

Assessment of Multiple Intelligence Levels of Pre-service Economics Teachers for Effective Use of Online Learning Platform in Enugu Metropolis

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Abstract--- This study investigates Multiple Intelligence levels of pre-service Economics teachers for effective use of online learning platforms. Multiple Intelligence determines the intelligence areas of an individual in educational activities including online learning. The objective of this study is to analyze the Multiple Intelligence levels of pre-service Economics teachers at the University of Nigeria, Nsukka for effective use of online learning in learning Economics concepts. The population of the study was 141 pre-service Economics teachers and all the population was used since the number is manageable. A questionnaire designed by the researcher was used for data collection. Descriptive statistics were used to analyze the data. The findings showed that pre-service Economics teachers' mean averages in the categories of Multiple Intelligence in online learning in learning Economics concepts were the same. It was also revealed that male students dominate in logical-mathematical type in online learning when compared to other intelligence types than their counterparts. Therefore, this study recommends that lecturers should encourage pre-service Economics teachers to use activities in line with their dominant intelligence for effective use of online learning platforms. Moreover, different kinds of online learning platforms should be made available for student-teachers.

Keywords--- Multiple Intelligence, Economics, Pre-service Economics Teachers, Online Learning.

I. Introduction

Online learning in education system has been a concern to educators in this post Covid-19 pandemic and it is a modern way of learning in this technological trend. It has been in existence for past decades causing the traditional way of face to face learning to phase out gradually especially in this Covid-19 pandemic to keep students safe. Also, it involves different kinds of technological devices for effective and efficient learning which could reach to the learners both far and near. Online learning permits distance learning because it helps the lecturers and students to interact wherever they are ((Allen & Seaman, 2015; Baruah, 2018). This suggests that learning can take place at any time without minding the distance. Studies (Karwati, 2014, Murphy, 2020) found that online learning is effective in teaching and learning and it is interactive in nature. Keengwe and Kidd (2010) define online learning as a computer-based learning platforms and delivery methods that involves genres, multimedia, simulations, educational programming, games and mobile platform. Nguyen (2015) define online learning as internet learning. Internet learning in Nguyen definition suggests that students can search and read information through internet. Some of the course context are uploaded in the internet which gives the students especially pre-service Economics teachers access to easily get materials they need for effective learning. During the invention of Covid-19 pandemic in the year 2020, these course contexts uploaded in the internet were very helpful when the schools were shutdown.

Coronavirus pandemic (Covid-19) was a viral disease that affect the whole world which made the World Health Organization (WHO) to declare it as public health challenge. This viral disease has cause serious economic, social, and psychological disruption (Amzata, Aminub, Kolob, Akinyeleb, Ogundairob and Danjibo, 2020). Since it came into existence in 2019, the various human activities are in epileptic stage especially in education system. Many schools in different countries including Nigeria were shut down in 2020 (Adelekun, 2020). The coronavirus pandemic is not what can be eradicated automatically, Government ordered schools to resume with strict measures to control the widespread of the disease. One of these measures is online learning which promotes social distancing from learners. Most schools in Nigeria encourage online leaning and use it in teaching and learning especially Economics to meet up education standard.

Economics is a subject taught in senior secondary schools for a better understanding of economics activities in the society. It is a subject necessary for every individual because it deals with interaction with the environment, decision making and utilization of scarce resources for the purpose of finding possible solution to economic problems. Basic Economics is important for individuals for the purpose of understanding the effects of national and global economic conditions in the society (Ugwu & Ugwu, 2015). The subject is taught by the teacher who underwent training at the Universities or colleges of Education. These pre-service Economics teachers are meant to understand different pedagogy needed for easy transfer of knowledge to the learners especially during this post Covid-19 era where online learning platform is highly commendable in education system.

Pre-service Economics teachers in higher institutions of learning are future Economics teachers that are undergoing teacher training program on how to impact knowledge to the learners. These pre-service teachers are in different institutions learning different courses for a better effective delivery of instructions. Pre-service teachers today especially in Nigeria are inadequate of blending their learning with technology, not that they don't offer some course in Information Communication technology (ICT) but it could be the level of intelligence towards the use of technology. Khalid, Karim and Husnin (2018) opined that teachers' skills and attitudes affect the decision they make when planning their teaching. Husnin further found that many teacher education institutions offer one or two technology course which may not be enough to give the pre-service teachers the knowledge needed to integrate online learning in their teaching. This view corroborates with Apau (2017) who found that the curriculum designers of colleges of Education and Universities have not develop courses and opportunity for students-teachers to adequately understand and make research for the implications of technology classroom practice. Although, individual difference in learning can affect the rate at which Pre-service Economics teachers view online learning platforms.

