

Online Learning Readiness of Senior High School Students of Tabuk City Division and its Correlation to Mathematics Anxiety

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Abstract

The purpose of the present study is to investigate the correlation between the levels of online learning readiness in Mathematics and mathematics anxiety of 144 senior high school students. the Online Learning Readiness Scale (Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y., 2010) and Mathematics Anxiety Scales (Mahmood, S. & Khatoon T. (2011)) were used to assess the levels of online learning readiness and mathematics anxiety. The One-Way ANOVA results showed that there are no significant differences on the level of readiness for online learning as to variables gender and school affiliation. However, there was a significant difference along household monthly income variable. Moreover, there are no significant differences on the levels of mathematics anxiety as to variables gender, school affiliation and household monthly income. Lastly, t-test for Pearson Correlation Coefficient revealed a low significant relation between levels of Online Learning Readiness (OLR) and Mathematics Anxiety (MA) of senior high school students of Tabuk City Division.

KEYWORDS: Online Distance Learning; Online Distance Learning Readiness; Mathematics Anxiety; Correlation

1. Introduction

Learning is a lifelong process in this competitive world where we must update the knowledge every day with global exposure. To sustain competitiveness in education we induce technology into the learning process. Using the tools of technology, the learning, and teaching process happen in any electronic mechanism (Naresh, B., Sree Reddy, D. B., & Pricilda, U., 2016).

Although technology is no longer an unfamiliar idea, today's learning and teaching made a huge shift as the Department of Education is embracing the concepts and practices of online learning.

According to Castle, S. R., & McGuire, C. J., (2010), online delivery has the potential to offer significant benefits in achieving multiple goals related to sustainable education. For example, students from a variety of backgrounds can access educational opportunities, allowing for vast dissemination of education. Beyond these stated benefits, we must also identify what components of online education are deemed effective from the student's perspective.

The challenge of technology access remains for public school students. Other factors such as home environment (conduciveness to learning), learner attitudes toward home learning, and

technical competence can affect learner outcomes and the effective use of online learning. Learning at home also requires parent participation and support.

Besides, students' readiness is another powerful factor in implementing online learning successfully (Rasouli, Rahbani & Attaran, 2016). Readiness can be studied by assessing students' knowledge (George et al., 2014; Duckworth & Yeager, 2015), technology skills (Livingstone, S., & Helsper, E., 2010; Kim, K. J., & Frick, T. W., 2011; Rasouli, Rahbani & Attaran, 2016), technology availability (Anene, Imam & Odumuh, 2014; Rasouli, Rahbani & Attaran, 2016; Seraji, 2010), self-directed learning (Hung, 2010; Duckworth & Yeager, 2015), computer and internet efficacy (Hung, 2010; Lau, C. Y., & Shaikh, J. M., 2012), enjoyment (Alenezi, A. R., & Karim, A., 2010) and attitude (El-Gayar, Moran & Hawkes, 2011; Lau, C. Y., & Shaikh, J. M., 2012) in e-learning.

The study conducted by Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010) found that gender made no statistical differences in the five OLRs dimensions. On the other hand, a study conducted by Naresh, Reddy & Pricilda (2016) showed that male students were more comfortable with technology, and preferred technology for learning. However, a contrasting finding showed that there was no significant difference between male and female students in their readiness for e-learning (Rasouli, Rahbani & Attaran, 2016).

Moreover, Lau and Shaikh (2012) concluded that the financial status of learners had a significant effect on students' technical skills and learning preferences. However, financial status does not significantly affect learner's computer self-efficacy and their attitudes towards computers.

Devine, A., Fawcett, K., Szűcs, D., & Dowker, A. (2012) defined Mathematics anxiety (MA) as a state of discomfort associated with performing mathematical tasks, is thought to affect a notable proportion of the school-age population. Some research has indicated that MA negatively affects mathematics performance and that girls may report higher levels of MA than boys. On the other hand, some research has indicated that boys' mathematics performance is more negatively affected by MA than girls' performance is.

Another study conducted by Goetz, T., Bieg, M., Lüdtke, O., Pekrun, R., & Hall, N. C. (2013), replicated previous research showing that female students report higher levels of anxiety than do male students.

According to the study conducted by Devine, A., Fawcett, K., Szűcs, D., & Dowker, A. (2012), no gender differences emerged for mathematics performance, but levels of MA were higher for girls than for boys. Girls showed higher levels of MA than boys and high levels of MA were related to poorer levels of mathematics performance.

Mutodi, P., & Ngirande, H. (2014) indicated high levels of mathematics anxiety among female students. Based on the findings of this study, it is worth noting that mathematics anxiety is one psychological factor that affects students' achievement and their general practices. In their study, Harari, R. R., Vukovic, R. K., & Bailey, S. P. (2013) found that levels of mathematics anxiety did not differ by sex.

