indicator obtained a mean score of 3.89 and *SD* equal to 0.56. Even though these indicators were the lowest in this analysis, still these indicators were rated high by the students which support to the presented literature of this study about these two said indicators. Some authors believed instructional materials aimed at exploring the full potentials of the students in terms of learning thereby easing the transfer of knowledge from the teachers to the students (Esiobu, 2005).

The dependent variable of this study is the online engagement of junior high school in Mathematics which refers to the effort the learner made to promote his or her psychological commitment to stay engaged in the process of learning in order to acquire knowledge and build his or her critical thinking (Dixson, 2015). It is an essential element to keep learners motivated and help them achieve learning goals (Kehrwald, 2008; Shea et al.,

2006). In order to provide correlation with pedagogical competence of teachers, this study aimed to provide analysis results to the level of the junior students' online engagement in terms of skills, emotions, participation and performance as presented in Table 2. Still, in determining its expected result, the mean as the statistical treatment for its data analysis was used.

Table 2. Summary of the Level of Online Engagement of Junior High School Students in the New Normal

Indicators	*SD*	Mean	Descriptive Level
Skills	0.36	4.22	Very High
Emotion	0.37	4.23	Very High
Participation	0.31	4.21	Very High
Performance	0.29	3.98	High
Overall	0.19	4.16	High

As shown in Table 2, the overall mean of the level of online engagement of junior high school obtained a mean score of 4.16. This numerical analysis indicates a high descriptive equivalent level which denotes that the students' online engagement is oftentimes evident. This is in line with the results from Gerber et al. (2013) revealing that learners' coursework submissions occur as a result of academically engaged learners. The activities of the junior high school teachers in this study encouraged online and social presence, enhanced and built learner confidence and increased performances which were considered key factors in the students' engagement (Akyol & Garrison, 2008; Anderson et al., 2014; Dixson, 2015).

In addition, the standard deviation from the analysis in Table 2 obtained a score rating equal to 0.19 which is considered low. Low standard deviation means data are clustered around the mean indicating that the values tend to be close to the mean of the set.

Specifically, three out of the four indicators presented under online engagement obtained a very high descriptive level which means that these three indicators are always evident to junior high students. These indicators

were the emotion with a mean score of 4.23 and *SD* equal to 0.37, the skills indicator with a mean score of 4.22 and *SD* equal to 0.36, and the participation indicator with a mean score of 4.21 and *SD* equal to 0.31. However, the performance indicator obtained the lowest descriptive rating among the four indicators which is high. This means that this indicator is oftentimes evident to junior high school students. This indicator has a mean score of 3.98 and *SD* equal to 0.29. All of the presented standard deviation were considered low indicating that their *SD* values tend to be close to their set mean score.

As shown in Table 3 the relationship between pedagogical competence of teachers including its presented indicators and online engagement of junior high school students in the new normal. Based on the analysis in Table 3, the overall correlation showed *p*-value equal to 0.293 and an r-value equal to 0.106 suggesting to accept the null hypothesis of the study. This means that there is no significant relationship between pedagogical competence of teachers and online engagement of junior high school students in the new normal. An overall result suggested that there is no significant correlation between the two presented variables.

Table 3. Significance on the Relationship Between Pedagogical Competence of Teachers and Online Engagement of Junior High School Students in the New Normal

Online Engagement of Junior High School Students

Pedagogical Competence of Teachers	*R*	*p*-value	Decision on Ho	Interpretation
Use of Instructional Materials	-.112	0.266	Accept	There is no significant correlation
Learning Communication Skill	0.079	0.434	Accept	There is no significant correlation
Knowledge of Subject Matter	0.273	0.006	Reject	There is a significant positive correlation
Teachers' Teaching Style/Techniques	0.287	0.004	Reject	There is a significant positive correlation
Overall	0.106	0.293	Accept	There is no significant correlation

On the other hand, the analysis in Table 3 resulted that two out of the four indicators under the pedagogical competence of teachers showed a positive significant relationship with the online engagement of junior high school students in the new normal. These indicators were the "Knowledge of Subject Matter" indicator with *p*-value equal to 0.006 and an r-value equal to 0.273, and the "Teachers' Teaching Style/Techniques" indicator with a *p*-value equal to 0.004 and an *r*-value equal to 0.287. This implies that results on the analysis of these indicators suggested that as the teachers' pedagogical competence in terms of their knowledge of subject matter as well as their teachers' teaching style/techniques increases or become better, junior high school students' online engagement also will increase or improve during this new normal set-up.

Lastly, the two remaining teachers' pedagogical competence indicators were not significant correlated with the online engagement of junior high school students in dealing mathematics subject in the new normal. These indicators were the "Use of Instructional Materials" indicator with *p*-value equal to 0.266 and an *r*-value equal to -0.112, and the "Learning Communication Skill" indicator with *p*-value equal to 0.434 and an *r*-value equal to 0.079.

