PERCEIVED TEACHER AFFECTIVE SUPPORT AND COGNITIVE AND PSYCHOLOGICAL ENGAGEMENT AMONG STEM STUDENTS IN DISTANCE LEARNING

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ABSTRACT

Teacher affective support and student engagement are both fundamental to making the educative process meaningful in distance learning environments. This study assessed the levels of perceived teacher affective support and cognitive and psychological engagements among Science, Technology, Engineering, and Mathematics (STEM) students enrolled in online, modular, and blended distance learning modalities. The study also examined the relationship between the respondents' perceived teacher affective support and cognitive and psychological engagement. Descriptive research design and correlational method were used in the study. A total of 401 STEM students from a public senior high school in the Santa Cruz district, Province of Laguna participated in the study. Two self-report instruments were used and administered in the study. Results showed that respondents' perceived teacher affective support was to a very great extent. Cognitive engagement among the respondents was similar to a very great extent, while data showed that participants' psychological engagement was at a great extent. Pearson's test of correlation revealed that the respondents' perceived teacher affective support is significantly correlated to cognitive engagement. Likewise, the study also demonstrated a significant relationship between perceived teacher affective support and psychological engagement. The data indicate that teacher affective behaviors correlate with student engagement in distance learning experiences. The findings of the study may provide a framework for educators and administrators in flexible learning modalities and alternative delivery modes.

Keywords: teacher affective support, cognitive engagement, psychological engagement, distance learning, STEM education

INTRODUCTION

COVID-19 pandemic has brought major shifts in the systems in many the countries across the globe. The crisis has also created a disruption in education and has affected learners in all continents (United Nations, 2020; UNESCO, 2020). These sudden effects prompted change and innovation in the way education is provided to students. The public health emergency experienced in several regions of the Philippines has driven the creation of the Basic Education Learning Continuity Plan (DepEd Order No. 012, s. 2020) for Filipino students to continue their basic education under flexible learning options and alternative delivery modes (DepEd Order No. 018, s. 2020). In the Philippines, the Department of Education implemented learning strategies and modalities to deliver distance learning in times of COVID-19 public health emergency. In the distance learning delivery modalities of the Basic Education Learning Continuity Plan, teachers and learners are remote from each other during instruction. Learning experiences may happen through modular and online distance learning, and TV/Radio-Based Instruction. Other delivery modes comprise blended learning and homeschooling. These are the modalities Philippine schools can

adopt considering the community quarantine and restrictions, as well as the learner and school contexts (DepEd Order No. 012, s. 2020; DepEd Order No. 018, s. 2020).

Latino (2020) highlighted that the shift to remote learning required greater support, connection, and communication from teachers, and maintaining student engagement is particularly the top priority during the COVID-19 pandemic. Educators and other stakeholders shall be aware of the support being perceived by students as these perceived supportive behaviors are associated with students' personal and school adjustment (Malecki & Demaray, 2003). Teachers can increase students' emotional response to the learning experience in distance learning contexts by employing behaviors that positively influence emotion as these two are significantly correlated (Brooks & Young, 2015). In the study of Li et al. (2020), teacher autonomy support was observed to have a direct impact on students' school engagement. Correspondingly, Sakiz (2015) revealed that teacher affective behavior and mastery goal orientation improve and enhance emotional, motivational, and academic functioning among learners.

Levels of student engagement are acknowledged as a way for students to experience increased learning and improved educational outcomes (Lester, 2013). Moreover, student engagement has been associated with academic performance, behavior, and success (Hart et al., 2011). It has further been noted that cognitive and psychological engagement include more internal indicators that are less observable but are associated with positive learning outcomes (Appleton et al., 2008; Fredericks et al., 2004). In a technology-mediated distance learning course, Li & Lam (2015) found out that teacher support is one of the factors that facilitate emotional engagement. In a distance learning setup, Sun and Rueda (2012) further found out that student engagement can improve by providing necessary technical help and by offering strategies for students to increase their self-regulation in distance education environments.

With these constructs, the study focused on assessing the level of perceived teacher affective support, cognitive and psychological engagement among STEM students in a distance learning set-up. It also centered on determining the correlation between STEM students' perceived teacher affective support and cognitive and psychological engagement.

OBJECTIVES OF THE STUDY

This study aimed to assess the perceived teacher affective support and cognitive and psychological engagement among STEM students in distance learning. It is specifically intended to 1) determine the level of teacher affective support as perceived by the respondents; () determine the level of respondents' cognitive and psychological engagement; 3) examine if there is a significant relationship between perceived teacher affective support and cognitive engagement of the respondents; and 4) examine if there is a significant relationship between the participants' perceived teacher affective support and psychological engagement.

