Self-Efficacy and Motivation as Predictors to Mathematics Performance in Online Learning

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ABSTRACT

This study wants to determine if motivation and self-efficacy can be a predictor of students' Mathematics performance in an online learning context. A descriptive-correlational design was conducted to explore the study. The participants were selected from 4 campuses of Davao De Oro State College. All students who are enrolled in the Mathematics of Investment subject were included in the study using a universal sampling technique. This study used adapted 4 points Likert scale questionnaires for motivation and self-efficacy and self-tailored summative assessment for Mathematics performance. The study concluded that the students had a moderate level of self-efficacy and motivation in an online learning context. The result showed that both motivation and self-efficacy have a negligible relationship and were not statistically significant. The study also found that motivation and self-efficacy were not significant predictors of students' Mathematics performance. The study recommends that students develop personal strategies to enhance self-efficacy and motivation, while teachers should design and implement effective instructional strategies to cater to varied learning styles. Furthermore, school administrators should develop policies and programs that promote effective online learning practices in Mathematics education.

TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

A. The Problem and its Background

Mathematics is considered a fundamental subject as it develops students' logical reasoning. Though the mathematics performance of the students is heavily influenced by the cognitive domain as they mostly use their cognitive faculties, affective factors are equally significant. Affective factors such as motivation and self-efficacy play an important role in order for students to achieve academic success (Sikhwari, 2007; Hiller et. al, 2022). Self-efficacy refers to the level of learners' confidence in their ability to complete a certain task. On the other hand, motivation refers to a psychological state that drives an individual to engage in an activity.

The environment also influences the learning process (Chukwuemeka, 2013). Most countries all over the world such as the USA, Pakistan, India, South Africa, and China transitioned to online learning due to the COVID-19 pandemic. Some educators and learners were caught off-guard by the sudden change which caused some issues in the students' motivation and self-efficacy. Changes in the environment can interfere with self-efficacy and motivation. Self-efficacy and motivation are different in every context (Hodges, 2008; Brachtl et al., 2023). As a result, students' self-efficacy and motivation in online learning settings differ from their self-efficacy and motivation in face-to-face learning settings, and it is regarded as a critical component for successful online learning (Shen et al., 2013). Consequently, the changes in students' level of motivation and self-efficacy significantly influence the students' performance (Mijares III, 2022).

In the Philippines, as the Department of Education (DepEd) and Commission on Higher Education (CHED) implemented an online learning mode of instruction, it brought challenges to educators and especially students as they experienced poor internet connection, outdated devices, lack of resources, and many more (Cabansag, 2020). It resulted in low motivation to continue education amidst the pandemic. In addition, as the nation faces the COVID-19 pandemic, the Philippine Association of State Universities and Colleges (PASUC) (2020) estimates that a total of 44, 069 college students won't enroll for the academic year 2020–2021. Many believe that motivation and self-efficacy are predictors of students' performance (Sartawi et al., 2012; Ugwuanyi et al., 2020; Kim et al., 2014). Interestingly, the study of Mijares III (2022) was contrary to the previous statement, it showed that motivation and self-efficacy are not significant predictors of students' mathematics performance.

In Davao De Oro State College – Maragusan Branch, where the researcher is presently teaching, the researcher and his colleagues noticed that some students lack the motivation to participate in any online class. In addition, students who have been recognized as having poor engagement have expressed a lack of confidence in their ability to do the task properly.

With the mentioned context, this led the researcher to determine if motivation and self-efficacy can be a predictor of students' performance in an online learning context. In addition, the researcher aims to determine if motivation and self-efficacy can be predictors of students' mathematics performance and identify any factors that may influence it. By examining this topic, students can better understand the importance of motivation and self-efficacy in their academic performance.

B. Review of Related Literature and Studies

Various related literature and related studies are presented to provide direction and a frame of reference for this study. It includes literature as well as studies, which are directly or indirectly related to this study.

