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INTERNET SELF-EFFICACY AND INTERACTION OF STUDENTS IN MATHEMATICS COURSES

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Abstract

Interaction creates an essential environment in learning Mathematics effectively and opportunities for teachers and students to talk about their own thinking, and reflection on students' learning process. Since interaction in the classroom can reveal students' views and ideas, it would be important to study the underlying relationship between internet self-efficacy and interaction in Mathematics courses. The study used descriptive-correlational technique involving 439 students from the selected universities and colleges in Davao City, and criterion sampling was used. Findings revealed that the respondents had extensive internet self-efficacy and interaction in Mathematics courses. The results further revealed a strong significant relationship between internet self-efficacy and interaction in Mathematics courses. The results of regression analysis also revealed that the three predictors of internet self-efficacy had significant influence on interaction in Mathematics courses and suggested that a reasonable percentage of the variance on interaction in Mathematics courses can be explained by the three predictors. Furthermore, among the three predictors, extent of self-efficacy in system manipulation was the most influential factor that contributed to the level of interaction in Mathematics courses. Lastly, future research should include more variables that could somehow affect the level of interaction in Mathematics courses.

Keywords

Education, Internet Self-Efficacy, Interaction, Mathematics Courses, Davao City, Philippines

1. Introduction

Today, mathematics courses are still considered among the most difficult to develop and teach (Lokken, 2009) and communication of mathematics concepts remain difficult and time-consuming (Rey, 2010). Research also proved that students find it hard to defend their solutions and basis using their proofs and rational generalizations based on description, maxim, and evidences that is why it is harder for them to have a comprehensive discussion in the classroom (Kucheman & Hoyles, 2006). Moreover, students are usually discouraged to participate due to lack of teacher and students interaction, where teachers would create the teacher-centered, direct instruction method of discussion as their approach in teaching (Kendall, 2008).

Relative thereto, some of the researchers asserted that students' belief of their abilities to perform specific tasks is associated with their active participation on the internet-based learning (Kuo, Yu-Chun, Walker, Schroder & Belland, 2014). Eventually, the internet is the most commonly used media above all others nowadays (Tatkovic & Ruzic, 2005), leading to the fact that students may have growing opportunities to learn by utilizing the internet. Their self-efficacy in utilizing the internet, which may have considerable impacts on their views, usages and learning outcomes should become an important research topic for educators (Wang, Jackson., Wang, & Gaskin, 2015; Tsai & Tsai, 2003).

Higher education systems developed exponentially over the most recent five decades to meet the demands of quality education which gained momentum due to swift headways in Information and Communication Technology (ICT) (Buttar, 2016) and since, interaction in the classroom can reveal students' views and ideas, it would be important to study the underlying relationship between internet self-efficacy and interaction in Mathematics courses. The principal objectives of the study were as follows.

- To determine the extent of internet self-efficacy of the students.
- To determine the extent of interaction of the students in Mathematics course
- To determine the significant relationship between the internet self-efficacy of the students and interaction in Mathematics courses.



- To determine the domain of internet self-efficacy that significantly influences interaction in Mathematics courses.

1.1 Hypotheses

The following null hypotheses are formulated at 0.05 alpha level of significance:

1. There is no significant relationship between the internet self-efficacy of the students and interaction in Mathematics courses.
2. Internet self-efficacy does not significantly influence interaction in Mathematics courses.

2. Review of Related Literature

In an attempt to describe the existing status of the study, a review of related literature is hereafter presented. This review includes studies and researchers which provided insights about the veracity of the problem which the researcher chooses as the research focus. The independent variable is internet self-efficacy with the indicators surfing and browsing, encryption and decryption, and system manipulation (Torkzadeh & Van Dyke, 2002). On the other hand, the dependent variable of this study is the interaction of the students in Mathematics courses, with the indicators, learner to learner, learner to instructor and learner to content (Moore, 1989).

2.1 Internet Self-Efficacy

In line with education, a lot of researchers believe that online learning is altering the way how education is viewed for how many years using the traditional approach (Allen & Seaman, 2010; Anderson, 2008; Engelbrecht, Harding & Potgieter, 2005). On the other hand, computer students who are provided with learning aims proved their higher self-efficacy in their performance and more use of their self-organized tactics than those who were given the performance goals (Kim, 2009).

