Emotional Intelligence and Knowledge Retention in Grade 11 Science Learners

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ABSTRACT

This study investigates the causal relationship between emotional intelligence (EI) and knowledge retention among Grade 11 students in Earth and Life Science. Employing a causal-comparative research design, 130 randomly selected learners from Lantapan National High School–Senior High School during the school year 2022–2023 participated. Descriptive statistics, correlation, regression, and path analysis were utilized to examine the data. Results showed that students, on average, did not meet expected retention levels, despite demonstrating generally high emotional intelligence, particularly in self-awareness and social awareness. Among the EI components, only self-awareness significantly predicted retention. Path analysis confirmed a model with self-awareness as a key determinant of retention, indicating its critical role in academic performance. These findings underscore the importance of integrating self-awareness-focused strategies in teaching. Future research should explore longitudinal impacts of EI and incorporate qualitative data to deepen understanding of learners' emotional and cognitive experiences.

Keywords: emotional intelligence, self-awareness, knowledge retention, causal model, Grade 11 learners

INTRODUCTION

The implementation of the K–12 curriculum, mandated by Republic Act 10533, was a pivotal step in enhancing the Philippine education system. It aimed to equip learners with 21st-century skills, preparing them for higher education, employment, or entrepreneurship in a globally competitive landscape. Among these essential skills is scientific literacy—encompassing reasoning, process skills, and the application of knowledge in real-life contexts.

However, the abrupt transition to distance learning during the COVID-19 pandemic significantly disrupted learners' academic and emotional development. Many students struggled with isolation, environmental distractions, and reduced opportunities for social interaction. These challenges may have influenced their emotional intelligence (EI), which in turn could impact their knowledge retention.

Emotional intelligence—the ability to understand, regulate, and utilize emotions effectively—has been associated with academic success. Learners with high EI tend to manage stress better, build healthier relationships, and engage more actively in their learning (Mayer et al., 2008; Cañas et al., 2020). Despite this, anecdotal observations at Lantapan National High School reveal that many students remain disengaged and struggle to recall previously taught concepts during in-person classes. This apparent disconnect highlights the need to examine how specific EI components relate to retention, especially in post-pandemic settings.

While much research has focused on pedagogy, curriculum enhancements, and instructional strategies, less attention has been paid to the emotional and psychosocial factors influencing learning outcomes. Classroom environments shaped by positive interpersonal relationships and emotional safety foster better engagement and deeper learning (Abe, 2005; Anderson, 2007).

Hence, this study aims to fill this gap by exploring the causal relationship between emotional intelligence and knowledge retention. Specifically, it investigates which EI components are most predictive of retention, providing a basis for designing targeted interventions. Through this, the research contributes to the development of holistic educational approaches that integrate both cognitive and emotional dimensions of learning.

LITERATURE REVIEW

Overview

Learning is an active, contextualized, and ongoing process influenced by both cognitive and psychosocial factors. The classroom, composed of physical and human components, plays a crucial role in shaping academic outcomes. While physical resources like books and modules contribute to learning, it is the human interactions—between teachers and students, and among peers—that form the foundation of an effective learning environment (Malik & Rizvi, 2018).

Among the various learning environments, the psychosocial setting has emerged as the most influential. It encompasses the quality of interpersonal relationships, communication, and emotional climate within the classroom (Abe, 2005; Anderson, 2007). Erikson's theory of psychosocial development emphasizes that learners thrive when they are allowed to express ideas, resolve conflicts, and engage in collaborative thinking, contributing to self-awareness and self-regulation (Erikson, 1963).

However, the shift to modular and remote instruction during the pandemic limited students' opportunities for these interactions, often weakening motivation and emotional regulation. This highlights the importance of addressing emotional intelligence as a vital component of academic success.

Emotional Intelligence in Education

Emotional intelligence (EI) refers to an individual's ability to perceive, manage, and utilize emotions in constructive ways (Mayer & Salovey, 1997). In educational contexts, EI enhances learners' resilience, fosters motivation, and supports better academic and social outcomes. Goleman (1998) conceptualized EI as comprising five domains: self-awareness, self-regulation, self-motivation, social awareness, and social skills.

Studies have consistently linked high EI to improved academic performance, student engagement, and lower stress levels (Valiente et al., 2012; MacCann et al., 2020). Students with strong self-awareness and social skills are better at navigating academic challenges, forming relationships with teachers and peers, and staying motivated despite setbacks.

However, some scholars argue that the relationship between EI and academic achievement is nuanced. For instance, Shipley et al. (2010) found no significant direct relationship between EI and academic grades, though students with moderate academic performance scored higher in emotional well-being.

These mixed results underscore the need to explore which components of EI have the strongest impact on learning outcomes. Furthermore, assessing EI can help educators develop targeted interventions that enhance both emotional and academic development.

Knowledge Retention and Emotional Intelligence

Knowledge retention—the ability to store and recall learned information—is critical for academic success. Retention is influenced by various cognitive strategies, including scaffolding, reflection, and active engagement (Ritter et al., 2013; Kosar & Bedir, 2018). More recently, emotional factors such as autonomy and motivation have been identified as key contributors to retention (Alsharari et al., 2020).

Research suggests that emotionally intelligent students are more autonomous and persistent, which enhances long-term retention. Lillis (2011) further found that student-faculty interactions, particularly those involving emotionally intelligent educators, positively impact learners' desire to persist in their studies.

Despite these promising findings, there is limited research exploring how specific EI components—such as self-awareness or self-regulation—affect retention in secondary education. This study aims to bridge that gap by identifying which aspects of EI most significantly predict knowledge retention in science education

Research Questions

This study aims to develop a causal model on the learners' retention level by looking into their emotional intelligence in Lantapan National High School-Senior High School.

Specifically, it sought to answer the following questions:

1. What is the level of the knowledge retention of learners in earth and life science subject?
2. What is the extent of manifestation of learners' emotional intelligence in terms of;
   a. Self-awareness
   b. Self-regulation
   c. Self-motivation
   d. Social awareness, and
   e. Social skills?
3. Is there a significant relationship between learners' knowledge retention level and emotional intelligence?
4. Which variable best predicts learners' knowledge retention?
5. What causal model best describes learner's retention in Grade 11?

Hypotheses

Causal Model as a Springboard for Innovation

This study conceptualized that retention of learners may be influence by their emotional intelligence. The variables of the current study are illustrated in Table 1 which shows the code, nature, and measure of the following variables: knowledge retention level and emotional intelligence highlighting Self-awareness, Self-regulation, Self-motivation, Social awareness, and Social skills.

Table 1. The code, Nature and Measures of the Variable of the Study

Variables	Code	Nature	Measure
Retention rate	RETRATE	Endogenous	Achievement test in Earth and Life Science
Emotional Intelligence	EMOLIGENCE_EI	Exogenous	Emotional Intelligence Assessment tool from Goleman (1998)
Self-awareness Self-regulation Self-motivation Social awareness Social skills	SELFAWARE_EI SELFREG_EI SELFMOT_EI SOCAWARE_EI SOCSKILLS_EI		

The hypothesized causal models of the study were illustrated in Figures 1 to 3. These models were explored hoping to come up with the best interlinkages among the variables namely: knowledge retention level and emotional intelligence of Grade 11 learners of Lantapan National High School-Senior High School.

