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Situational Interest and Engagement of Public Junior High School Science Students in Modular Distance Learning

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Due to the ongoing global health crisis, the Philippine Basic Education opted to implement modular distance learning (MDL) as an alternative mode of learning for the current school year. This modality depends highly on the use of self-learning modules (SLMs) with the goal of bringing about learning and continuing students' education amidst the pandemic. The present study employed mixed methods research to describe and examine the relationship between situational interest and engagement (behavioral, emotional, and cognitive) of public junior high school science students in modular distance learning. Participants in the online survey were 380 students from eight different public secondary schools while the interviews involved 19 junior high school students who were determined based on their initial responses on the survey. Results revealed the significant correlation between situational interest and the three dimensions of engagement (behavioral, emotional, and cognitive). Emotional engagement obtained the lowest mean among the engagement dimensions while novelty attained the lowest mean score among the situational interest dimensions. Results showed that although most students in the current study are interested and engaged in MDL, the format and content presentation of the SLMs do not always necessarily interest and engage students into learning.

Keywords: situational interest, behavioral engagement, emotional engagement, cognitive engagement, modular distance learning

INTRODUCTION

Engaging science students and tapping their interest is already a challenge during face-to-face classes (Waldrip & Prain, 2017; Hadzigeorgiou & Schulz, 2019). Pandemic is bringing even greater challenges in science education. Now that students are not contained in a physical classroom but at the confines of their homes, their learning processes become highly independent and self-regulated. This autonomy can potentially lead them to simply complying passively and submitting to minimum learning standards.

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Further, science concepts being usually technical and needing guided instruction and elaboration, the absence of a competent teacher may greatly affect the degree of students interest and engagement to learning. With the challenges brought about by the pandemic, ensuring that students are interested and engaged into the learning process can provide a conducive environment for the effective and efficient continuation of education.

As reflected by DepEd's results on learner's enrollment and survey form conducted prior to the opening of classes on October 5, 2020, modular distance learning (MDL) was found to be the top preference of parents as learning modality for their children (DepEd, 2020). Among the distance learning modalities proposed by the department, the MDL appears to be the most feasible modality for majority of the basic education learners. In view of the DepEd's pursuit of ensuring learning continuity amidst the ongoing pandemic, MDL can address socio-economic inequities of its learners as parents raised concerns on limited to no access to mobile devices and internet connection. Conveniently, modules are being picked up by parents and or guardians from the school on a weekly basis. At the end of the week, accomplished modules will be handed over to the teachers for checking and monitoring.

Moore (1993) hints that there may be some challenges in delivering MDL, particularly in reducing the transactional distance between learners and teachers. With the physical separation between learners and teachers, the latter should be able to design ways to engage students and tap their interest so they can benefit with higher learner-content interaction. Teachers are brought at the forefront of this interaction where conscious efforts should be taken on their end to keep students attentive and engaged with their modules. With students facing difficulty in their modules alone and having limited people to turn to, the transactional distance increases. This can negatively impact the quality of their work and their learning. These concerns are among the cases pointed out by studies conducted on distance education such as those of Burdina, Krapotkina, and Nasyrova (2019) and Al-dheleai and Tasir (2020). In order to address this, a closer look on the importance of interaction and its proper channels can be beneficial for both teachers and students.

It will be worthy to understand the level of engagement and interest of students under the MDL so that teachers would be able to address the possible challenges that the former face in dealing with their lessons. Conclusions from other studies stress on the essential role that interest has in promoting student engagement. Schraw, et al. (2001) described interest as changeable and that it furthers learning. Situational interest and personal interest are its two types. Situational interest concerns itself to capturing student's attention whereas personal interest is vital in sustaining it. The authors intently emphasized that situational interest is a pre-requisite to student learning. It being malleable (Schraw, et al. 2001; Rotgans & Schmidt, 2011; Renninger & Hidi, 2018). Teachers can do so much in improving student's interest by actively selecting stimulating materials and purposively structuring the learning environment. Sun and Rueda (2012) found that interest and the three dimensions of student engagement were found to be positively associated with each other. This explains that distance education

students will get engaged in their learning environment if they initially express interest in what they do.