Furthermore, most of them might have the knowledge of using WhatsApp, internet, mails, blogs among others in different activities other than teaching and learning. Using online platform in teaching and learning involves act of thinking and identifying Multiple Intelligence areas of individuals. According to Babacan and Dilci, individual differences brought about disparity between individuals in thinking and Multiple Intelligence areas. There is need to know the strengths and weaknesses of the students in learning with online platform to enable the instructors to effectively impart the knowledge.

Pre-service Economics teachers' intelligence could determine the use of online learning platform in teaching and learning. Babacan and Deilci (2012) defined intelligence as a brain structure that comprises different parts. Harward Gardner developed eight (8) separate types of intelligence as follows: verbal-linguistic intelligence, Logic-Mathematical intelligence, Musical intelligence, Spatial Intelliegnce, Bodily-Kinesthetic intelligence, interpersonal intelligence, intrapersonal intelligence and Naturalist intelligence (Snowman, McCown & Biehler, 2009). These intelligences seem to be independent of one another, but an individual would likely exhibit difference levels of skills in each of these intelligence.

Gardner (1999a, b) define the core components of eight classification of intelligence as follows:

- Logical-Mathematical Intelligence: it deals with the ability to handle long chains of reasoning, perform mathematical operations, analyse issues scientifically, it associates with mathematical thinking.
- Linguistic Intelligence: It consists of sounds, rhythms, meanings of words and different functions of language. Ability to remember information.
- Musical Intelligence: It deals with music performance, compositions, manipulating music instrument, composing songs and different forms of musical expressions.

- Spatial Intelligence: Ability to create mental images for the purpose of finding solution to a problem. Transform one's initial perceptions. Designers. Cartoonists
- Bodily-Kinesthetic Intelligence: Using one's physical body to solve problems. Power to use mental skills to direct bodily movement.
- Interpersonal Intelligence: Sensitive to other peoples' moods, temperaments, motivations, intentions. It gives the ability to work with others effectively.
- Intrapersonal Intelligence: To identify one's own feelings and the ability to differentiate them and guide behaviours. Sensitive to one's own strengths, weaknesses, desires and intelligences.
- Naturalist Intelligence: Ability to recognize different kinds of plants and animals within one's environment and the ability to interact with living creatures.

Consequently, pre-service Economics teachers need the skills of these intelligences for effective use of online learning platform in teaching and learning because the evidence of these Multiple Intelligence skills will determine how the pre-service teachers will utilize online learning platform for effective and efficient instructions in the classroom. Technology education can support higher-level thinking like metaphorical and analogical thinking and also develop their intelligence (Snowman, McCown & Biehler, 2009). In line with this, Lewis (2005) opined that it gives students opportunity to think beyond what is expected thereby improve their cognitive capabilities. It is necessary for pre-service Economics teachers to know their intelligence characteristics for effective use of online learning platform in teaching and learning because it will them to know their areas of specialty. In view of this, Yildiz, Onturk and Efek (2020) stated that difference education programmes should be available in schools to give the students opportunity to experience their mental abilities and participate actively in the educational process through teaching pedagogy. The benefit of Multiple Intelligence over online learning is that it can make pre-service Economics teachers to be versatile in integrating different types of pedagogy in teaching and learning. Therefore, this study will focus on three components of Multiple Intelligence which is related to Economics concepts and online learning. They are as follows: Logical-mathematical intelligence, spatial intelligence and interpersonal intelligence.

II. Statement of the problem

The problem of this study emanated from the fact that despite the effort made so far in integrating online learning platform in teaching and learning, pre-service Economics teachers are inadequate in blending traditional face to face teaching with online learning platform. This could affect students' performance because students of this technological age are groomed with technological skills right from the time they were born. So, it could be difficult to impart knowledge only with traditional method especially abstract concepts in Economics. Based on this backdrop, there is need to analyse Multiple Intelligence level of pre-service Economics teachers for effective use of online learning platform.

III. Research Questions

This study is guided by the following research questions:

1. What is the level of logical-mathematical intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform?
2. What is the level of spatial intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform?
3. What is the level of interpersonal intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform?