The hypothesized causal model 1 proposed the direct linkage of self-awareness, self-regulation, self-motivation, social awareness, social skills, to the knowledge retention level of Grade 11 learners.

The hypothesized causal model 2 proposed the direct link of self-awareness, self-regulation and self-motivation and indirect linkage of social awareness and social skills to the knowledge retention level of the learners.

The hypothesized causal model 3 proposed the direct link of Social Awareness and social skills and indirect linkage of self-regulation, self-motivation and self-awareness to the knowledge retention level of grade 11 students.

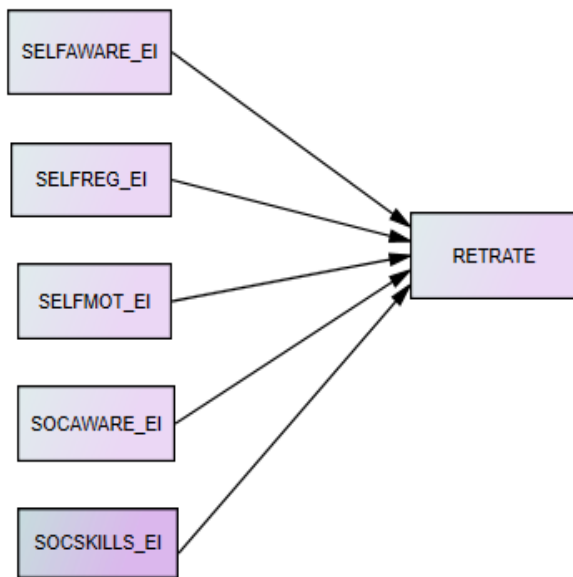The following figure shows the diagram of the different hypotheses made.

Figure 1. Hypothesized causal model 1 on Learners' Academic Performance

Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

Figure 2. Hypothesized causal model 2 on Learners' Academic Performance

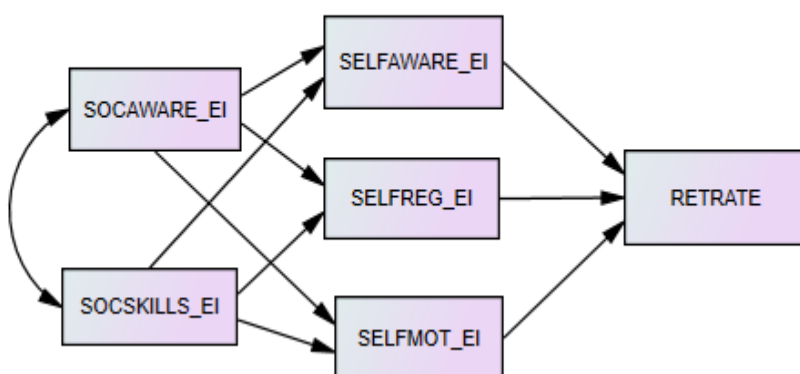| Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

Figure 3. Hypothesized causal model 3 on Learners' Academic Performance

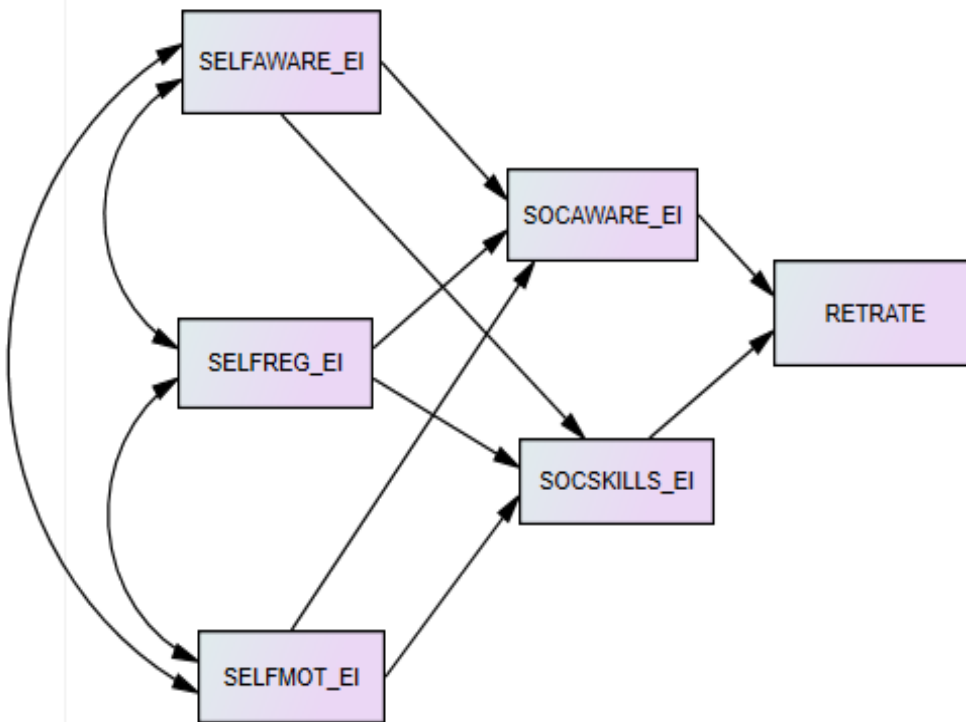| Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

The purpose of this study is to develop a causal model that best captures retention rate of Grade 11 learners. Thus, this claim leads to the following null hypothesis set at 0.05 level of significance.

Ho_1 : There is no significant relationship existing between academic performance of grade 11 learners and their psychosocial attributes and learning styles.

Ho_2 : There are no predictor variables of academic performance of learners.

Ho_3 : There is no causal model that best describes the academic performance of learners.

Scope and Delimitation

This study was administered to the Grade 11 learners of Lantapan National High School-Senior High School during the school year 2022-2023. It focuses on the knowledge retention level of learners in Grade 11, linking to emotional intelligence. Moreover, the researcher focused only on the knowledge retention level of the learners in earth and life science. Hence, the study was delimited to the development of the causal model on the knowledge retention level of learners based on their emotional intelligence and identification of the best predictor which serves as springboard for new intervention.

RESEARCH METHODOLOGY

Research Design

A causal-comparative design was used in this study since the researcher was primarily interested in describing relationships among variables (Sousa et al., 2007) to determine the causal outcomes of emotional intelligence on the knowledge retention level of Grade 11 learners. In here, the causal-comparative design was used to investigate the linkage between emotional intelligence and knowledge retention level in Grade 11 learners. Furthermore, this study aims to create a causal model that serves as a springboard for an intervention to improve the retention of Grade 11 learners.

Sampling Method

A simple random sampling method was employed in determining the samples for the study, which means that the researcher randomly selected the participants of the study to avoid bias since all samples in the population have an equal probability of being chosen (Olken, 1993). This procedure also ensures complete statistical coverage of Grade 11 HUMSS learners in Lantapan National High School-Senior High School enrolled in the school year 2022–2023.