The use of Internet has a good effect to the learners on their performance (Zenon, 2006). Internet usage helps the students' self-efficacy towards computers is connected to their usages which have big influence in their performance in classroom including their interaction (Johnson, Aragon & Shaik, 2000). Thus, the ways students use the internet can't negatively affect learner's performance in school (Larose, Lin & Eastin, 2003).

2.2 Interaction in Mathematics Courses

Interaction in teaching mathematics is significant in teaching and acquiring knowledge; through it, learners could interchange their thoughts and ideas to their colleagues and teachers



(Cobb & Bauersfield, 1995). It is one way of exchanging ideas in a way that parties, the teacher, and the learner could benefit each other (Hufferd-Ackles, Fuson & Gamoran-Sherin, 2004), and lastly, students are expected to justify and explain their solutions that will then lead to a meaningful classroom interaction (Bruce, 2007). Besides, Solomon, Baptiste, Hall, Luke, Orchard, Rukholm, & Damiani, 2010) has also noticed that students would find it hard to express or present their ideas and thoughts in the class as most of them are frightened.

Additionally, Mathematics is best learned through actively participating in classroom discussion and it is done by participating or communicating with your teachers and your associates. Likewise, the interaction between the learners about the subject matter would lead to having an internal didactic conversation which occurs when learners speak about the things that they acquire as part of their learning experience (Garfield, 2010).

In this regard, teaching and learning mathematics is realized through human interaction. It's a mutual action conveying an interdependence of attitudes shown by a teacher and students at different levels. The students' ability to reconstruct meaning has been affected by their social interaction from their teachers or peers (Bauersfeld, 1979) elaborate that. Accordingly, teachers can encourage their students' interest and growth in mathematical learning through asking and responding to questions (Piccolo, Harbaugh, Carter, Capraro & Capraro, 2008).

In this connection, the teachers must assist their students on verifying, elaborating or explaining each idea to the solution of each mathematical problem that is given (Reston, 2000). With this, it would be very effective for the students to participate in classroom discussion because they are given a chance or opportunity to explain or express their ideas on presenting their mathematical solutions in class.

3. Theoretical Framework

Theoretically, the study is mainly anchored in a social or interactive perspective of learning which viewed learning in terms of participation of both the teacher and the learners (Lave & Wenger, 1991). Eventually, Dewey emphasized that learning is a social process through an active personal experience of every learner, where purposeful personal experience were deemed to be the keys to authentic learning. Similarly, a person's development and acquisition of knowledge are influenced by interaction in social settings. Peer interaction in a cooperative social setting offer the learners more sufficient time to imitate, observe and gradually develop

their higher mental abilities and functions (Vygostsky, 1978). Specific to Mathematics, sharing knowledge, teaching and learning mathematics is successfully done through human interaction, which then become a theoretical perspective which firmly believes that learning is realized in a social setting which highlights the importance of human interactions in facilitating learning (Bauersfeld, 1979).

Moreover, using instructional learning device could give opportunity to engage students in different activities and give them a new environment of interaction, the active and higher order interaction. With this approach, the way students will interact would motivate them to participate in a discussion (Rey, 2010). Similarly, the theories presented above were also affirmed in the study of Kuo (2010) from which he found out that internet self-efficacy is significantly parallel to learner to instructor and learner to content interaction.

Since the study primarily aims to determine the significant relationship between internet self-efficacy of the students and interaction in mathematics courses, the presented theories and propositions above immensely support the variables in this study.

4. Methods

4.1 Research Design

The study utilized the quantitative non-experimental research design utilizing the descriptive correlational technique. Descriptive research method is a fact-finding study with adequate interpretations of the findings. It describes what actually exists such current situations, practices, conditions or any phenomena (Aquino, Hagos, Puyat, Sobremisana & Halili, 2000). Correlational technique investigates the association between factors, which includes creating and testing a theoretical model that can explain the correlation results (Edmonds & Kennedy, 2012; Lomax & Hahs-Vaughn, 2013). Also, it studies how scores on one or more variables increase and fall as scores on other variable increase or decrease.