METHODOLOGY

This study utilized the descriptive research design to determine the level of perceived teacher affective support and assess the level of cognitive and psychological engagement of STEM students in distance learning modalities. The correlational method was likewise employed to determine the relationship between students' perceived teacher affective support and cognitive and psychological engagement.

Participants of the study were senior high school students from the Science, Technology, Engineering, and Mathematics (STEM) strand in a public institution in Santa Cruz district, Province of Laguna during the Academic Year 2020-2021. The participants voluntarily participated in the study and they were informed that they were free to opt-in and out of the research at any point in the conduct of the study.

Parental permission for child participation was also distributed to and signed by the parents or guardians. Likewise, assent to participate in the study was distributed to and signed by the respondents. The respondents and their parents were informed of the purpose of the study, risks,

and benefits should the child decide to participate or not, and notice on confidentiality.

The participants were under the online, modular, and blended (combination of modular and online) distance learning modalities. A total of 401 students, 213 (53%) from Grade 11 and 188 (47%) from Grade 12, agreed to participate and responded to self-report instruments that were administered through digital and print means.

Two instruments were used and administered in the study. The respondents' perceived teacher affective support was measured using nine items adapted from Sakiz et al. (2012). The items in this instrument measured the respondents' perceived teacher affective behavior including concern, fair treatment, encouragement, and respect for students, among others. On the other hand, the 5-point scale secondary level Student Engagement Instrument (Appleton and Christenson, 2004; Appleton et al., 2006) was used to assess the respondents' cognitive and psychological engagement. The six-factor model of the instrument includes items under cognitive engagement (control and relevance of schoolwork, future goals, and aspirations, extrinsic motivation) and psychological engagement (teacher-student relationship, peer support for learning, family support for learning) subtypes (Appleton et al., 2006).

Descriptive statistics, mean and standard deviation, were computed to determine the level of perceived teacher affective support and cognitive and psychological engagement of the STEM students. To determine the relationship between participants' perceived teacher affective support and cognitive engagement, as well as the relationship between perceived teacher affective support and psychological engagement, Pearson product-moment correlation was used.

RESULTS AND DISCUSSION

The succeeding tables and accounts reveal the results and findings of the study.

1. Level of Perceived Teacher Affective Support among STEM Students in Distance Learning

Table 1
Perceived Teacher Affective Support among STEM Students in Distance Learning

	Grade 11		Grade 12		Overall		
	M	**SD**	**M**	**SD**	**M**	**SD**	**VI**
Perceived Teacher Affective Support	4.52	0.75	4.32	0.85	4.42	0.807	VGE

From Grade 11 STEM students' perception (M=4.52, SD=0.75) and from Grade 12 STEM students' perception (M=4.32, SD=0.85), the level of teacher affective support was generally interpreted as a very great extent. The overall mean of 4.42, with the supported value of standard deviation 0.807, indicated that the respondents answered *strongly agree* with the items in the perceived teacher affective support scale. As presented, the level of perceived teacher affective support among STEM students is to a very great extent. Child-perceived teacher emotional support is regarded as fundamental to student development and creates contexts for students to be engaged in learning (Kikas and Tang, 2018).

2. Level of Cognitive and Psychological Engagement among STEM Students in Distance Learning

2.1. Level of Cognitive Engagement among the Respondents

Table 2
Level of Cognitive Engagement among STEM Students in Distance Learning

	Grade 11		Grade 12		Overall		
Factors	**M**	**SD**	**M**	**SD**	**M**	**SD**	**VI**
Control and Relevance of Schoolwork	4.35	0.76	4.15	0.85	4.26	0.807	VGE
Future Goals and Aspirations	4.75	0.74	4.75	0.52	4.75	0.530	VGE
Extrinsic Motivation	3.95	1.20	4.32	0.96	4.12	1.107	GE
Cognitive Engagement	4.35	0.90	4.41	0.78	4.38	0.815	VGE

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As depicted, the cognitive engagement in terms of control and relevance of school work among the respondents was to a very great extent (M=4.26, SD=0.807). Similarly, the respondents exhibited a very great extent of cognitive engagement in terms of future goals and aspirations (M=4.75, SD=0.530). In the extrinsic motivation factor under the cognitive engagement subtype, scores were reversed, and the results showed a great extent (M=4.12, SD=1.107). With an overall mean of 4.38 and a standard deviation of 0.815, the respondents' level of cognitive engagement is interpreted to a very *great extent*. In the analysis of four asynchronous online discussions, Zhu (2006) stressed that interaction types and levels of cognitive engagement play a role in the teaching and learning process.