Instrumentation

The instruments used in the study were both academic and non-academic assessments. These were then divided into academic assessments for knowledge retention level, and emotional intelligence for non-academic assessments, respectively. The following describes the different instruments employed in gathering, interpreting, and analyzing the data collected.

Knowledge Retention Level

The researcher designed and constructed a sixty (60) item multiple choice test to measure the knowledge retention level of the learners. A one-way table of specification (TOS) was made to check the content specified along with the levels of cognitive domain of the students. The researcher-made questionnaire was then subjected to pilot testing by Grade 12 learners from the Science, Technology, Engineering and Mathematics (STEM) strand with a Cronbach's alpha of 0.870. It was then validated by the panel of experts in science to determine whether test items were appropriate to test learners' knowledge retention level. After which, the researcher selected 30 validated test items from the sixty (60) pilot tested test items that serves as an instrument to test the retention level of the learners.

To measure the retention rate of the learners, the following scales were used in interpreting the data based on Deped Order No. 8 s.2015.

Score Range Distribution	Knowledge Retention level
28-30	Outstanding
25-27	Very Satisfactory
22-24	Satisfactory
19-21	Fairly Satisfactory
1-18	Did not meet expectation

Emotional Intelligence Assessment

The researcher adopted an emotional intelligence assessment from Goleman (1998) which was used in identifying the level of the learner's emotional intelligence in terms of its two major divisions, namely; personal competence and social competence. Under personal competence were the variables like Self-awareness, self-regulation and self-motivation while for social competence where social awareness and social skills. In addition, it is a self-questionnaire consisting of 50 items, with a five (5) point Likert scale, indicating whether the statement is (1) does not apply to me, (2) seldom apply to me, (3) applies half the time, (4) mostly

applies to me, and (5) always applies to me. Furthermore, the instrument was subjected to pilot testing before the actual implementation to ensure its reliability with a Cronbach's alpha of 0.750.

To measure the emotional intelligence of the Grade 11 learners, the scores of the students will be added as to its type of emotional intelligence hence the following scales were used in interpreting the data.

Score	Descriptive Rating	Qualitative Interpretation
35-50	Strength	High emotional intelligence
18-34	Needs Attention	Moderate emotional intelligence
10-17	Development Priority	Low emotional Intelligence

Data Collection Methods

To ensure ethical standards of research, a permission from the Secondary School Principal and head teacher and to the schools division superintendent were secured with the information that a study was conducted for the Grade 11 learners. This study only focuses on evaluating the emotional intelligence and knowledge retention level of the learners. The study utilized causal-comparative research design to determine the linkage of the chosen variables on the emotional intelligence and retention level of the learners. A random selection method, specifically simple random sampling method, was used to determine the participants of this study. Assistance from Grade 11 advisers were also requested during the administration and distribution of the questionnaires via google form and the validated knowledge retention level test of the Grade 11 learners.

Prior to the administration of the questionnaire, assent form and consent form were secured from the parents and participants, respectively, for their voluntary participation in this study. Anonymity of responses was also maintained and used for the sole purpose of the study. Hence, all information provided remains confidential and reported as aggregate data.

Moreover, all the instruments used in this study were pilot tested and validated before used in gathering the data. Once the instruments were reliable and validated, the researcher then created a Google form for the learner participants to easily access the questionnaires.

To measure the knowledge retention level of the students, the researcher made a validated and reliable achievement test in Earth and Life Science and were given to the participants, comprising of 30 items. In getting the knowledge retention level of the learners, the scores of the participants were subjected to descriptive statistics to identify their retention level.

For emotional intelligence the researcher adopted and pilot tested questionnaires from Goleman (1998).

The questionnaires were then collected, checked, tallied and tabulated. The collected data were subjected to the appropriate statistical tools for analysis and interpretation and to answer the general and specific objectives of the study.

Ethical Consideration

The researcher ensured that no harms or conflicts were made upon conducting and analyzing this research study. Furthermore, the anonymity and confidentiality of all the participants involved are kept and restricted through their assent and consent forms

Data Analysis Plan

Descriptive statistics was used to determine the level of Grade 11 learners' emotional intelligence and knowledge retention level through inferences of frequency, percentage mean and standard deviation.

Pearson product-moment correlation was applied to determine the relationship between knowledge retention level and emotional intelligence.

Regression analysis was used to determine the variable that best predicts knowledge retention level

Finally, path analysis was used to establish the best causal model fit in order to evaluate the goodness of fit of the hypothesized models, the following indices were computed: Chi-square/degree of freedom, Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Normal Fit Index (NFI), Tucker-Lewis Index (TLI), and Root Means Square Error of Approximation (RMSEA). The NFI, CFI and TLI are indices that estimate goodness of fit of the tested model in a relation to the null model. All these indices should exceed 0.95 to indicate a good fit (Arbuckle, 2009).

DISCUSSION OF RESULTS

This section offers the interpretation and analysis of data collected from 130 students of Lantapan National High School-Senior High School grade 11 students on their emotional intelligence, and knowledge retention level during the school year 2022–2023. The data supplied in this area is structured according to the sequence of the study's objectives.

The first report explains learners' retention level, and their emotional intelligence in terms of self-awareness, self-regulation, self-motivation, social awareness, and social skills. The following section examines the correlation and regression between various variables that best predict learners' academic performance. Finally, the third section demonstrates the best causal model that best fits learners' academic achievement.

Level of Learners' Knowledge Retention

The knowledge retention level is based on the validated 30 items in earth and life science achievement test. The table shows the knowledge retention level of the students. The study found that the overall mean level of the retention test of the students was 17.41 (s.d=6.43) with a qualitative description of did not meet expectation. Additionally, sixty-six (66) or fifty-one (51) percent of the students fall under did not meet expectation level, twelve (12) (n=15) percent on fairly satisfactory level, eighteen (18) (n=24) percent on satisfactory level, and nineteen (19) (n=25) percent on very satisfactory level while none of the students got an outstanding level.

Table 1. Knowledge Retention level

Variables	Retention Rate				
	N	Score Range Distribution	frequency	%	Qualitative description
RETRATE	130	28-30	0	0	Outstanding
		25-27	25	19%	Very Satisfactory
		22-24	24	18%	Satisfactory
		19-21	15	12%	Fairly Satisfactory
		1-18	66	51%	Did not meet expectation
Overall Mean		**17.41**	Did not meet expectation		
s.d		**6.43**			

The study's findings revealed that grade 11 learner's knowledge retention level in earth in life science did not meet the expected learning competencies. Retention refers to the transfer of newly acquired knowledge from the short-term to the long-term memory, which could be accelerated by active student engagement through collaboration (Allison, 2014). The findings of the study are opposite to those of Pechenkina (2017), who discovered that academic success is used to determine student retention level. In this study, retention was shown to be in a did not meet expectation level, meaning that even if they had previously dealt with the topics, they were not able to totally recall the scientific principles. This could only show that the knowledge obtained by the students is not maintained.