In terms of MDL implementation, local studies gave inconsistent results. Dangle and Sumaoang (2020) reported on their study that students struggle with self-studying and that parents lack knowledge in guiding their children. Conversely, in another study, it was found that students learn with ease and become independent, and that the module contains simplified explanations of the lesson that students can easily follow (Labrado, 2020).

As noted in the existing studies, student engagement is a crucial component in student learning success (Chen et al., 2008; Chickering & Gamson, 1987; Kuh, 2009; Fredricks, et al., 2016). It has been acknowledged as a perennial challenge and a desirable goal both in face-to-face and distance education settings. Given that students are remote from each other and their teachers in distance learning, it becomes more difficult to engage students compared to traditional classroom learning (Bolliger & Halupa, 2018; Moore et al, 2008). As a response, studies have affirmed that interaction between learners and teachers can have a major impact in promoting student engagement which in turn effect learning (Liao, 2006; Dixson, 2010; Falloon, 2011; Stone, 2012; Ustati & Hassan, 2013).

Taking all these into account and guided by Moore's Transactional Distance Theory, the present study explored the relationship between situational interest and engagement of high school science students in modular distance learning. Having an understanding of these underlying students' context can provide school heads basis in drafting more relevant policies for the improved implementation of MDL. Moreover, chances of teachers merely employing MDL without acknowledging the challenges that go around it will be reduced.

Study Objectives

The study aimed to describe and examine the relationship between situational interest and engagement of high school science students in modular distance learning. The study specifically aimed to accomplish the following objectives: (a) Describe the situational interest of high school science students in modular distance learning; (b) Describe the behavioral, emotional, and cognitive engagement of high school science students in modular distance learning; (c) Determine the relationship between the situational interest and engagement of the students; and (d) Identify the challenges on engaging science students in modular distance learning.

METHOD

Research Design

This study used the mixed methods research to describe and examine the relationship between situational interest and engagement of high school science students in modular distance learning. Specifically, mixed methods explanatory sequential design was employed. This research design integrated the results from both quantitative and qualitative research approaches for a deeper and comprehensive understanding of the

constructs being studied (Creswell & Creswell, 2018). Tools like questionnaire (quantitative) and interview (qualitative) were used to facilitate data gathering in the study. This method is very appropriate because the identified experiences and challenges from the qualitative interviews helped explain in more depth the initial results which gauged students' level of engagement and interest in MDL. The integration of the quantitative and the qualitative findings provided a better understanding on what challenges students encountered under MDL.

Sample

To identify the sample, simple random sampling of the schools was done. From the sixteen (16) schools of cluster 4 in the Schools Division of Pampanga, 8 high schools were randomly selected through fishbowl method. The total population of the study will be the 10,485 junior high school students from these select schools. The minimum sample size was determined using the Raosoft online sample calculator. The response distribution was 50%. The standard deviation is set at 95% confidence level with a margin of error at 5%. The recommended sample size was 371 from the total population of 10,485 junior high school students. To get the sample size for each school, stratified random sampling was employed. The proportion from the total population was multiplied by the recommended sample size. To determine the respondents from each grade level in each school, the researchers sought the assistance of the head teachers in doing the selection. For the interview, at least 4 respondents from each school were purposively selected based on the results of the initial survey. Respondents who were highly and least engaged and situationally interested were invited for an interview.

Research Instruments

Student Engagement Questionnaire

According to Fredricks et al (2004), student engagement is a multifaceted construct that consists of behavioral, emotional, and cognitive components. In this tool, student engagement is assessed into three – behavioral engagement, cognitive engagement, and emotional engagement. Behavioral engagement refers to the involvement of students both in curricular and extracurricular activities. This is represented by five (5) items in the questionnaire. Cognitive engagement pertains to student's thoughtfulness and willingness to master difficult skills. Eight (8) items are included in this area. While emotional engagement covers the positive and negative responses of the students to their peers, teachers, and school. This was measured using six (6 items) in the questionnaire. The respondents answered the questionnaire using a 4-point Likert scale, 4 being strongly agree and 1 being strongly disagree. The questionnaire also undergone pilot testing and internal consistency validation check. After employing Cronbach's reliability test, this study instrument yielded an internal consistency coefficient of 0.81 for behavioral subscale, 0.87 for emotional subscale, and 0.84 for cognitive subscale. Overall, the instrument was found to have an internal consistency coefficient of 0.92. This implies that the scales developed were valid and reliable in describing student engagement (Taber, 2018).