4.2 Research Locale

The study was conducted in selected universities and colleges in Davao City. Davao is the largest city located in Mindanao, Philippines. With 2,444 square kilometers total land area and is considered as the largest city in the country in terms of land area. Davao city is composed of three congressional districts, which are broken down into 11 administrative districts with a total of 182 barangays and serves as the main gateway of commerce, trade and industry of



Mindanao. In terms of education, Davao city currently hosts five universities namely, Ateneo de Davao University, University of Immaculate Conception, University of Mindanao, University of the Philippines and the University of Southeastern Philippines. Eventually, there were 30 other tertiary institutions situated in the city.

However, the study only focused on the freshmen students officially enrolled from the University of Immaculate Conception, University of Southeastern Philippines, AMA Computer College, Assumption College of Davao, Holy Cross of Davao College and St. John Paul II College of Davao. The aforementioned schools were chosen because these were the top schools with the most number of freshmen students in the metropolitan of Davao City qualified to be the respondents in this study.

4.3 Population and Sample

The study was conducted to the selected universities and colleges in Davao City. The subjects of this study were random cluster samples of intact classes enrolled with mathematics course/s as identified by every institutions' concerned personnel. Due to a large number of population, a sample of 400 students was enough from the Slovin's formula computation. Thus, a total of 439 freshmen students participated in the study. Eventually, this sample was considered large enough to test the measures and research hypotheses.

4.4 Research Instrument

The internet self-efficacy scale used in the study was adapted from the developed instrument which encompasses an overall measure related to general internet use (Torkzadeh et al., 2001). It's a 19-item internet self-efficacy scale that has been developed and validated where the principal factor analysis of the scale supported a conceptually meaningful three-factor model with high alpha reliabilities. The aforementioned research instrument measures internet self-efficacy in terms of surfing and browsing with six items, encryption and decryption with seven items and system manipulation with six items. The reliability scores of the three sub-scales were 0.93, 0.98, and 0.94, respectively. The adapted questionnaire had the overall reliability score of 0.96 (Torkzadeh et al., 2001).

Subsequently, all three interaction subscales were adapted from a prior research regarding the study of student interaction and satisfaction in a blended learning environment. The instrument included three subscales, namely, learner to learner, learner to instructor and learner to content interaction (Kuo, Eastmond, Schroder & Bennett, 2009). The instrument was reliable

but lacked validity information (Kuo et al., 2009). However, the items were revised in the study to fit the fully traditional classroom setting. Slight modifications including wording changes were made to assure the suitability of items for the study before the content validation was conducted.

4.5 Statistical Tools

The following statistical tools were used in the computation and analyses of the data.

Mean. This was used in determining the extent of students' internet self-efficacy and interaction in Mathematics courses.

Pearson Product Moment Correlation. This was used in measuring the degree and direction of the linear relationship between internet self-efficacy of the students and interaction in Mathematics courses.

Regression Analysis. This was used in identifying the significant influence of the domains of internet self-efficacy on the interaction in Mathematics courses.

5. Results

Presented in this section are the interpretation and the analyses of findings based on the research objectives asserted in the study. Discussion of topics are arranged in the following headings: Extent of Internet Self-Efficacy of the Students, Extent of the Interaction of the Students in Mathematics Courses and Significance of the Relationship between Internet Self-Efficacy and Interaction of the Students in Mathematics Courses. Further, linear regression analysis of the significance of the influence of internet self-efficacy and on the interaction of the students in mathematics courses is executed as the final stage of the analysis.

The standard deviations in two descriptive tables. Particularly, Tables 1 and 2 ranged from 0.50 to 0.79 which is less than 1.0 as the typical standard deviation for a 5-point Likert scale. This implies that the ratings in the accomplished questionnaire are closer to the mean which indicates homogeneity of responses among the freshmen students from the selected universities and colleges in Davao City.

5.1 Extent of Internet Self-Efficacy of the Students

Table 1 presents the responses of the respondents on their extent of internet self-efficacy, which registered an overall mean score of 3.60 or extensive indicating that majority of items regarding internet self-efficacy of the students were manifested frequently to a high degree

and functioning most of the time. The generated overall mean score was the result obtained based on the mean scores of 3.82 or extensive for surfing and browsing, 3.52 for encryption and decryption and 3.45 for system manipulation.