Based on the analysis presented in Table 4, the overall result obtained a *p*-value of 0.001 and *F*-value of 4.884. This means that Pedagogical Competence of Teachers had a significant influence Online Engagement of Junior High School students in the new normal. This also implies that the regression model used in the analysis of the study was found to be useful and that there is validity in the interpretation on the assumption to predict which teachers' pedagogical Competence had a significant influence Junior High School students' online engagement.

Table 4. Regression Analysis on the Significant Influence of Pedagogical Competence of Teachers on the Online Engagement of Junior High School Students in the New Normal

Online Engagement of Junior High School Students

Pedagogical Competence of Teachers	Unstandardized Coefficients		Standardized Coefficients				
	B	Std. Error	Beta	t	Sig.	Decision on Ho	Interpretation
Constant	2.677	0.428		6.248	0.000		
Use of Instructional Materials	0.093	0.042	0.254	2.201	0.030	Reject	Significant
Learning Communication Skill	0.064	0.039	0.189	1.641	0.104	Accept	Not Significant
Knowledge of Subject Matter	0.168	0.079	0.206	2.137	0.035	Reject	Significant
Teachers' Teaching Style/Techniques	0.209	0.082	0.247	2.552	0.012	Reject	Significant

$R = 0.413$, $R^2 = 0.171$, F-Value = 4.884, p-value = .001

Specifically, it was found out that three out of the four domains of teachers' pedagogical competence significantly influenced the online engagement of junior high school students in mathematics during the new normal set-up. Hence the null hypothesis that no domain of pedagogical competence that significantly influences online engagement of junior high school students in the new normal is rejected. These domains were the Use of Instructional Materials with a p-value is equal to 0.030 and t-value equal to 2.201, the Knowledge of Subject Matter domain with a p-value equal to 0.035 and t-value equal to 2.137, and the Teachers' Teaching Style/Techniques domain with a p-value equal to 0.012 and t-value equal to 2.552. Consequently, the analysis obtained a coefficient of determination (R2) equal to 0.171 implying that the analysis using this statistical treatment is useful at 17.1 percent predictive power. This simply means 17.1 percent on the variability of the online engagement of junior high school students in mathematics during the new normal set-up can be explained by the domain of teachers' pedagogical competence perceived by the said students.

Furthermore, the extent of the influence of the three teachers' pedagogical competence as perceived by junior high school students to their online engagement in mathematics during the new normal set-up as presented in column B in table 4 showed a numerical figure of 0.093 for the use of instructional materials, 0.168 for the knowledge of subject matter, and 0.209 for the Teachers' teaching style/techniques. These numerical data results suggested as these three significant teachers' pedagogical competence increases by one point, the online engagement of junior high school students in the new normal post-pandemic period also increases by 0.093, 0.168 and 0.209 respectively.

CONCLUSIONS

During the new normal set-up of education, teachers' knowledge of the subject matter as well as their styles and techniques in teaching were highly evident in them as perceived by the students. This means that even during pandemic, teachers were still competent and were still able to provide quality teaching environment. Teachers provided teaching content which is necessary for students' learning. On the contrary, teachers during the new normal were still highly perceived by the students in terms of their instructional materials use and their learning communication skill. Although these pedagogical competencies were perceived lower by the students from previous presentation, still these pedagogies were highly manifested by the teachers. Limitations on the resources due to online learning situations such as issues in signal and lack of necessary

technologies as presented in literature were considered factors of not possessing these competencies in the full extent during the new normal set-up.

Consequently, junior high school students during their online engagement in their mathematics subjects in the new normal set-up very highly engaged participative and emotional. Students complied all their requirements, assignments and problem sets given to them by their teachers with eagerness. They were very emotional especially on their work remarks and feedbacks. However, they find it challenging when discussion was done in groups and also when they need to perform on something due to uncontrollable factors such as issues in signal and lack of necessary technologies in order to perform the necessary task with quality.

Furthermore, there is no significant relationship between the overall pedagogical competence of teachers and the overall online engagement of junior high school students in the new normal. This is in support to the study which uphold that teachers' general academic ability does not affect their instruction. Moreover, there is no correlation between students' academic performance and teacher's pedagogical effectiveness. However, teacher's pedagogical competence in terms of their knowledge of subject matter and their teaching style/techniques showed to have a significant positive correlation to students' online engagement. This means that an increase in teachers' knowledge in handling mathematics subjects and the more varied and relevant the teachers' teaching style/technique lead to an increase of online engagement of junior high school.

Lastly, teachers' pedagogical competence in terms of the use of instructional materials, knowledge of the subject matter, and teaching style/technique significantly influenced on online engagement of junior high school students in the new normal. It is stressed that a professionally qualified teacher no matter how well trained would be unable to put his ideas into practice if the school setting lacks the equipment and materials necessary for him or her to translate his competence into reality to make students to be engaged in the learning process. Also, to create an ideal atmosphere in the classroom, teachers need a necessary teaching style that can foster student class engagement. Lastly, one of such skills and of course, the most important variable that enhances teacher effectiveness is the knowledge/mastery of the subject matter.

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