Situational Interest Questionnaire

Situational interest refers to the interest initiated by the immediate environment (Hidi & Renninger, 2006, 2018; Schraw et al, 2001). Chen, et al (1999) described it as a complex construct which include five dimensions. In this tool, situational interest is assessed into six – challenge, instant enjoyment, attention quality, novelty, exploration intention, and total interest. Novelty refers to newness and uniqueness of the information or activity; challenge concerns about difficulty; attention demand is equated to focus in learning an activity; exploration means learners becoming discoverers of their learning; and instant enjoyment is a positive feeling of satisfaction, while total interest indicates student's response and evaluation of the situational interest of a particular activity. The respondents answered the questionnaire using a 4-point Likert scale, 4 being strongly agree and 1 being strongly disagree. After pilot testing the said questionnaire, internal consistency of the items was computed. This instrument had an internal consistency (Cronbach's α) of 0.72 for exploration intention, 0. 79 for instant enjoyment, 0.62 for novelty, .80 for attention demand, 0.77 for challenge, and 0.90 for total interest. Overall, the instrument scored an internal consistent of 0.89 (Cronbach's α) indicating that the scales included were valid and reliable in describing situational interest. These values are within the acceptable ranges provided by Ursachi et al (2015) and Taber (2018) for internal consistency.

Interview Guide

The study employed a semi-structured interview. This helped in identifying the challenges on engaging science students in modular distance learning. The questions were developed according to the 4 variables – situational interest, cognitive engagement, emotional, behavioral. The alignment between the questionnaires and the interview questions was also established. There were at least three (3) questions per variable in the study. A 30- to 60-minute interview either through phone call or video conference platforms was employed.

Research Procedures

Survey questionnaires were used extensively in the study. The questionnaires also undergone pilot testing and internal consistency validation check. The first phase of the study focused on descriptively analyzing the levels of situational interest and engagement (behavioral, emotional, and cognitive) of high school science students in modular distance learning. Considering the context of MDL, the questionnaires, through a Google form link, were sent to those who responded to the invitation of participating in the study.

Representative students were remotely interviewed through either phone call or video conference whichever was applicable to each respondent. They were given open – ended questions to know the challenges they encountered while undertaking modular distance learning and what strategies they used to resolve the encountered challenges. The semi-structured interview was validated by language and education experts to check for the suitability of language, its content, and its alignment to the construct being assessed.

The integration of the results of the survey and interview provided a better understanding on what challenges the students encountered while studying through MDL. This led the researcher to themes and assertions pertinent to the variables and policy recommendations based on the result of the study were drawn.

Statistical Analysis

The data were all treated using Intercooled Stata, version 13 (StataIC 13). Specifically, the following statistical tools were used: frequency count, mean, and standard deviation. Frequency count was used to determine the percentage of students responding to the different scales of the questionnaires. Mean was used to compute the average rating given by the respondents to each of the variables. Standard deviation was used to determine the spread of the responses.

In addition, correlational analyses were conducted to explore the link between the study variables – situational interest, cognitive engagement, emotional engagement, and behavioral engagement. The Pearson correlation coefficient, r, was used to describe the linear relationship between the study variables.

FINDINGS

Situational Interest

Among the dimensions of situational interest, novelty recorded a mean score of 2.97, making this dimension attain the lowest degree of agreeability while exploration rated the highest with a mean score of 3.47. This may tell us that the modules were most likely designed or patterned after the activity sheets or worksheets being used by teachers during their face-to-face classes. As such, students may not see striking differences in terms of how the materials are delivered. These can be taken in two different perspectives. This setup may be beneficial as students will not have to adjust so much in familiarizing themselves with the flow of the lesson in these modules. On the other hand, this setup may not also be responsive of the distinctive features of distance education. Note that during the face-to-face sessions, these activities were used to compliment teacher instructions, as teachers are required to hold classes in their respective schedules. At most, the modules could be extension activities that students may use after the class discussion. The closest resemblance to the current setup is when students who are lagging are given SLMs so they may be able to catch up with the mainstream discussions. However, it must be noted that there is still, at varying extent, teacher-student interaction, where the latter can ask and make clarifications about the lesson. If one is to truly create SLMs designed for distance education, they must consider the limited teacher-student and student-student interaction.