Table 1: *Extent of Internet Self-Efficacy of the Students*

Indicators	Standard Deviation	Mean	Descriptive Level
Surfing and Browsing	0.61	3.82	Extensive
Encryption and Decryption	0.77	3.52	Extensive
System Manipulation	0.79	3.45	Extensive
Overall	0.59	3.60	Extensive

5.2 Extent of the Interaction of the Students in Mathematics Courses

Depicted in Table 2 is the extent of the interaction of the students in Mathematics courses, in terms of the learner to learner, learner to instructor and learner to content, answers the second objective of the study. The results revealed that the dependent variable had an overall mean score of 3.74 described as extensive which indicates that interaction in Mathematics courses has been manifested frequently and is most of the time practiced. The mean score was derived from the individual mean scores of the three indicators. Particularly, both for the learner to learner and learner to instructor which had a mean score of 3.76 and the learner to content interaction had 3.69.

Table 2: *Extent of Interaction of the Students in Mathematics Courses*

Indicators	Standard Deviation	Mean	Descriptive Level
Learner to Learner	0.67	3.76	Extensive
Learner to Instructor	0.67	3.76	Extensive
Learner to Content	0.50	3.69	Extensive
Overall	0.54	3.74	Extensive

5.3 Correlation between Measures

Table 3 reveals the significance of the relationship between internet self-efficacy and interaction of the students in Mathematics courses. Figures in Table 3 revealed that the students' internet self-efficacy is strongly correlated with their interaction in mathematics courses, $r(459) = .579$, $p = .000$. Since the p-value is less than 0.05. It can be stated therefore that there is a

significant relationship between internet self-efficacy and the interaction of the students in Mathematics courses, thus null hypothesis is rejected. This means that as the students have high internet self- efficacy the classroom interaction in Mathematics courses also likely to occur or vice versa. Moreover, the individual relationship between indicators of internet self-efficacy and interaction in mathematics courses are also presented in Table 3.

Table 3: Correlation between Measures

Internet Self-Efficacy	Interaction in Mathematics Courses			
	Learner to Learner	Learner to Instructor	Learner to Content	Overall
Surfing and Browsing	.283** (.000)	.237** (.000)	.657** (.000)	.417** (.000)
Encryption and Decryption	.333** (.000)	.276** (.000)	.735** (.000)	.478** (.000)
System Manipulation	.355** (.000)	.309** (.000)	.747** (.000)	.504** (.000)
Overall	.402** (.000)	.341** (.000)	.883** (.000)	.579** (.000)

As depicted in the table, the r -values and p -values for the correlation between indicators of internet self-efficacy and interaction in Mathematics courses are presented as follows: for surfing and browsing and interaction in Mathematics courses it registered an r -value of 0.417 with a p -value of 0.000; encryption and decryption notes an r -value of 0.478 with a p -value of 0.00 and system manipulation has an r -value of .504 with a p -value of 0.000 the results implied that surfing and browsing, encryption and decryption, and system manipulation significantly correlated to the interaction of the students in Mathematics courses.

5.4 Significance of the Influence of Internet Self-Efficacy on Interaction of Students in Mathematics Courses

Table 4 shows the regression analysis of the influence of internet self-efficacy of the students on their interaction in Mathematics courses. To meet the assumptions required to use linear regression, preliminary data screening was done. It can be gleaned in the table that the R2 or coefficient of determination value registers 0.337 implies that 33.7 percent of the variance in interaction of the students in Mathematics courses is attributed to the indicators of internet self-



efficacy. The remaining percentage cannot be accounted to the indicators of internet self-efficacy. Thus, 66.3 percent of the variation in interaction in Mathematics courses can be accounted to the other variables which are not included in this study.

Meanwhile, the R value .581 indicates a strong relationship among the variables. Similarly, the result yielded an F-value of 73.714 with a p-value less than 0.01 which signified that the model fit is significant. It can be stated therefore that internet self-efficacy can influence interaction in mathematics courses. The strength of the model indicated that there was a reasonable level of representativeness in the selected predictor variables.