IV. Hypotheses

1. There is no significant difference between the level of logical-mathematical intelligence of male and female pre-service Economics teachers and the use of online learning platform.
2. There is no significant difference between the level of spatial intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform.
3. There is no significant difference between the level of interpersonal intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform.

V. Theoretical Framework

Theoretically, the study is anchored on Multiple Intelligence theory propounded by Howard Gardner (1999). The tenet of this theory is that individual has different types of intelligence which he/she is not aware of. Also, individuals are different in their strength of these intelligence. Gardner posits that there is existence of eight types of intelligence (Logical-mathematical intelligence, visual-spatial intelligence, verbal-linguistics intelligence, musical-rhythmic intelligence, bodily-kinaesthetic intelligence, interpersonal intelligence, intrapersonal intelligence, and naturalist intelligence) in an individual and they are used to solve different kinds of problems. The relationship between this theory and the present study is that for pre-service Economics teachers to utilize online platform effectively in teaching and learning there is need to know the level of their intelligence skills for proper applications of teaching techniques in the classroom. Economics deals with both quantitative and qualitative concepts in which many of them are abstract concepts, and teachers require the skills involve in most of these eight types of intelligence especially logical-mathematical intelligence and interpersonal intelligence for effective use of online learning in teaching and learning of Economics. Many researches (Dolati & Tahriri, 2017, Yildiz, Onturk & Efek, 2020, McClellan & Conti, 2008, Yalmanci & Gozum, 2013) have proved this theory effective in teaching and learning and it enhances students' achievement. The existence of various types of intelligence in teachers could help them to design their instructions effectively so that students will be able to comprehend the concepts easily. Ghamrawi (2014) in his study observed that there was a relationship between teachers who use Multiple Intelligence theory in their teaching styles and those who use personal Multiple Intelligence profiles. Moreover, Sava (2012) discovered that teachers agreed that all the intelligence types are helpful and important in the process of foreign language.

VI. Methods

The study adopted descriptive survey design because it tried to discover the intelligence level of pre-service Economics teachers for effective use of online learning platform. Eze et al. (2020), Ezema et al. (2021), Ezeaku et al. (2021), Okeke, Ugwuanyi and Mufutau (2020), Okeke, Okeke and Ugwuanyi (2020), Ugwuanyi et al. (2020), Okenyi et al. (2021) have adopted this design in similar studies. Pre-service Economics teachers in the University of Nigeria, Nsukka were used for the study. The population of the study consist of 163 pre-service Economics teachers in the Faculty of education, University of Nigeria, Nsukka. Since, the number is manageable, all the population was used for the study. Questionnaire titled "Multiple Intelligence level of pre-service Economics teachers for effective use of online learning was". The questionnaire has section A and section B. The researcher modified the questionnaire from the original copy of Chislett and Chapman (2006) to suit the present study. The questionnaire contained three (3) clusters and 24 items are in all. It was validated by three experts, one from Measurement and evaluation unit (Science Department) while the other two were from Social Science Education (Economics Unit), Faculty of Education, University of Nigeria, Nsukka. The reliability coefficient was obtained, and the Cronbach's Alpha coefficient was 0.86 which shows that the instrument was reliable. The instrument was administered through electronic form. The data collected were analysed using mean and standard deviation with SPSS to answer the research questions. The benchmark of 2.50 and above indicated agreement while the benchmark of 2.50 below indicated disagreement to the item questions. T-test statistics was used to analyse the hypotheses at 0.05 level of significant.

VII. Results

Research Question One: What is the level of logical-mathematical intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform?

Table 1: Mean rating scores and standard deviation of the level of logical-mathematical intelligence of pre-service teachers of University of Nigeria, Nsukka on the use of online learning platform

S/N	Item Statement	X	SD	Decisions
1	If I am learning how to do something, I like to see drawings and diagrams of how it works	3.51	0.70	Agreed
2	I find graphs and charts easy to understand	2.88	0.91	Agreed
3	I find mental arithmetic easy	2.93	0.90	Agreed
4	I find it easy to remember telephone numbers	2.53	0.90	Agreed
5	My favourite subject at school is maths	2.75	0.97	Agreed
6	I enjoy calculations	2.12	1.07	Disagreed
7	I like statistical problems	3.12	0.91	Agreed
8	I find pleasure in anything that involves numerals	2.64	0.98	Agreed
9	I can retain mathematical formulas	3.09	0.86	Agreed
10	Solving quantitative problems make me to be alert	2.96	0.98	Agreed
	Average	2.85	0.47	Agreed

n = 162, X = Mean, SD = Standard deviation

The results in Table 1 indicated that the pre-service teachers agreed on the items 1, 2, 3, 4, 5, 7, 8,9,10 and disagreed on the item 6 with average mean score of 2.85 and standard deviation of 0.47. It is evident that students like to see drawings and diagrams, find graphs and chat easy, mental arithmetic, can remember phone numbers, maths, and statistical problems, retain mathematical formulas and solve quantitative problems. But students disagreed that they enjoy calculations.