Table 1
Descriptive statistics for situational interest's dimensions

Dimension	Exploration	Enjoyment	Novelty	Attention	Challenge	Total Interest
Mean	3.47	3.10	2.97	3.15	3.00	3.05
SD	0.38	0.45	0.42	0.47	0.45	0.50

Student Engagement

Behavioral, emotional, and cognitive engagements obtained mean scores of 3.30, 2.98, and 3.14, respectively. This means that students in the current study are generally engaged in accomplishing their modules in modular distance learning. This was supported by the lower standard deviations of all mean scores which proved the consistency students' responses to each engagement dimension. These findings further indicate that though students are left with little choice but to comply with the undertakings of MDL, they still manage to participate accordingly to this mode of learning. These findings, however, disproved the study of Dangle and Sumaoang (2020) which reported that students lack focus and are struggling with self-studying. Moreover, students in the present study are not as engaged emotionally in MDL as supported by the lowest mean score of 2.98 in the same table. This may suggest the feeling that they simply have to comply with it as a requirement and it is what is expected from them (behavioral and cognitive).

Table 2
Descriptive statistics for student engagement dimensions

Dimension	Behavioral	Emotional	Cognitive
Mean	3.30	2.98	3.14
SD	0.42	0.47	0.39

Correlating Situational Interest and Student Engagement

Interest is moderately correlated to both behavioural and cognitive components of student engagement (r= 0.6412 and r= 0.5355, respectively). This means that students who have the interest will more likely participate and get involved in the tasks included in their modules. And if interest is sustained and adequately supported, students will give the content of their modules approbation and they will continue to accomplish their SLMs actively and deliberately with a higher level of intentions. These findings are aligned with the study of Renninger and Hidi (2019) which pointed that students' willingness to participate and the extent of effort they exert in working with the content are based on their level of interest.

The same table reports that there is a strong association between interest and emotional engagement (r= 0.7316). This indicates that interest is a key factor which influences student emotional engagement in distance learning setting. Students who are reasonably interested in accomplishing their modules are likely to respond positively to the demands of the activities. This may suggest the intrinsic value of interest in the accomplishment of the tasks in the modules. Noting that emotional engagement is essentially into the ability of the students to feel excitement in doing the task, it is but understandable that such correlation would exist. This finding is consistent with the study of Fredricks et al, (2004, 2005), as cited in Sun and Rueda (2012), which showed that interest takes a key role in facilitating emotional engagement.

Collectively, the same table shows that interest is positively correlated with all types of engagement (behavioural, emotional, and cognitive engagements). This supports that the

more interested students are in MDL the higher the chance that they will be more engaged and connected in what they are learning. This implies that students who finds interest in studying their lessons through their modules can likely be more inclined to work on the task not only for the sake of compliance. This finding agrees to the study of Sun and Rueda (2012) which proved that high student interest equates to higher student engagement.

Table 3
Correlations between situational interest's and student engagement's dimensions

Dimension	Exploration	Enjoyment	Novelty	Attentior	Challenge	Total interest	Behavioural	Emotiona	Cognitive
Exploration	1								
Enjoyment	0.4599*	1							
Novelty	0.2992*	0.3635*	1						
Attention	0.4780*	0.4894*	0.3403*	1					
Challenge	0.3802*	0.5517*	0.3391*	0.5516*	1				
Total interest	0.4156*	0.7165*	0.4097*	0.5887*	0.5990*	1			
Behavioral	0.5649*	0.5528*	0.3697*	0.6120*	0.4856*	0.6412*	1		
Emotional	0.3261*	0.6661*	0.3830*	0.5357*	0.5733*	0.7316*	0.6196*	1	
Cognitive	0.5235*	0.4867*	0.4070*	0.5750*	0.5310*	0.5353*	0.6316*	0.5779*	1

Challenges in Modular Distance Learning

In-depth individual interviews were conducted to gain deeper understanding of the perceptions of the learners. In this phase, the participants who registered the highest and the lowest situational interest and engagement in each school were invited for the interviews. This provided a linear perspective between those who are interested and engaged with the SLMs and those who were not.