Table 4: Significance of the Influence of Internet Self-Efficacy on Interaction of the Students in Mathematics Courses

Internet Self-Efficacy	Interaction in Mathematics Courses			
	B	β	t-value	Sig.
Surfing and Browsing	.140	.164	3.567	.000
Decryption and Encryption	.128	.251	5.281	.000
System Manipulation	.158	.295	6.097	.000
R value	.581			
R^2	.337			
F value	73.714			
p value	.000			

Furthermore, to assess the contribution of each predictor, the t values of the unstandardized regression coefficients b were examined. As shown in Table 4, all the three predictors of internet self-efficacy were found to significantly influence Interaction in Mathematics courses thus, Surfing and Browsing $t(459) = 3.567$, $p < .01$, Encryption and Decryption $t(459) = 5.281$, $p < .01$ and System Manipulation $t(459) = 6.097$, $p < .01$. Therefore, the linear regression analysis revealed that the most influential factor that contributed to the level of interaction in Mathematics courses was the respondents' level of confidence in system manipulation.

6. Discussions

6.1 Extent of Internet Self-Efficacy of the Students

The first objective of the study is to determine the extent of internet self-efficacy of the students. As exhibited by the results, the extent of students' internet self-efficacy was extensive, which was defined as learners' belief that they can achieve the things needed to do in utilizing the internet in general. Internet self-efficacy, as the independent variable of this study refers to the confidence of the students on the general use of internet (Chai et al., 2011).

The result showed that the students had extensive internet self-efficacy, which implies that majority of items regarding internet self-efficacy of the students were manifested frequently to a high degree and functioning most of the time which coincides with the claim in a previous that most of the learners prioritized the internet as a source of information or answers to their assignments or unanswered questions in the class (Bowman, 2002). And that the classrooms utilizing the internet has developed richly, and that internet-aided classrooms may offer more course of learning than the traditional classroom environment (Abdous & Yoshimura, 2010).

Particularly, in surfing and browsing, the item with the highest mean rating described as extensive is about the confidence of the students in finding information by using a search engine. This simply means that most students nowadays have adopted the internet tools and other new technological devices as part of their academic journey (Kennedy, Edmonds, Dann & Burnett, 2008). However, though the use of ICT tools has a limited advantage to supplement the needs in their courses even though they acknowledge the benefits of ICT materials (Hartshorne & Ajjan, 2009). The result also affirms the finding in the study of which conducted eight in-depth case studies, which concluded that students with high internet self-efficacy had better ability in using searching tools in the internet and acquired more knowledge than those students with low internet self-efficacy in an internet-aided learning environment (Tsai and Tsai, 2003).

Consequently in encryption and decryption, the item with the highest mean is about the students' confidence in receiving e-mail messages, with the computed mean described as extensive. Moreover, students' internet self-efficacy in system manipulation incorporate a high level of involvement in the world of internet, which garnered a mean rating described as extensive. The item underscored in the questionnaire with the highest mean was about students' confidence in downloading files and software, with the mean score of more than four, described as extensive.

Based on a similar thought, some researchers have stated that students' exposure in the web or internet has something to do with their perception of their abilities that relate to academic skills and stored knowledge which may have a significant role in their learning outcomes and learning processes in an internet-provided classroom environment (Tsai, Chuang, Liang & Tsai, 2011). The result also affirms the views asserted in a study that the world in this present time is changing into a multimedia and technological society leading to a new way of communicating with others. Thus, while most of the students are exposed to the new technologies available in the society nowadays, believed that internet is the mostly used media among the available media tools (Tatkovic & Ruzic, 2005). Lastly, it has been proposed that learners' belief in internet manipulation can contribute to their interests and motivation in their learning process (Coffin & MacIntyre, 1999).

As a whole, the overall result in the extent of internet self-efficacy which is described as extensive, is consistent with the notion that students in higher education nowadays tend to display high efficacy and dependence of utilizing the Internet for communicative purposes and general use (Wu & Tsai, 2006).