Learner retention and academic achievement are influenced by a number of factors. Pillado et al. (2020) found that motivational practices and experiences, goal setting and achievement, and personal learning are all important contributors to cognitive retention while teaching strategies, learning activities, educational resources, and learning technologies were all cited as significant contributors. However, the latter does not help learners to retain their science learning in the context of the study even if teachers provided assistance to

students such as hand-outs, videos and other teaching materials. This might also be one of the adverse effect of the pandemic that students are not yet emotionally grasping to the in-person classes leading to low retention level of the learners. Furthermore, because this study is a springboard for new educational innovation, the findings of the study may serve as the foundation for future developments aimed at increasing student retention in science.

Level of Learners' Emotional Intelligence

Emotional intelligence is almost as crucial as cognitive intelligence and having a conscientious attitude when it comes to academic performance (Salovey & Grewal 2005). This is attributed to the reason that emotionally intelligent students are better prepared to cope with negative emotions that may interfere with learning (Mayer & Cobb,2000).

Table 2 shows the learners' emotional intelligence. As shown in the table, there were five (5) variables: self-awareness, self-regulation, self-motivation, social awareness, and social skills, which were crafted from Goleman's (1995) Emotional Intelligence.

As gleaned from the table, the overall emotional intelligence of the learners showed a descriptive rating of "strength" (m = 34.93; sd = 6.20), meaning they have high emotional intelligence. The self-awareness variables showed the highest mean percentage score of 39.15 (sd = 5.70), followed by social awareness with a mean of 35.16 (sd = 6.73). Next is social skills, with a mean percentage score of 35.11 (s.d. = 6.09), followed by Self-motivation with a mean percentage score of 34.80 (s.d. = 6.05). Self-regulation, on the other hand, had the lowest mean score of 32.99 (s.d. = 5.73) with a descriptive rating of "needs attention" and moderate emotional intelligence.

Table 2. Level of Emotional Intelligence of students

Variables	EMOTIONAL INTELLIGENCE				
	N	Mean	SD	Descriptive rating	Qualitative Interpretation
SELFAWARE_EI	130	36.57	6.38	Strength	High EI
SELFREG_EI	130	32.99	5.73	Needs attention	Moderate EI
SELFMOT_EI	130	34.80	6.05	Strength	High EI
SOCAWARE_EI	130	35.16	6.73	Strength	High EI
SOCSKILLS_EI	130	35.11	6.09	Strength	High EI
OVERALL	130	34.93	6.20	Strength	High EI

The result depicted that learners had already developed high emotional intelligence. An individual with high emotional intelligence is claimed to be capable of seeing emotions, integrating emotions to facilitate thought, comprehending emotions, and regulating emotions to promote personal growth (Mayer & Salovey, 1997). Additionally, Cristóvo, Candeias, and Verdasca (2017) explained that emotional intelligence in the educational context pacifies the teaching-learning process with information, skills, attitudes, and values, resulting in the learner's self-awareness, self-management, and self-directed learning. Emotional intelligence has also been found to be a predictor of academic achievement in several research (Valiente, Swanson, & Eisenberg, 2012; Lanciano & Curci, 2014; Marjanovic, Dimitrijevic, Protic, & Mestre, 2021). This is attributed to the reason that emotionally intelligent students are better prepared to cope with negative emotions that may interfere with learning (Mayer & Cobb,2000). However, the result of the study showed that even if the students have high emotional intelligence, it does not follow a high retention of the students. This can be attributed to the 2-year distance learning wherein students are overloaded with learning task that could demotivate students to learn.

Self-awareness is the highest characteristic of emotional intelligence measured in this study. Self-awareness, according to Boyatzis, Goleman, and Rhee (2000), is the ability to notice one's own feelings, comprehend one's own habitual emotional responses to events, and perceive how one's own emotions influence one's own behavior and performance. When a learner is self-conscious, they are aware of their own skills as well as their current limitations. The study's findings show that grade 11 students at Lantapan National High School-Senior High School in the school year 2022–2023 had a high level of self-awareness. This indicates that they are

aware of their own strengths and weaknesses, which is likely to lead to high academic achievement (Arabsarhangi & Noroozi, 2014). In addition, the findings revealed that grade 11 students have explicit control over events in their lives that affect their learning, necessitating the capacity to access prior knowledge in order to integrate facts, correct mistakes, pose questions, and making conclusions (Steiner, 2014). However, the result of the study showed that the retention rate of the learners is low even if they have high self-awareness. This could pose teachers to make intervention that can enhance the retention level of the students in relation to their self-awareness.

Similarly, social awareness and social skills were also highly determinant variables in this study. The ability to notice, understand, and respond to what other people's feelings is known as social awareness, whilst the ability to manage, influence, and inspire emotions in others is known as social skills. Being able to handle emotions in relationships and being able to influence and inspire others is known as social skills (Boyatzis, Goleman, & Rhee 2000). The findings revealed that participants showed high emotional intelligence in terms of social awareness and social skills; that is, they can consider other people's perspectives and comprehend their needs as a result of their interactions with individuals from different cultures and inspire others. According to Dodge (1986), learners with excellent social awareness and social skills may easily engage in positive interactions with others and develop effective solutions to a variety of social problems. They can form great bonds with others through connecting with them. They are also more receptive to learning from others, which is a crucial life skill. Also, Eddles-Hirsch et. al (2010), explained on their study that students with social and emotional skills perform better academically, have stronger relationship with peers and teachers, experience greater well-being and engage in less risky behavior. Therefore, in the context of the study, participants demonstrated exemplary social awareness and social skills intelligence, which implies they are much more receptive to new learning from others, aid others by becoming good listeners without casting judgement, and fix issues in a systematic manner, empowering others and performing much better academically. But, the retention level of the students in this study suggest that teachers should consider an activity that is more focused on social awareness and social skills to enhance their retention level because, these emotional intelligences are already innate from the students, what they lack is to ignite it in order for them to boost their different intelligences thus, increasing their retention level.

In this study, self-motivation is also a good contributing variable. Self-motivation is the ability to move and guide one's own goals using one's own deepest emotions. This capacity allows the learner to take charge and endure in the face of challenges and disappointments (Boyatzis, Goleman, & Rhee 2000). In the framework of this study, participants demonstrated strong self-motivation intelligence, which means they are more likely to be engaged in the coursework and use a more self-regulated learning method (Lowman, 1990). Self-motivation has a consistent impact on how students learn. Learners tend to boost their energy level, which influences the types of learning approaches and thought processes used, as well as their persistence in achieving a given objective. However, the retention level of the students is not parallel to their self-motivation, therefore, it can be deduced that teachers and other school administrator should consider these intelligences before making or crafting interventions, innovations or programs to enhance the cognition of the students.