Table 4
Interview participants

Participant Code	School	Situational Interest[1]	Student Engagement[1]
A1	A	High	High
A2	A	High	High
A3	A	Low	Low
A4	A	Low	Low
B1	B	High	High
B2	B	Low	Low
C1	C	High	High
C2	C	Low	Low
D1	D	High	High
D2	D	Low	Low
E1	E	High	High
E2	E	Low	Low
F1	F	High	High
F2	F	Low	Low
G1	G	High	High
G2	G	Low	Low
H1	H	High	High
H2	H	High	High
H3	H	Low	Low

[1]High and low classifications were based on the relative mean scores in each of the scales.

Authenticity of Enjoyment in Accomplishing Modules

Respondents have divided perspectives towards the authenticity of the tasks in the SLMs. A1 noted that she cannot remember any lesson from the SLMs in which she enjoyed. On the contrary, a number of respondents (A2, D1, D2, …) even those in the low interest and engagement group, reported that among the activities they found enjoyable were experiments, problem solving, breaking codes, and making pamphlets and brochures. Evidently, these identified activities that utilize and develop not only the critical but also the creative skills of learners increase learner-content interaction. Rotgans and Schmidt (2011) reported that students' situational interest can be activated and increased when challenging tasks like puzzles and problem solving are presented. Students will be more engaged when the instructional materials are presented in a fun and easy format (Widestra & Samudra, 2020) which explained why a number of students (C1, D1, F1, …) suggested to add more pictures and interesting visual aids in the modules. Some modules may have actually included enjoyable inclusions in their design but this was not consistent. This may also be the reason why E2 noted that answering the worksheets included in the SLMs to be mechanical, repetitive, and does not engage him so much and that of the number of students who disagreed at accomplishing modules being an enjoyable and appealing task.

Relevance of SLMs to Learners' Interest

Most students found that SLMs lack relevance to their everyday lives as indicated in their suggestions to get the modules more significant to their generation. This can be related to activities they had to accomplish which they viewed as mundane and difficult like too much writing (E2) and self-learning (F1 and D1). Specifically, E1 said that he is not enjoying because it is hard to do self-learning using the module alone. Conversely, D1 and F1 expressed appreciation of these modules as relatable with the mention of Mobile Legend, Harry Potter, and superheroes being integrated in their design and presentation. Harris, et al (2020) discussed that the physical presentation of learning materials can attract student interest while tailoring these materials into real-world contexts can support increased student engagement. This implies that careful consideration should be made in developing the SLMs in a way that it features catchy backgrounds and real-life scenarios. Furthermore, the current presentation of SLMs may not necessarily support the interest of distance education learners as confirmed by the low mean scores for emotional engagement.

SLMs' Level of Difficulty

In terms of difficulty, the science modules matched the grade level and level of understanding of the majority of students in the present study. However, there are a number of them who claimed that though most of the modules' contents are easy to accomplish, there are still some lessons that are really difficult to do. F1 specifically mentioned Chemistry to be difficult and Biology to be easy. The level of difficulty to most students including those with high interest and engagement was also associated to the kind of lesson presented in the SLMs and only B2 claimed that the modules are particularly difficult – "I have difficulty sometimes, sometimes I'm in a hurry because many of our modules are difficult to understand and answer". Another student (A4) also claimed that the difficulty of the modules depends on the number of modules he is answering, indicative that he gets overwhelmed with the loads he has to accomplish. These are consistent to the studies of Gueta and Janer (2021) and Dangle and Sumaoang (2020) which reported that most of the students found their SLMs difficult to answer especially when it involves problem solving. Students in these previous studies were reported to have trouble in accomplishing their modules alone. These claims explain the low mean scores under the challenge dimension.