6.2 Extent of Interaction of the Students in Mathematics Courses

The dependent variable considered in this study is the interaction of the students in Mathematics. In fact, interaction is an essential concept and has been viewed as one of the important learning constructs in all forms of education, whether technology is involved or not. As exhibited, the results revealed that the interaction of the students in Mathematics courses was summarized as extensive. This entails that interaction of the students in Mathematics courses was most of the time practiced. All the three indicators under this dependent variable were all described as extensive with the over-all mean within the mean range of three and four.

In particular, among the seven items included in learner to learner interaction, the interactions related to the course with their fellow students garnered the highest mean, evidenced by the computed mean of almost four, described as extensive, which means that this kind of interaction is most of the time practiced. The extensive learner to learner interaction is indicative that students are often more engaged in the classroom activities. Students are involved in exploring real life issues and in solving given problem in Mathematics with the aid of available technologies nowadays. The nature of interactions in the classrooms with the aid of ICT materials provided a venue for students to share their views and learnings with other learners.



This means that the students agreed that during their Mathematics classes they were able to share their thoughts or ideas about the classroom discussion they were involved to and its practical applications with their other classmates (Slavit & McDuffie, 2003).

Further, on learner to instructor interaction, the ability of the instructors to reply to questions of the students in a timely manner registered the highest mean. The result is described as extensive. According to them, for the students, they feel assured and comforted in sharing their view and ideas because trust has been already developed (Gallitano, Boland & Fong, 2009).

Thus, the way teachers deal with the wrong responses or answers of the students is a good teaching practice to develop that will lead to development of the students' ability and ease to interact with their instructors. Teachers can help boost the students' growth of mathematical knowledge through the way instructors ask questions and respond to the queries of the learners (Piccolo et al., 2008).

Furthermore, instructors' responses to open-ended questions of the learners helped gauge changes in their perceptions of Mathematics. Instructor's abrupt, spontaneous, unprompted and informal feedback had essential contribution on developing and shaping the ideas expressed by the learners. It's also observed that students' self-efficacy are enhanced when they get explanations to the correct answers in a multiple choice questions. Thus, through feedbacks of the instructor, academic self-efficacy and interest of the students in the course are enhanced (Kotecha, 2012).

On the third indicator of interaction in Mathematics courses which is learner to content interaction, the respondents expressed their highest evaluations on the item that the given course materials are helpful to understand better the course content. This item is evidently described as extensive with the mean of more than four. This result follows a proposition of a previous study which stressed that numerous media or ICT tools can offer a wide opportunity for learner to content interaction to take place (Anderson, 2003).

6.3 Correlation between Measures

The test of the relationship between variables revealed a significant relationship between internet self-efficacy and interaction in Mathematics courses of the freshmen students from the selected universities and colleges in Davao City. All the three indicators of internet self-efficacy are significantly correlated to interaction in Mathematics courses. Table three also depicted that the students' internet self-efficacy is significantly correlated with their interaction in



a Mathematics class. Particularly, as indicated, the r - value is between the range of 0.4 and 0.6. Therefore the said variables are strongly correlated. This means that as the students have high internet self-efficacy the classroom interaction in Mathematics courses also likely to occur or vice versa. This result is supported by researchers that have revealed that students' confidence towards internet and computer is related to their usages and performance in learning environments (Johnson, 2005, Kinzie, Delcourt & Powers, 1994).

The findings above also corroborate the proposition of a study which reported that utilizing ICT or online learning materials will enable the instructors to uniquely engage the students in various learning activities and offer various ways for interaction (Rey, 2010). In addition, it improves the way students communicate with each other. Likewise, it motivates the learners to pay more attention and to participate more in the learning process.

The same can be accounted from a study which found out that internet self-efficacy is significantly and positively correlated with learner to instructor and learner to content interaction (Kuo, 2010). Another longitudinal study similarly revealed the positive effects of self-efficacy of the students on problem-solving skills (Hoffman & Spataru, 2008).

6.4 Significance of the Influence of Internet Self-Efficacy on Interaction of Students in Mathematics Courses

The influence of internet self-efficacy on students' interaction in mathematics courses was analyzed using linear regression analysis. Consequently, to meet the assumptions required to use linear regression, preliminary data screening was done. Durbin-Watson statistic was one and ninety-three hundredths, which fell between one and three, the recommended range (Durbin & Watson, 1950) thus, there was independence of observations. Subsequently, the histogram for residuals was also reasonably normal. To assess whether if there were any multivariate outliers, the standardized residuals from this regression were plotted against the standardized predicted values. The scatter plot of the residuals showed that there was no indication of extreme outliers, thus, there is no pattern of heteroscedasticity. Hence, the assumptions required for linear regression were reasonably well met.