Finally, self-regulation demonstrated a moderate level of emotional intelligence in this study. This implies that the participants must work to improve their intelligence. Self-regulation is the ability to remain focused and think coherently even when confronted with strong emotions. In the perspective of the study, it showed that this is the only variable that is in need of attention by the participants, Learners can improve it by being able to manage their own emotional state, accepting responsibility for their actions, and avoiding hasty decisions that they later regret through goal setting, self-monitoring, self-instruction, and self-reinforcement (Schraw,Crippen & Hartley, 2006). In parallel, Sahranavard et al. (2018) exemplified that learners with better cognitive self-regulation can have better educational performance by managing their emotions and emotional influences. They also have great motivation to study and can make targeted plans. In relation to this study, since the learners are at the level of need of attention when it comes to their self-regulation, it can be noted that they still gradually coping to the effect of pandemic by gradually motivating themselves to immerse in their studies.

As a result, measuring emotions and emotional intelligence, as well as how they shape what learners recall on a specific learning exercise is important so that teachers can cope with the essential needs of the learner. Result of this study is opposite to Yahaya et. al (2011) which imply that the level of emotional intelligence

contributes to and enhances the cognitive abilities in student. Thus, in increasing student retention level of learners. The stability of the emotional intelligence of a student will help to produce a competent and successful learner in line with the philosophy of education. Furthermore, the result is also good avenue on the possible innovation or intervention that can enhance learners' retention rate.

Correlation Analysis of the relationship between retention level and emotional intelligence

Pearson product-moment correlation was used to assess the level of relationship between continuous variables explored. Mainly, Pearson r was run to determine the relationship between the dependent variable, the retention level in earth and life science, and the independent variables, which was the emotional intelligence.

The correlation analysis of the relationship between Learners retention level, and emotional intelligence is summarized in the table.

As shown on the table, there is a positive significant relationship between retention rate, self-awareness r=0.212 (P<0.05) and social awareness r=0.189 (P<0.05). However, there were no significant correlation on retention rate, self-regulation, self-motivation and social skills.

Self-awareness is positively correlated to self- regulation r=0.692 ((P<0.01); self-motivation r=0.688 (P<0.01); social awareness r= 0.747 (P<0.01); social skills r=0.737 (P<0.01); Similarly, Self -regulation is also positively correlated to self -motivation r=0.629 (P<0.01); social awareness r=0.763 (P<0.01); social skills r=0.732 (P<0.01). Equally, Self- motivation is positively correlated to social-awareness r=0.626 (P<0.01); social skills r=0.661 (P<0.01). Moreover, Social Awareness is positively correlated to Social skills r=0.739 (P<0.01).

Table 3. Correlation of Retention Level to the Emotional Intelligence

Variable	1	2	3	4	5
1.RETREATE					
2.SELFAWARE_EI	0.212*				
3.SELFREG_EI	0.065	0.692**			
4.SELFMOT_EI	0.053	0.688**	0.629**		
5.SOCAWARE_EI	0.189*	0.747**	0.763**	0.626**	
6.SOCSKILLS_EI	0.125	0.737**	0.732**	0.661**	0.739**

**P<0.01 (2-TAILED); *p<0.05 (2-TAILED); N=130

The null hypothesis that there is no significant relationship between retention level and emotional intelligence is rejected. The result of the study implies that there is a positive direct linear relationship between retention level, self-awareness and social awareness. This means that if the self-awareness and social awareness increases there is a tendency that the retention level of the students' increases. The result is similar to the study of Bangira et al. (2013) that retention level is strongly associated to cognitive ability of the learners, particularly on their ability to retain the concepts learned in their long term memory. Moreover, Wilton et.al (2019) explained that integration of multiple active learning approaches significantly improves learners' retention rate, these include multiple- in- class formative assessments and weekly review quizzes. These result serve as a foundational data, on the crafting of intervention or innovation on the phase two of this study, it will demonstrate active learning activities that hopes to increase retention level considering the emotional intelligence particularly the self-awareness and social awareness.

The result also suggests that all the variables under emotional intelligence are positively correlated with each other, according to Epstein (1998) emotionally intelligent children are healthier, happier and more adaptable and these traits lead to desired academic achievements. In addition, High level of emotional intelligence is related to high levels of life satisfaction but low level emotional intelligence is related also to low levels of life satisfaction (Canas, et. al, 2020). Antaramian (2016) suggested that the happiest, most satisfied learners were more invested in their educational experiences, had greater confidence in their academic abilities, experienced less academic stress, were more positively motivated, and earned higher general weighted average (GWA)

than the learners with average and low satisfaction. The result is opposite to the study of Swanepoel and Britz (2017) wherein their study indicated a positive relation between retention level and emotional intelligence in which, increase in retention level signifies high emotional intelligence.

Regression Analysis on which of the Independent Variables best predict Learners' Knowledge Retention level

The table presents the regression analysis in finding the best predictor on the learners' knowledge retention level enrolled in school year 2022-2023.

Learners' retention level was influenced by the independent variable included in the regression analysis. In this analysis one (1) model was generated, the model showed that self-awareness has an influenced on the retention level with a beta weight of β = 0.303 with an F value of 2.30 and probability of 0.000 (p<0.05).

Table 4. Regression analysis of emotional intelligence that influence retention level

Coefficients									
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	r	r^2	F-value	Prob
	B	Std. Error	Beta						
1 (Constant)	12.60	3.708		3.397	.001	.292[a]	.085	2.30	0.000
SELFAWARE_EI	.307	.153	.303	2.007	.047				
a. Predictors: (Constant), RETRATE_EI									
b. Predictors: (Constant), RETRATE_EI, VIS_LS									
c. Dependent Variable: LEPERFORM									

The result of regression analysis exemplified that the self-awareness coefficient had the highest degree of influence shown in the model, considering its 0.303 beta weight. Moreover, the R^2 value of 0.085 in the model was explained by the predictor self-awareness. Therefore, the null hypothesis that there is no predictor variable of learners' retention level is rejected. Retention level is considered as one of the most important outcome of educational experiences. Studies revealed that retention level are influenced by the learner's self-awareness (Ribeiro, Rosário, Núñez, Gaeta, & Fuentes, 2019; Chernyshenko, Kankaraš, & Drasgow, 2018; Frydenberg, Martin, & Collie, 2017).

Causal Model of Learners' Knowledge Retention level

Path analysis is a causal modeling approach in finding the correlations within a defined network, a straightforward extension of multiple regression, and aim to provide estimates of the magnitude and significance of hypothesized causal connections between a set of variables (Lleras,2005).

To determine the best-fit model for the learner's knowledge retention level, the following criterion for model fitting was considered. Chi-square of ratio should be less than two or greater than 0 implies acceptable fitting model; goodness-of-fit (GFI) should be greater than 0.95 to accept the model; Norm Fit Index (NFI) should have a value above 0.95, below 0.95 is considered to be a poor-fitting model. Tucker Lewis Index (TLI) should have a value above 0.95, below 0.95 is considered to be a poor-fitting model, TLI close to 1 indicates a good Fit Hu and Bentler; and the Root Mean Square Error of Approximation (RMSEA) should have the value of 0.01, 0.05, 0.08 show excellent, good and mediocre respectively.