Novelty of SLMs

In terms of novelty, accomplishing SLMs, according to A3 and B2, is not something new as the science modules require too much writing which can really be boring and is no longer fitting today's technological trend since this generation does not need the use of paper and pen that often. SLMs are supposed to provide newer experiences. A repetition of the tasks in their former learning modules (LMs) during classroom classes does not help in providing new experiences for the learners. Contradicting this is D1 who addressed the novelty of the modules positively stating that making a brochure of mantle convection was enjoyable since it was the first, she learned digital editing and learning something new is fun. The diverging and mostly negative answers of the

students' to the science SLMs novelty is an explanation why novelty gets the highest percentage of disagreed response and the lowest mean score among the dimensions of situational interest as shown in Tables 5 and 9. The findings related to novelty is highly dependent to the implementation of the SLMs as an LDM and not in their contents. Tasks are novel only when they provide new information and experience resulting to favourable student enjoyment (Rotgans & Schmidt, 2011; Huang & Gao, 2013). Taking these into account, those people involve in the development of SLMs must arrange the activities in science modules with appropriate level of fun and novelty if effective learning is desired.

Redefining Time-on-Task and Commitment to Learning

Results have shown that most of the respondents reported that they intend to learn from the science modules. Few students (A4, B1, and F1) particularly noted that learning science through SLMs may give them advantage because they plan to pursue STEM courses in senior high school. While this is true for many, D2 explained that he only answers the questions in the SLMs because he has to continue his education. This reveals that this particular student may represent those who expressed disagreement in the claim that they are truly learning from SLMs. This is connected to the study of Ainley and Ainley (2011) which discussed that intentions are deemed significant in determining students' actual participation and building personal value is beneficial in increasing student engagement in learning science content. Most students (D1, D2, E2, …) from both high and low engagement and interest groups have also voiced out that they are generally focused when answering difficult topics (computations and problem solving) in the SLMs. When students are presented with mentally challenging tasks, their level of motivation may increase (Roure & Pasco, 2019). Given that SLMs are being accomplished at home, teachers and parents must collaborate in ensuring that students follow the time frame indicated in their Weekly Home Learning Plan to encourage promptness and diligence. Unfortunately, teachers in the study of Castroverde and Acala (2021) have reported challenges on students' timely submission of complete answer sheets. Complementing this are the number of students in Table 8 who do not accomplish their modules on time. Despite the challenges MDL brings, teachers' timely monitoring, giving feedbacks, and coordinating with parents can positively address issues on students' disengagement.

Quality of Learning and of the Learning Process

The self-learning modules are based on the most essential learning competencies (MELCs) provided by DepEd which means they were crafted to provide learners not just with the information they need in their grade level, furthermore, equip them with the skills and learning for lifelong education. This noble intention needs to provoke students' critical yet voluntary commitment and based on the answers gathered in this study, it appeared that most learners are committed and are mostly doing their part in absorbing the SLMs' content. When asked if learners review their answers by checking their answers keys, most (with both high and low interest and engagement) said that they do, D1 even said that she goes back to her lessons when she realizes her errors and will review until she finally gets them. This relates to the study of Labrado, et al (2020)

which mentioned that students may develop a sense of responsibility in their learning since the accomplishment of modules is self-regulated. The above findings may explain the significant number of students who always check their mistakes as seen in Table 12.

When having difficulties with the tasks or the lessons, a number of them (D1, F1, F2, …) said that they research the internet or get help from someone who can. Yet, all these positive answers were also merged with reasons that lower the quality of students' cognitive engagement, "Yes (to searching the net), because of the amount and difficulty of activities included the SLMs", said A3. This is connected to the the study of Gueta and Janer (2021) which reported that students in their study have struggles in answering modules because no teacher is there to guide them when lessons get difficult. A1 said on the other hand that she would answer her module after helping in their sari-sari store or after her household chores. Personal habits also interfere in learners' engagement, like F1 who said that she usually answers her modules right before submission because she works better when strained with deadline. This implies that studying at home lacks proper scheduling and students are surrounded with distractions causing them to procrastinate (Gueta & Janer, 2021).

From Inclusion to Alienation

Culturally exposed to mainstream classes, majority of respondents who now study through MDL have expressed unprecedented difficulties in accomplishing their modules with zero to minimal assistance from others. Ideally, MDL necessitates parents and significant others to patiently guide and teach their children in lieu of teachers. This support from More Knowledgeable Others (MKOs) at home is crucial in making students feel less discouraged and still remain connected in the learning process even in a distance setting. On one side, H3 has reported that he gets disheartened whenever he answers the modules by himself. As per A1, her siblings are present to help her when topics get challenging. This is related to the study of Dangle and Sumaoang (2020) which mentioned that siblings are the top helpers of the students when answering the modules. Another student (A3) in the present study further noted that answering modules felt overwhelming hence making her cry and think of dropping from school. These concerns find congruence to the studies of Abante, et al (2021) and Gueta and Janer (2021) which stated that learners experience difficulty in coping with MDL since they have limited interaction with their peers and teachers. These students' responses from the interview may support the low mean scores of the situations and the lowest mean for emotional engagement among all engagement dimensions.