Although there are many studies on online learning and students' Math Anxiety, no studies were undertaken on the relationship between readiness levels of online learning students for online learning and mathematics anxiety. The study is, therefore, an attempt to look at and put into writing the extent of Online Distance Learning Readiness and Mathematics Anxiety of Selected Senior High School Students of Tabuk City Division.

1.1. Methods

The sample for the study consisted of 144 senior high school students of Tabuk City Division, Department of Education who were tagged to prefer online learning as their learning modality for School Year 2020-2021. The responses taken for statistical analysis were derived from the 18-question OLRs and 14-question MAS, which both contain a three-point Likert scale. Summary data of students' level of OLR and MA were sorted as to gender, school affiliation and household monthly income (reported by NEDA, as of 2015). Quantitative descriptive statistics were used to determine the Online Learning Readiness for Mathematics and Mathematics Anxiety, next, data were subjected to One-way Analysis of Variance (ANOVA) and then, the data were analyzed for relation between online learning readiness and mathematics anxiety.

1.2. Results

The results presented in Table 1 show differences in online learning readiness and mathematics anxiety levels of senior high school as to the gender, school affiliation and household income. The findings from total average weighted mean (TAWM) of 1.99 revealed a moderate readiness for online learning in Mathematics, while the TAWM of 1.80 represents moderate level of Mathematics Anxiety.

Table 1. Level of Online Learning Readiness (OLRS) and Mathematics Anxiety (MAS) as to gender, school affiliation and household monthly income.

Variables		N	OLRS	MAS
GENDER	Male	55	1.97	1.83
	Female	89	2.00	1.78
SCHOOL AFFILIATION	Agbannawag NHS	10	1.93	1.71
	Kalinga NHS	35	2.06	1.86
	Tabuk City NHS	99	1.97	1.79
	8,000 and lower	70	1.95	1.77
HOUSEHOLD MONTHLY INCOME	8,001 to 15,000	31	1.94	1.84
	15,001 to 30,000	21	2.01	1.81
	30,001 to 50,000	15	2.20	1.85
	50,001 and higher	7	2.10	1.69

To investigate the online learning readiness between various variables, One-way ANOVA was used and indicated no significant difference ($F_{crit} 4.130 > F_{ratio} 0.305$) as to the gender and school affiliation ($F_{crit} 3.179 > F_{ratio} 1.204$). However, ANOVA showed a significant difference ($F_{crit} 2.479 < F_{ratio} 4.380$) for students as to household monthly income (table 2). Table 2. One-way ANOVA for comparing the online learning readiness between various variables.

Source of Variance		Sum of Squares	DF	Variance	F_{crit}	F_{ratio}
Gender	Between Groups	0.011	1	0.011	4.130	0.305
	Within Groups	1.278	34	0.038		
	Total	1.290	35			
School Affiliation	Between Groups	0.140	2	0.070	3.179	1.204
	Within Groups	2.957	51	0.060		
	Total	3.097	53			
Household Monthly Income	Between Groups	0.887	4	0.222	2.479	4.380
	Within Groups	4.305	85	0.051		
	Total	5.192	89			

Differences in mathematics anxiety scales based on the students' demographics were investigated. One-way ANOVA indicated no significant difference among variable gender ($F_{\text{crit}} 4.225 > F_{\text{ratio}} 0.255$), school affiliation ($F_{\text{crit}} 3.238 > F_{\text{ratio}} 1.310$), and household monthly income ($F_{\text{crit}} 2.513 > F_{\text{ratio}} 0.748$).

Table 3. One-way ANOVA for comparing the Mathematics Anxiety between various variables.

Source of Variance		Sum of Squares	DF	Variance	F_{crit}	F_{ratio}
Gender	Between Groups	0.017	1	0.017	4.225	0.255
	Within Groups	1.756	26	0.068		
	Total	1.774	27			
School Affiliation	Between Groups	0.158	2	0.079	3.238	1.310
	Within Groups	2.356	39	0.060		
	Total	2.515	41			
Household Monthly Income	Between Groups	0.215	4	0.054	2.513	0.748
	Within Groups	4.684	65	0.072		
	Total	4.899	69			

A positive relationship was found between readiness for online learning and mathematics anxiety perceived interaction. However, there is no significant relationship between Online Distance Learning Readiness and Mathematics Anxiety of Selected Senior High School Students in Tabuk City Division since the t-computed value of 5.03 is higher than the t-critical value of 1.98 at .05 level of significance.