Causal Model 1

Figure 4, shows the direct relationship of Retention Rate (RETRATE_PS); Self-awareness (SELFAWARE_EI); Self-regulation (SELFREG_EI); Self-Motivation (SELFMOT_EI); Social Awareness (SOCAWARE_EI); Social Skills (SOCSKILL_EI).
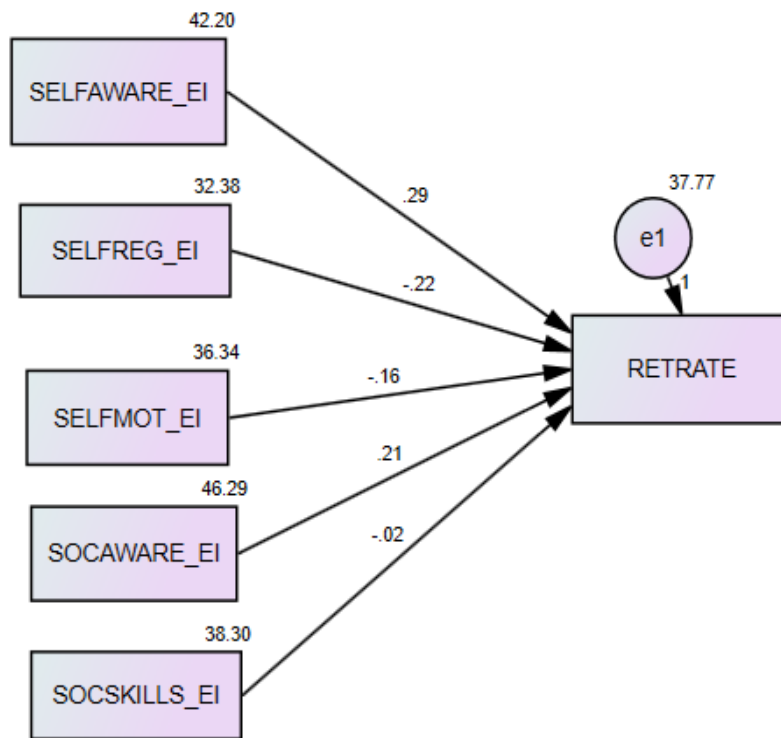
Figure 4. Causal Model 1

Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

Table 5. presents the goodness fit indices of causal model 1 and the standard value. Where the p-value is higher than 0.05, GFI, CFI, NFI, TLI are higher than 0.95, and RMSEA is less than 0.05.

Table 5. Goodness Fit Indices of Causal Model 1

STANDARD INDICATOR	STANDARD VALUE	CAUSAL MODEL 1 VALUE
CMIN/DF	<2.00	47.173
P-VALUE	>0.05	0.000
GFI	>0.95	0.377
CFI	>0.95	0.013
NFI	>0.95	0.023
TLI	>0.95	-0.481
RMSEA	<0.05	0.598

Causal model 1 (Figure 4) shows a poor fit based on the criteria of model fitting mentioned above. The value of chi-square is very large, GFI is less than 0.95, CFI is less than 0.95, NFI is less than 0.95, TLI is less than 0.95, and RMSEA is higher than 0.05. This indicates a poor fit. Hence, another model should be tested. Thus, the hypothesized causal model 1 is rejected.

Causal Model 2

Figure 5 showcase causal model 2 of the study, as glean from the table that Retention Rate (RETRATE_PS) has direct relationship of Self-awareness (SELFAWARE_EI); Self-regulation (SELFREG_EI); and Self-

Motivation (SELFMOT_EI); while there is an indirect relationship of Social Awareness (SOCAWARE_EI); and Social Skills (SOCSKILL_EI) to the retention level of the student.
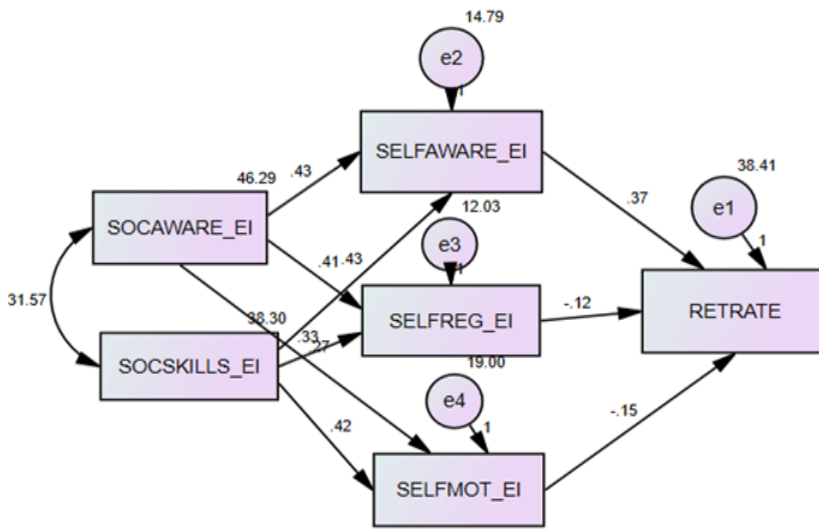

Figure 5. Causal Model 2

Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

Table 6 presents the goodness fit indices of causal model 2 and the standard value, where the p-value is lower than 0.05, GFI (0.225), CFI (0.966), NFI (0.957), TLI (0.899) are higher than 0.95, but the RMSEA is greater than 0.05 (0.156).

Table 6. Goodness fit indices of Causal Model 2

STANDARD INDICATOR	STANDARD VALUE	CAUSAL MODEL 2 VALUE
CMIN/DF	<2.00	4.153
P-VALUE	>0.05	0.001
GFI	>0.95	0.225
CFI	>0.95	0.966
NFI	>0.95	0.957
TLI	>0.95	0.899
RMSEA	<0.05	0.156

Causal model 2 (Figure 5) shows a poor fit based on the criteria of model fitting mentioned above. The value of chi-square is large compared to the standard value of less than 2, the p-value is 0.001 which is less than the desired standard value, GFI is less than 0.95 (0.225), CFI is less than 0.95. Even if GFI (0.998), CFI (1.000), NFI (0.998), TLI (1.023) and RMSEA (0.000) are suited for a fitted model. This indicates a poor fit since not all indices are satisfied. Hence, the hypothesized causal model 2 is rejected and another model should be tested.