Research Question Two: What is the level of spatial intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform?

Table 2: Means rating scores and standard deviation of the level of spatial intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform

S/N	Item Statement	X	SD	Decisions
1	I often see clear images when I close my eyes	2.80	0.97	Agreed
2	I Can recall things in mental pictures	3.24	0.87	Agreed
3	I can design images to explain an information	2.88	1.05	Agreed
4	I best learn with images	3.14	0.86	Agreed
5	I understand abstract concepts through visual learning	2.89	0.92	Agreed
6	I enjoy drawings	3.23	0.75	Agreed
7	I can understand Economics concept easily when it is in a diagram	3.22	0.83	Agreed
8	I can interpret bar chart and pie chart	3.22	0.92	Agreed
	Average	3.08	0.46	Agreed

n = 162, X = Mean, SD = Standard deviation

Data on Table 2 showed the mean scores and the standard deviation of the level of spatial intelligence of pre-service Economics teachers. As indicated by the mean scores, pre-service Economics teachers agreed on all the items in the table with the overall mean of 3.08 and standard deviation of 0.46. Therefore it is obvious that pre-service Economics teachers' see images when they close their eyes, recall things in mental information, design images to explain an information, learn with images, understand abstract concepts through visual learning, Understand Economics concepts easily when it is in a diagram, enjoy drawings, and interpret pie and bar chat.

Research Question 3: What is the level of interpersonal intelligence of pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform?

Table 3 : Means rating scores and standard deviation of the interpersonal intelligence of pre-service Economics teachers of University of Nigeria on the use of online learning platform

S/N	ITEMS	X	SD	Decision
1	I learn best interacting with others	3.10	0.90	Agreed
2	I am a very social person and like being with other people	3.25	0.86	Agreed
3	I care about how those around me feel	2.99	0.86	Agreed
4	I find it easy to talk to new people	3.22	0.79	Agreed
5	I am good at solving disputes between others	3.59	0.62	Agreed
6	I can interact with my fellow students effectively	3.41	0.74	Agreed
Average		3.26	0.45	Agreed

n= 162, X = Mean, SD = Standard Deviation

The data on Table 3 interpret the mean scores and standard deviation of the interpersonal intelligence of pre-service Economics teachers of University of Nigeria on the use of online learning platform. Pre-service Economics teachers agreed on all the items in the table with the mean score above the mean criterion of 2.50. The aggregate mean score of 3.46 showed that the interpersonal intelligence of pre-service Economics teachers include: interacting with others, being social and stay with people, caring about how those around me feel, very easy to talk with new people, solving disputes between others and interact with my fellow students effectively ($X > 2.50$).

Hypothesis 1: There is no significant difference between the level of logical-mathematical intelligence of male and female pre-service Economics teachers and the use of online learning platform.

Table 4: t-test analysis of difference in the mean ratings of logical-mathematical intelligence of male and female pre-service Economics teachers and the use of online learning platform

Gender	N	Mean	Std Deviation	df	t	Sig	Decision
Male	46	2.91	.50	160	0.948	0.344	Accepted
Female	116	2.83	.46				

Table 4 reveals that there is no significant difference in the mean ratings of logical-mathematical intelligence of male and female pre-service Economics teachers and the use of online learning platform, the calculated t-value of 0.948 has an associated probability value of 0.344 which is greater than the alpha level of significance of 0.05. Therefore, there is no significance difference of logical-mathematical intelligence of male and female pre-service Economics teachers and the use of online learning platform in post Covid-19 era.

Hypothesis 2: There is no significant difference between the level of spatial intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform.