Taken together, Moore (1993) explains that the way we implement MDL may not support quality dialogue student-student and student-teacher interactions since their most interaction is greatly on the content. This nature of MDL causes an increase in a gap which Moore called transactional distance. This has gained support from the study of Bolliger and Halupa (2018) which proved that a decrease in transactional distance increases student engagement and satisfaction in distance learning. This may be directed to module writers to design learning materials like the SLMs to integrate relevant and fun activities and that teachers should maintain a good amount of interaction and guidance in order to rid of students' feeling of alienation as they learn from a distance.

CONCLUSIONS AND RECOMMENDATIONS

Since students have long been exposed and cultured to face to face classes, studying independently under MDL causes them unnecessary difficulty in adjusting to the demands of this learning arrangement. However, most of the respondents in the current study are still able to accomplish their science modules. All dimensions of situational interest scored with relatively high means except for novelty. This implies that students in the study are generally interested in their SLMs. Having said that, capturing and maintaining student interest is indeed a strong variable to look at when preparing SLMs. While MDL capitalizes on student-content interaction, the science SLMs are not always helpful in getting students engaged and interested. Their current layout and content presentation does not necessarily stimulate student interest. This may explain the low means for novelty and emotional engagement. Situational interest is positively and significantly correlated with all three dimensions of student engagement. With adequate support and monitoring, students will eventually develop interest in MDL and may generally succeed and continuously work with the contents and objectives they are presented with.

Dubbed as the primary and indispensable learning resource used in MDL in the current learning setup, SLMs, as this study suggests, should be created with great emphasis on its intended purpose. This is called for since MDL relies heavily on student-content interaction. If possible, curriculum designers, module writers, teachers, and experts from different subject areas should re–evaluate the SLMs to ensure that these materials are developmentally appropriate, contextualized, and localized, and can cater both needs and interests of the students. Activities and tasks included in the SLMs should also be properly spaced and considerably reduced with stress on providing necessary scaffolds in order to help students accommodate and master the prescribed most essential learning competencies. Revisiting and reinforcing the department's policies relevant to the crafting and evaluating SLMs from the national to the local school levels may result to increased and improved student-content interaction. If consistently checked and monitored, SLMs may rightfully serve its purpose of educating students even with little to no supervision from teachers. Furthermore, findings of the study confirm that transactional distance does exist in MDL as supported by low mean score for emotional engagement. It could have been helpful if the policy on giving student feedbacks on their progress be reiterated and enforced in a well-defined structure of interaction between students and teachers with due consideration on students' access to gadgets and internet connectivity. As pointed out in this study, there is also a need to intensify teacher-learner interaction to aid in eliminating student's feeling of isolation and thereby reducing the transactional distance. Hence, it is suggested that the DepEd, LGUs or other agencies should extend assistance to the purchase of necessary gadgets or resources that can be utilized for these interactions. In the long run, the department's efforts in providing communication points and resources may still be found essential when situations permit us to hold face-to-face classes if we opt to implement blended learning modalities.

The present study is conducted among students who might have higher levels of interest than other students since participation was non-compulsory. If that is the case, the study may not record adequate responses from the low interest groups. Future research whose participants will be recruited on a random basis may address this limitation of possible bias in selecting participants. Moreover, the study only included public junior high school learners who study through MDL so the results can only be interpreted and generalized to students with similar demographics and learning setting. A similar study may be conducted in another distance learning delivery modality such as online distance learning and blending distance learning. While the study was conducted at the latter days of the fourth quarter of the public school year 2020-2021 and limited data were found on studies relating to distance learning especially modular distance learning in the country, the results of the present study should not be deemed conclusive. Future researchers may consider doing longitudinal studies with the same constructs to enrich, support or refute the present findings as grounded by an extant amount of literature.

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