Causal Model 3

Figure 6 showcase causal model 3 of the study, as glean from the table that Retention Rate (RETRATE_PS) has direct relationship of Social Awareness (SOCAWARE_EI), and Social Skills (SOCSKILL_EI) and in

direct relationship to Self-Awareness (SELFAWARE_EI), Self-regulation (SELFREG_EI), and Self-motivation (SELFMOT_EI).
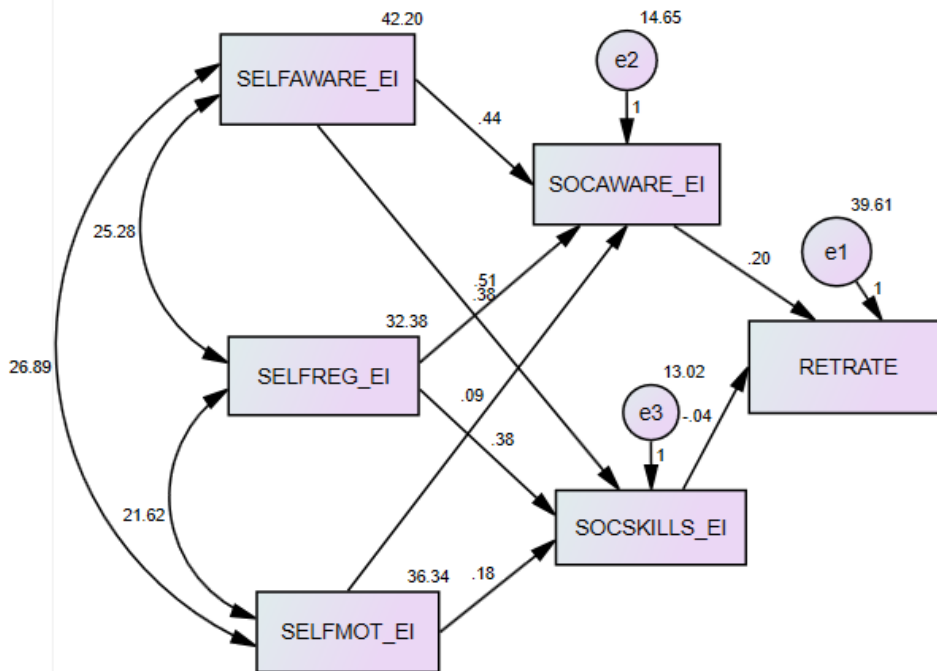

Figure 6. Causal Model 3

Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

Table 7 presents the goodness fit indices of causal model 3 and the standard value. As observed from the table, the chi-square ration of causal model 3 is 3.557 which is higher than the desired standard value, the p-value is 0.007 which is less than the desired standard value of greater than 0.05, GFI is 0.184 which is lower than the standard value of 0.95, though the CFI (0.978), NFI (0.971) and TLI (0.918) meet the standard value, still the RMSEA is greater than 0.05 (0.141).

Table 7. Good Fit Indices for Causal Model 3

STANDARD INDICATOR	STANDARD VALUE	CAUSAL MODEL 3 VALUE
CMIN/DF	<2.00	3.557
P-VALUE	>0.05	0.007
GFI	>0.95	0.184
CFI	>0.95	0.978
NFI	>0.95	0.971
TLI	>0.95	0.918
RMSEA	<0.05	0.141

Causal model 3 (Figure 6) shows a poor fit based on the criteria of model fitting mentioned above. Since the standard indicators were not meet as to its standard value. Hence, the hypothesized causal model 3 is rejected and another model should be tested.

Causal model 4

Figure 7 showcase the causal model 4 in this study, as observed from the figure, retention rate is directly linked to Self-awareness (SELFAWARE), and an indirect link to Social awareness (SOCAWARE_EI), Social Skills (SOCSKILLS_EI), Self-regulation (SELFREG_EI) and Self-motivation (SELFMOT_EI).
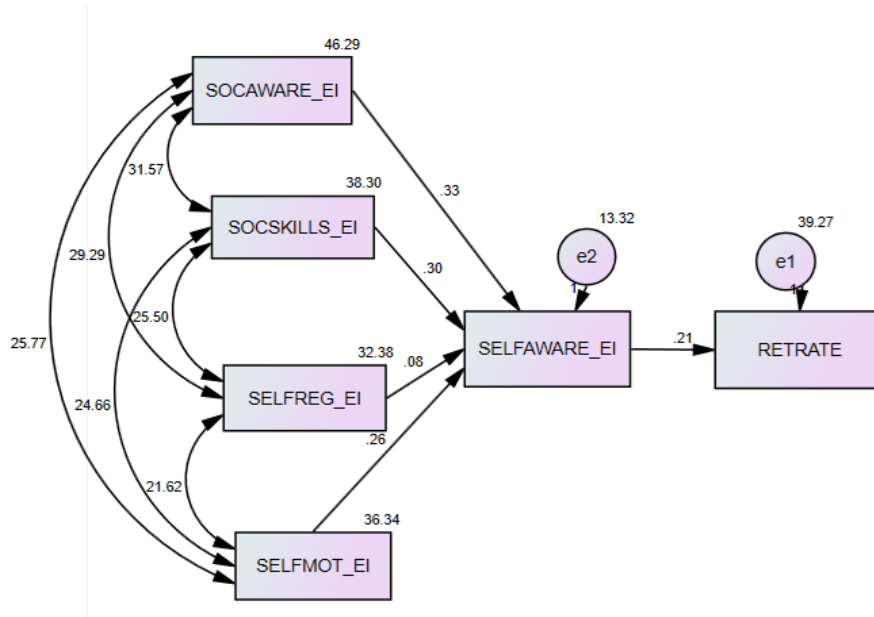

Figure 7. Causal Model 4

Legend:		
RETRATE_EI	Retention Rate	
SELFAWARE_EI	Self-Awareness	Emotional Intelligence
SELFREG_EI	Self-Regulation	Emotional Intelligence
SELFMOT_EI	Self-Motivation	Emotional Intelligence
SOCAWARE_EI	Social Awareness	Emotional Intelligence
SOCSKILLS_EI	Social Skills	Emotional Intelligence

Table 8 presents the goodness fit indices of causal model 4 and the standard value. As observed from the table, the chi-square ration of causal model 4 is 1.256 which met the desired standard value of less than 2.00, the p-value is 0.285 which met the standard value of greater than 0.05, additionally, the GFI (0.987), CFI (0.998), NFI (0.990) and TLI (0.992) also met the desired stand value of greater than 0.95. Moreover, the RMSEA also met the desired standard value of less than 0.05 with a value of 0.045.

Table 8. Goodness Fit Indices for Causal model 4

STANDARD INDICATOR	STANDARD VALUE	CAUSAL MODEL 4 VALUE
CMIN/DF	<2.00	1.256
P-VALUE	>0.05	0.285
GFI	>0.95	0.987
CFI	>0.95	0.998
NFI	>0.95	0.990
TLI	>0.95	0.992
RMSEA	<0.05	0.045

Causal model 4 (Figure 7) shows a good fit model based on the criteria of model fitting mentioned above. The value of chi-square satisfied the standard value of a good fit model, the P-value which 0.285 is greater than 0.05. The value in causal model 4 satisfies the GFI, CFI, NFI, TLI and RMSEA standard value thereby indicating that causal model 4 is a good fit model.

In the path analysis, the best fitting model in learners' retention level is anchored on the emotional intelligence under self-awareness. High self-awareness, tend to increase the retention level of the learners. Hence, the null hypothesis stating that there is no causal model that best fits learners' academic performance is rejected. This finding implies the participants of the study tended toward active learning for an increase retention rate, high self-awareness in learning. In other words, learners perform better under the environment of active learning to increase retention rate and self-awareness.