Table 5: t-test analysis of difference in the mean ratings of spatial intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform

Gender	n	Mean	Std Deviation	df	t	Sig	Decision
Male	46	3.07	.44	160	0.065	0.948	Accepted
Female	116	3.08	.47				

Table 5 reveals that there is no significant difference in the mean ratings of spatial intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform. The calculated t-value of 0.065 has an associated probability value of 0.948 which is greater than the alpha level of significance of 0.05. Thus, the p values is not statistically significant ($p > .05$).

Hypothesis 3: There is no significant difference between the level of interpersonal intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform

Table 6: t-test analysis of difference in the mean ratings of interpersonal intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform

Gender	n	Mean	Std Deviation	df	t	Sig	Decision
Male	46	3.19	.43	160	1.30	0.197	Accepted
Female	116	3.29	.46				

Table 6 reveals that there is no significant difference in the mean ratings of interpersonal intelligence of male and female pre-service Economics teachers of University of Nigeria, Nsukka on the use of online learning platform. The calculated t-value of 1.30 has an associated probability value of 0.197 which is greater than the alpha level of significance of 0.05. Thus, the p value is not statistically significant ($p > .05$).

VIII. Discussion

The findings of this study shown that pre-service Economics teachers like to learn with drawings, diagrams, charts, retain numbers and formulas but they do not enjoy calculations. The findings further revealed that male has greater mean of logical-mathematical intelligence level than their female counter part. These findings corroborate with the findings of Llor, Fernando, Ferrandiz, Hernandez, Sainz, Prieto and Fernandez (2012) who found that Spanish boys stood out in the logical-mathematical intelligence level when compare with their female counter part. These findings are also in line with the findings of Dewi and Rukmini (2019) who revealed that students found it difficult in working on calculations problems in school. Economics deals with quantitative aspect that is why pre-service Economics teachers should acquire mathematics skills for effective use of online learning in teaching and learning. Students of nowadays are train on how to use technology in learning right from their Nursery and Primary schools that is more reason pre-service teachers should be adequate and competent in using online learning platform in the classroom for easy transfer of knowledge. Basith, Rosmayadi, Triani and Fitri (2020) revealed in his study that students are satisfied with online learning when it is used in the classroom. Hence, there is no significance difference of logical-mathematical intelligence of male and female pre-service Economics teachers and the use of online learning platform in post Covid-19 era.

Furthermore, the findings also revealed that pre-service Economics teachers reported high spatial intelligence level. This implies that both male and female pre-service Economics teachers learn with images and found it easy to comprehend. This finding is also in line with that of Gani, Safitri and Mahyana (2017) which found that students of class VIII SMP N 2 Banda Aceh have high spatial intelligence level. Images help students to recall information especially when it is abstract like some Economics concepts.

The findings revealed that pre-service Economics teachers indicated high interpersonal level of intelligence. This implies that pre-service teachers have the desires to understand and motivate other people and students and they can work effectively with the students in the classroom environment. These findings are in contrast with that of Gonzalez-Trevino, Nunez-Rocha, Valencia-Hernandez and Arrona-Palacios (2020) who indicated that males shown high interpersonal intelligence differences than females. Moreover, the finding of this study is in agreement with that of Ernawati, Tsurayya and Ghani (2019) who found that teachers have high interpersonal level of intelligence with the students. Interpersonal intelligence is very necessary in transfer of knowledge to the learners. Teachers should have good relationship with the students because it will help them to comprehend concepts easily especially abstract concepts. Thus, there is no significance difference between the Multiple Intelligence of pre-service teachers and the use of online learning platform.

IX. Conclusion

Based on the discussion in this study, pre-services Economics teachers indicated high logical-mathematical intelligence except in calculated. It was observed that they do not like calculation, but Economics deals with both qualitative and quantitative aspect. Moreover, if pre-service Economics teachers found calculation difficult, they will probably be found other things that involve logical-mathematical intelligence difficult to comprehend. They need to improve in the skills of logical-mathematical intelligence

in order to learn and enjoy calculations for effective use of online learning platform in teaching and learning. Moreover, Images and diagram help in comprehending abstract concepts. Pre-service Economics teachers proved to understand diagrams and design information. Economics concepts consist of diagrams for better illustrations. Also, interpersonal intelligence makes both students and teachers to have good relationship with other people. Good relationship is very necessary when using online learning in the classroom and it encourages effective teaching. Pre-service Economics teachers recorded high interpersonal intelligence level which means that it will be easier for them to inculcate knowledge to the learners. Multiple Intelligence skills is very important in education system especially for future teachers because it will enable them to interact well with the students and equally have the skills to impact knowledge to the learners.

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