➢ *Motivation*

Motivation is a Psychology term that refers to the desire for something and the fuel that serves as a driving force to continue pursuing that desire (Motevalli et al., 2020). Motivation is an essential component of learning and plays a critical role in assisting students to become involved in academic activities. Motivation is defined as a situation that provides energy to, directs, and sustains behavior. This includes goals and activities that require the objectives to provide motivation to move and act. To operate for an extended period of time, action necessitates effort and persistence. Motivation entails a collection of beliefs, perceptions, values, information, and actions that are all interconnected. Motivation can lead to a variety of behaviors, and it is critical to comprehend the significance of motivation in the educational setting (Suhag et al., 2016).

Due to the fact that motivation speeds up cognitive processing, it affects how information is processed. As a result, motivated students are more likely to comprehend and carefully consider the subject at hand as opposed to merely superficially monitoring other people's learning activities (Yilmaz et al., 2017). And in relation to the psychological perspective, motivation refers to an internal process that stimulates individuals' conduct, guides them, and helps them to maintain their behavior through time (Anderman et al., 2013; Pintrich, 2003; Zimmerman & Schunk, 2011. In addition, motivation can be thought of as "the motor that keeps us moving," the desire to accomplish tasks that are important to people in one way or another, and the drive to succeed in these endeavors. (Nyman & Sumpter, 2019).

Student involvement in learning is predicated on their level of motivation to study (Saeed & Zyngier, 2012). According to research, a motivated learner possesses the inner strength necessary for learning and adapting to the demands of the school environment (Ferreira et al., 2011). A motivated learner is more likely to be actively engaged and exhibits improved performance, persistence, and creativity (Schunk et al., 2008). It is not viable to substitute online learning for students who are not sufficiently motivated (Aduayi-Akue et al., 2017), as a lack of motivation is a major cause of student attrition in distant education (Aduayi-Akue et al., 2017; Smith et al., 2005; Visser et al., 2002, cited by Murphy & Rodriguez-Manzanares, 2009).

Students' motivation in the classroom has lately been investigated using five frameworks of social–cognitive dimensions, as described by Pintrich (2003). In accordance with the concept of self-beliefs (e.g., self-efficacy), when students believe that they can do well in educational environments, they feel confident, are more likely to try their hardest, persevere longer, and perform better overall (Bandura, 1997). It is anticipated that students who have a stronger sense of personal control over their learning will perform better academically and achieve higher levels of success than those who don't. For a more sophisticated differentiation of extrinsic motivation in higher education, two theories have been developed to complement the traditional distinction between students' intrinsic and extrinsic motivation: students' interest and intrinsic motivation. It has been discovered that pupils' diverse types of interests lead to a variety of different learning outcomes (Ryan & Deci, 2000).

There are a number of factors that have a substantial impact on student motivation and achievement as a result of creating effective and efficient learning-teaching processes in educational systems. Among the many psychological, social, and cultural motivational factors are intrinsic and extrinsic directions, parental influence and participation, family history, peer pressure, self-efficacy expectations, effort, value attributed to a relative, anxiety, self-regulation and goal determination, talent perceptions, learning strategies, teaching style, and school environment (Yilmaz et al., 2017).

Osborne et al. (2003) also note that one of the elements that influence students' attitudes toward science is the high quality of the teaching process, which encourages interest and involvement in the subject. As a result, this article will provide an explanation of motivation as well as the use of an appropriate environment to boost students' motivation in mathematics learning.

Rifandi (2013) suggests that achieving success in mathematics has a significant impact on one's motivation to succeed. Several findings from the survey imply that factors contributing to the drop in favorable attitudes toward mathematics include a lack of teacher support as well as the environment in which students are taught.

Students' motivation can be aided by rationales that induce two effects: students must recognize the importance and personal value of the assignment, and students must sense a high degree of autonomy while working on the task (Jang, 2008). Furthermore, it has been noted in the literature that students' belief in mathematics can be influenced by their views in the following aspects: the nature of mathematics, the method of teaching and three learning, and their beliefs in their instructors (Lazim et al., 2004).

In addition, students' perceptions of their own achievement in mathematics learning are substantially correlated with their own motivational attitudes. Teachers' behaviors, attitudes, and the quality of instructional design for mathematics sessions have all had a significant impact on students' motivation (Rifandi, 2013).