Table 4. Correlation between Online Distance Learning Readiness in Mathematics and Mathematics Anxiety of Selected Senior High School Students of Tabuk City Division

		Online Distance Learning Readiness	Mathematics Anxiety
Online Distance Learning Readiness	Pearson Correlation	1	+.389**
	Sig. (2-tailed)		5.03
	N	144	144
Mathematics Anxiety	Pearson Correlation	+.389**	1
	Sig. (2-tailed)	5.03	
	N	143	144

1.3. Discussions

According to the results, the senior students are moderately ready for online learning. As it is shown in table 1, senior high students' average scores range from 1.97 to 2.20 on a 3-point Likert type rating scale, indicating that students exhibited moderate levels of online distance learning. The result affirms what Engin (2017) revealed that students have medium levels of readiness for online learning. However, there is no significant difference between male and female students in their online learning readiness. This affirms what Chung, et al. (2020); Engin (2017) and Hung, et al. (2010) revealed that male and female students do not exhibit significant different in their overall readiness for online learning. The three schools involved scored moderately ready for online learning indicating no significant differences on the perceptions of the respondents in the level of online distance learning readiness in Mathematics as to school affiliation is concerned.

The results show that those learners with higher household monthly income have high readiness level online learning indicating a significant difference on the perceptions of the respondents in the level of online distance learning readiness in mathematics of selected students of Tabuk City Division as to household monthly income. This is in consonance to what Lau and Shaikh (2012) concluded that there is a significant difference on the level of readiness for online learning as to financial status. This implies further that household monthly income has an influence on the extent of online learning readiness in Mathematics of senior high school students of Tabuk City Division. More specifically that those with higher household monthly income have higher readiness of online distance learning.

The results obtained from the response of the senior high school students on the extent of mathematics anxiety implies that students have moderate level of mathematics anxiety. This finding affirms what Effandi Zakaria et al. (2012) and Mahmood, S., & Khatoon, T. (2011) revealed that students have moderate level of mathematics anxiety. Male students have higher mean than their female counterpart. This implies that male students are more anxious in learning Mathematics online. This result contradicts what studies by Mutodi, et al. (2014); Goets, T., Bieg, M., Ludtke, O., Pekrun, R., & Hall, N. C. (2013); Effandi Zakaria, et al. (2012); Devine, A., Fawcett, K., Szucs, D., Dowker, A. (2012) and Mahmood, S., & Khatoon, T. (2011) revealed that female showed higher level of mathematics anxiety than male students. However, this indicates that there is no significant difference in the extent of mathematics anxiety of senior high school students of Tabuk City Division as to gender. This finding is consistent with the studies by Effandi Zakaria, et al. (2012); Devine, A., Fawcett, K., Szucs, D., Dowker, A. (2012) which revealed that there is no significant difference on the mathematics anxiety as to gender. However, this contradicts with what Mahmood, S., & Khatoon, T., (2011) noted that significant difference in mathematics anxiety exists according to gender, with female students exhibiting higher mathematics anxiety than their male counterparts. Moreover, the obtained means as to school affiliation and household monthly income were described as moderately anxious. In conclusion, there are no significant differences in the extent of mathematics anxiety of selected senior high school students of Tabuk City Division as to gender, school affiliation and household monthly income is concerned. The results imply that gender, school affiliation and household monthly income do not have an influence on extent of mathematics anxiety among senior high school students of Tabuk City Division.

The calculated Pearson Correlation Coefficient indicated that there is a positive low and significant relationship between Online Distance Learning Readiness and Mathematics Anxiety of Selected Senior High School Students in Tabuk City Division. This means that as the readiness for online distance learning increases, there is a lower likelihood of there being a relationship with the students Mathematics Anxiety. Furthermore, that student's readiness for online distance learning has a low dependency on their Mathematics anxiety level in an online context.

1.4. Conclusions and Recommendations

It was found that the respondents in this study generally indicated that they were ready for online distance learning. In line with the objectives of this study, it was found that female senior high students, the students from Kalinga National High School, and students whose household monthly income of 30,001 – 50,000 have better online learning readiness score.

Secondly, respondents in this study generally exhibited moderate level of mathematics anxiety indicating better anxiety levels among male students, students from Kalinga National High School and students who's of 50,001 and higher monthly income brackets.

Lastly, the senior high school students' readiness for online distance learning has low dependency on their Mathematics anxiety level.

Teachers should design activities to pull the students to share real-life experiences, to actively participate on or comment on issues pertaining to the online classes; create a learning community through which group discussions, experience sharing, instant feedback, and so on can keep the students interested in the subject and to find a way to connect lessons to day to activities, so students appreciate essence of the lesson to their personal growth and development, and to increase their motivations so that their online-learning readiness level can increase.

Teachers should provide encouragement to all students, emphasize that everyone makes mistakes and refrain from tying self-esteem to success in Math. Moreover, teachers should utilize varied tools, methods and set ups in meeting students online in such a way that their technological skills and mathematics-related skills are developed at the same time.

Future studies should investigate the factors that contribute to the readiness for online distance learning as well as their Mathematics anxiety.

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