2.2. Level of Psychological Engagement among the Respondents

Table 3
Level of Psychological Engagement among STEM Students in Distance Learning

Factors	Grade 11		Grade 12		Overall		
	M	SD	M	SD	M	SD	VI
Teacher-Student Relationship	4.35	0.72	4.13	0.79	4.24	0.763	VGE
Peer Support for Learning	4.00	0.85	4.01	0.88	4.00	0.865	GE
Family Support for Learning	4.41	0.82	4.25	0.85	4.34	0.834	VGE
Psychological Engagement	4.25	0.80	4.13	0.84	4.19	0.821	GE

Findings showed that the psychological engagement among the respondents was to a very great extent in terms of a teacher-student relationship (M=4.24, SD=0.763) and family support for learning (M=4.34, SD=0.834). On the other hand, the participants exhibited a great extent of psychological engagement in terms of peer support for learning (M=4.00, SD=0.865). As presented, with an overall mean of 4.19 and a standard deviation of 0.821, the level of psychological engagement among STEM students in distance learning was interpreted as at a *great extent*. In a meta-analysis conducted by Lei et al. (2018), a positive correlation was observed between emotional, cognitive, and behavioral engagement and academic achievement. This consequently implies that a higher level of engagement is associated with increased success in student performance (Mo and Singh, 2008).

3. Relationship between Perceived Teacher Affective Support and Cognitive and Psychological Engagement among STEM Students in Distance Learning

3.1. In terms of Perceived Teacher Affective Support and Cognitive Engagement

Table 4
Test of Correlation between Respondents' Perceived Teacher Affective Support and Cognitive Engagement

	Perceived Teacher Affective Support	
Cognitive Engagement	Pearson's r	0.3487**
	Sig.	0.0000
	N	401

**. *Correlation is significant at 0.05 level*.

Based on Pearson's test of correlation, it appeared that there was a positive relationship between the participants' perceived teacher affective support and cognitive engagement. Likewise, it can be inferred that there was a significant statistical correlation between students' perceived teacher affective support and cognitive engagement (r(399)=0.3487, p<0.001). This implies that as students perceive teacher affective support to a great extent, there is more likely that their cognitive engagement in distance learning can be improved. In consonance, Federici and Skaalvik (2013) revealed that students' perceptions of emotional and instrumental teacher support are positively correlated to intrinsic motivation, effort, and help-seeking behavior.

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3.2. In terms of Perceived Teacher Affective Support and Psychological Engagement

Table 5
Test of Correlation between Respondents' Perceived Teacher Affective Support and Psychological Engagement

	Perceived Teacher Affective Support	
Psychological Engagement	Pearson's r	0.6354**
	Sig.	0.0000
	N	401

**. *Correlation is significant at 0.05 level*.

As reflected, there was also a positive relationship between the respondents' perceived teacher affective support and psychological engagement. It can also be inferred that the students' perceived teacher affective support and psychological engagement had a significant statistical correlation (r(399)=0.6354, p<0.001). This suggests that there is more likelihood for increased psychological engagement among students in distance learning when teacher affective support is perceived to be at a relatively great extent. The outcomes of the study conducted by Callaway (2017) support that the teachers have an impact on student engagement and that teacher efficacy had a moderate statistically significant correlation with student engagement.

This study shows that perceived teacher affective support is related to cognitive and psychological engagement. The results support the findings of Culver (2015) that indicate the building of supportive teacher-student relationships promotes student engagement and successful developmental outcomes.

CONCLUSION

The findings of this study indicate that higher levels of perceived teacher affective support promote increased cognitive and psychological engagement among distance learning students. This implies that teacher behaviors that demonstrate support correlates with how engaged students are in the educational experiences. In addition, this suggests that although teachers and students are in a physically separated environment during distance learning, teacher affective behaviors might impact student engagement that is important for better and improved learning outcomes.

RECOMMENDATION

Educators and administrators can use the data on the levels of perceived teacher affective support and student engagement factors as frameworks for the development or improvement of approaches and methodologies in flexible learning modalities and alternative delivery modes. Analysis on the difference of students' level of perceived teacher affective support and cognitive and psychological engagement in modular, online, and blended modalities may be carried out further. Future research might investigate other external factors that contribute to student engagement in distance learning. The influence of perceived teacher affective support and cognitive and psychological engagement on academic success, student behavioral problem, and school dropout in distance education could also be assessed.

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