From regression analysis, all the predictors of internet self-efficacy were proven to significantly influence the respondents' interaction in mathematics courses. The strength of the model indicated that there was a reasonable level of representativeness in the selected predictor variables.

Further, the preceding results indicated that a one unit increase in the level of confidence in surfing and browsing was associated with an increase of around fourteen hundredths on the level of interaction in Mathematics courses, while holding the other predictors constant. A one unit increase in the level of confidence in encryption and decryption was associated with an increase of around one hundred twenty-eight thousandths on the level of interaction in Mathematics courses while holding the other predictors constant. Eventually, a one unit increase in the level of confidence in system manipulation was associated with an increase of around one hundred fifty-eight thousandths on the level of interaction in Mathematics courses, while holding the other predictors constant. Therefore, the regression analysis revealed that the most influential factor that contributed to the level of interaction in Mathematics courses was the respondents' level of confidence in surfing and browsing.

The result is supported by a study from which he stressed that students' utilization of internet has a positive influence on their academic learning which includes interaction in learning environments (Zenon, 2006). The result also affirms the findings of previous study which reported that students' self-efficacy in using the internet is associated to their performance and usages in learning environments, enabling the available technologies in this generation to offer various media alternatives in sustaining learner to content interaction (Johnson, 2005).

7. Conclusions

This section presents the conclusions of the study on the basis of the foregoing findings that undergone in-depth analysis. The respondents had extensive level of internet self-efficacy, indicating that majority of the students nowadays have adopted the internet tools and other new technological devices as part of their academic journey. According to the possible explanation is that when students are confident in their ability and want to master new skills, they tend to see help seeking as a way to enhance their learning, rather than a threat to their self-worth. Therefore, they tend to seek adaptive help to improve understanding and learning (Luo & Zhang, 2015). It can be inferred also that internet is the mostly used media among the available media tools in this present time. Consequently, students in higher education nowadays tend to display high efficacy and dependence of utilizing the Internet for communicative purposes and general use.



The respondents also expressed that they had meaningful interaction in Mathematics classroom in terms of learner to learner, learner to instructor and learner to content, which shows that they are actively involved in the discussion or any activities inside the classrooms, which also entails that interaction of the students in Mathematics courses was most of the time practiced. Indeed, the nature of interactions in the classrooms with the aid of ICT materials provided a venue for students to share their views and learnings with other learners. Thus, learner to learner discussion is a good teaching method to enhance students' communication skills (Yin, Bing, Yusof, Zakariya, & Karim, 2016). Eventually, it emphasized that students, during their Mathematics classes, were able to share their thoughts or ideas about the classroom discussion they were involved to and its practical applications with their other classmates leading to the notion that numerous media or ICT tools can offer a wide opportunity for learner to content interaction to take place.

Moreover, internet self-efficacy had a strong positive correlation with interaction in mathematics courses. This means that as the students had high internet self-efficacy the classroom interaction will also highly to occur or vice versa, that leads to the rejection of the first null hypothesis. This implies that students' confidence towards internet and computer is related to their usages and performance in learning environments, that utilizing ICT or online learning materials will enable the instructors to uniquely engage the students in various learning activities and offer various ways for interaction. In addition, it improves the way students communicate with each other. Likewise, it motivates the learners to pay more attention and to participate more in the learning process.

Eventually, confidence in utilizing the internet is essential in the expression of ideas of the students that leads to the rejection of the second null hypothesis. Confidence in surfing and browsing, encryption and decryption, and system manipulation significantly influence the extent of interaction in Mathematics courses implying that students' utilization of internet has a positive influence on their academic learning which includes interaction in learning environments. Eventually, students' self-efficacy in using the internet is associated to their performance and usages in learning environments, enabling the available technologies in this generation to offer various media alternatives in sustaining learner to content interaction. Lastly, the anchored theory and propositions in this study were affirmed and supported.



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