Summary of the Goodness of Fit on the Different Causal Models

Table 10 presents the summary of goodness of fit on the causal models formulated. As gleaned on the table, path model 1 yielded a very poor fit base on the following criteria of fit modeling. The Chi-square value is 47.173; the p-value is less than 0.000, GFI, CFI, NFI, and TLI are less than 0.95, RMSEA is higher than 0.05. Path model 2 is also not a good fit model because its chi-square value is greater than the standard value of less than 2.00. Path Model 3 is also a poor model since not all the standard indicator was met. Path model 4 is the parsimonious path model. The chi-square is 1.256; the p-value is higher than 0.05, the GFI, CFI, NFI, and TLI values are higher than 0.95, and RMSEA is less than 0.05. This indicate that the learners' retention level is best anchored on emotional intelligence particularly on their self-awareness, which suggests that the higher self-awareness, the higher the learners' retention level. Learners may practice this kind of style appropriately, which could significantly affect his/her multi-faceted role as learner in his/her academic journey.

Table 10. Summary of the Goodness of Fit on the different Causal Models

Model	INDICES						
	CMIN/DF	P-VALUE	GFI	CFI	NFI	TLI	RMSEA
Path Model 1	47.173	0.000	0.455	0.060	0.058	0.060	0.295
Path Model 2	4.153	0.001	0.225	0.966	0.957	0.899	0.156
Path Model 3	3.557	0.007	0.184	0.978	0.971	0.918	0.141
Path Model 4	1.256	0.285	0.987	0.998	0.990	0.992	0.045
Standard Value	<2.00	>0.05	>0.95	>0.95	>0.95	>0.95	<0.05

It makes sense to say that high retention rate and self-awareness leads to a favorable outcome. Early studies have indicated that there exists a relationship between emotional intelligence particularly the self-awareness, and retention rate of learners. Antaramian (2016) suggested that the happiest, most satisfied learners were more invested in their educational experiences, had greater confidence in their academic abilities, experienced less academic stress, were more positively motivated, and earned higher general weighted average (GWA) than the learners with average and low satisfaction. Therefore, causal model 4 is the springboard for new innovation/ intervention to increase further the academic performance of the participants in earth and life science.

Summary

The primary aim of this is to develop a causal model on the retention level and emotional intelligence of the learners. Particularly, this study hopes to determine the level of retention of learners in earth and life science subject, evaluate the extent of manifestation of the emotional intelligence in terms of self-awareness, self-regulation, self-motivation, social –awareness, and social skills.

The study uses comparative causal research design, 130 learners were randomly selected as participants of the study who took up earth and life science enrolled in school year 2022-2023 at Lantapan National High School. The instruments used in the study were academic assessments for retention rate which is a 30 item achievement test, and non-academic assessments for emotional intelligence in Likert scale form. The findings of the study were analyzed using descriptive statistics, Pearson product-moment correlation, Linear Regression and Path Analysis.

The following significant findings were drawn from the study:

1. The study found that the overall mean level of the retention test of the students was 17.41 (s.d=6.43) with a qualitative description of did not meet expectation. Additionally, sixty-six (66) or fifty (51)

percent of the students fall under did not meet expectation level, twelve (12) (n=15) percent on fairly satisfactory level, eighteen (18) (n=24) percent on satisfactory level, and nineteen (19) (n=25) percent on very satisfactory level while none of the students got an outstanding level.

2. the overall emotional intelligence of the learners showed a descriptive rating of "strength" (m = 34.93; sd = 6.20), meaning they have high emotional intelligence. The self-awareness variables showed the highest mean percentage score of 39.15 (sd = 5.70), followed by social awareness with a mean of 35.16 (sd = 6.73). Next is social skills, with a mean percentage score of 35.11 (s.d. = 6.09), followed by Self-motivation with a mean percentage score of 34.80 (s.d. = 6.05). Self-regulation, on the other hand, had the lowest mean score of 32.99 (s.d. = 5.73) with a descriptive rating of "needs attention" and moderate emotional intelligence.

3. there is a positive significant relationship between retention rate, self-awareness r=0.212 (P<0.05) and social awareness r=0.189 (P<0.05). However, there were no significant correlation on retention rate, self-regulation, self-motivation and social skills.Self-awareness is positively correlated to self-regulation r=0.692 ((P<0.01); self-motivation r=0.688 (P<0.01); social awareness r= 0.747 (P<0.01); social skills r=0.737 (P<0.01); Similarly, Self -regulation is also positively correlated to self - motivation r=0.629 (P<0.01); social awareness r=0.763 (P<0.01); social skills r=0.732 (P<0.01). Equally, Self- motivation is positively correlated to social-awareness r=0.626 (P<0.01); social skills r=0.661 (P<0.01). Moreover, Social Awareness is positively correlated to Social skills r=0.739 (P<0.01).

4. The model showed that self-awareness has an influenced on the retention level with a beta weight of β = 0.303 with an F value of 2.30 and probability of 0.000 (p<0.05).

5. path model 1 yielded a very poor fit base on the following criteria of fit modeling. The Chi-square value is 47.173; the p-value is less than 0.000, GFI, CFI, NFI, and TLI are less than 0.95, RMSEA is higher than 0.05. Path model 2 is also not a good fit model because its chi-square value is greater than the standard value of less than 2.00. Path Model 3 is also a poor model since not all the standard indicator was met. Path model 4 is the parsimonious path model. The chi-square is 1.256; the p-value is higher than 0.05, the GFI, CFI, NFI, and TLI values are higher than 0.95, and RMSEA is less than 0.05.

6. In the path analysis, the best fitting model in learners' retention level is anchored on emotional intelligence particularly the self-awareness of the students.

CONCLUSION

Based on the findings of the study, the following conclusions are drawn:

The springboard for new intervention or innovation in order to enhance the retention level of the learners in earth and life science, must consider the level of emotional intelligence particularly the self-awareness of the students. self-awareness must go hand on hand along with active learning approaches to promote holistic learning and increase the knowledge retention level of the learners in earth and life science. Learners may practice this kind of approaches appropriately, which could significantly affect his/her multi-faceted role as learner in his/her academic journey.

Reflections/Recommendation

Based on the findings and conclusions, the following are reflected/recommended:

1. Teachers may be encouraged to develop intervention/innovation catalyzing on the emotional intelligence particularly the self-awareness and active learning to enhance their retention level.

2. School administrators through the LRMDS coordinator may be encouraged to conduct Learning Action Cell (LAC) for the crafting of instructional materials as innovation/intervention highlighting the importance of emotional intelligence attributes of learners in order to capacitate teachers to meet the learning needs of 21st century learners.

3. Active learning must be structured in a way that it matches the emotional intelligence focusing on the self-awareness of the learners to enhance the retention level of the learners.

4. Teachers may be encouraged to utilize learner-centered approach in teaching other than directed instruction.

5. Further research should be conducted to look into other possible interventions that can enhance retention level of the learners.

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