Paas et al. (2005) asserted that meaningful learning can only occur when it is combined with motivation, which they believe is the case. Using a motivational perspective in the classroom, they claimed, would help discover the task qualities that drove students to put out more mental effort and achieve higher levels of performance. In addition, It is the belief of Keller (2008) that only when the motivating features of students are discovered and, consequently, techniques for addressing their areas of weakness are determined that the learning environment is optimized.

Many people believe that mathematics is only necessary for those working in industries such as engineering, science, and finance. This is a frequent mistake. Some people even believe that mathematics is solely concerned with computations. In reality, mathematics is a subject that may be applied to a variety of situations in everyday life. Students learn how to discern between the suitable use of mathematical information for different scenarios through the study of mathematics, which is to say, they learn how to determine which mathematical knowledge is appropriate for which reasons. The value of mathematics can be infused through the process of problem-solving. They can be word problems, non-routine problems, or real-life situations that require a variety of methodologies to be applied in order to be solved (Taplin, 1998, cited by Albay, 2020). Students are more appreciative and motivated to master mathematics when they can apply what they have learned in class to their daily lives. As a result, we should provide students with a comprehensive set of abilities that will enable them to meet the challenges of their lives.

Teachers serve as role models and a mentor for students who want to pursue higher education. An investigation carried out by Zhang (2014) also revealed that the teacher's enthusiasm was an efficient predictor of students' intrinsic motivation, according to the findings. The teacher's passion acted as a beneficial external catalyst in fostering students' interest, curiosity, and willingness to study by igniting their internal motivation. Effective instructors put out the effort necessary to build meaningful relationships with their pupils. Teachers communicate with their students in an empathic and caring manner, and they make every effort to assist students who are experiencing course-related or personal difficulties. In order for pupils to be motivated to learn, teachers' supportive relationships are essential (Wang, 2014).

Teachers are more eager, motivated, and equipped to teach and evaluate when the students have a greater capacity to increase their desire to learn (Williams & Williams, 2011). Moreover, according to Bayraktar (2015), in order to create an effective teaching and learning environment in a classroom, teachers' effective use of methods, techniques, tools, and materials in the relevant teaching field has a significant effect on student motivation. The importance of motivation in mathematics instruction cannot be overstated. Mathematical educators are asked to adapt their instructional practices in order to promote and improve students' motivation to learn Math (Wong & Wong, 2017).

An emotion-controlling system is equipped with the ability to direct behavior, and this is what motivates people. This potential can present itself in several ways, including intellect, emotion, and conduct (Hannula, 2004). They are present as part of one's goal structures, as well as one's views about what is essential, and they influence one's decision to engage in a certain endeavor.

The importance of good teachers in encouraging student motivation and accomplishment cannot be overemphasized. Those dispositions, which are repeating patterns of thoughts, feelings, or actions that result in better levels of performance as a teacher, are described as effective teachers' dispositions (Hutajulu et al., 2019; McCune & Entwistle, 2011).

➢ *Self Efficacy*

Bandura (1997) defined self-efficacy as an individual's belief in their ability to complete a task in a different situation. Since the covid-19 pandemic, the popularity of online learning dramatically increase. According to him, mastery experience, vicarious experience, verbal persuasion, and physiological affective states are the four main sources of knowledge that influence or develop self-efficacy.

Students' learning might be affected by their self-efficacy (Wang et al., 2017). It has an impact on how students conduct investigations, as seen by their actions, efforts, perseverance, adaptability in differences, and achievement of goals. Strong self-efficacy beliefs improve cognitive processes and performance in various settings, including academic contexts (Zulkosky, 2009). Similar research shows that students who have a high sense of self-efficacy are committed to completing difficult assignments and going the extra mile when facing challenges (Hong et al., 2017).

The learning process is intrinsically tied to the learning environment. Changes in the environment can interfere with self-efficacy. Self-efficacy is different in every context (Hodges, 2008). Students' self-efficacy differs from their self-efficacy in face-to-face learning environments as a result, and it is seen to be a crucial element for successful online learning (Shen et al., 2013). Moreover, online learning self-efficacy is further defined by Zimmerman and Kulikowich (2016) as learners' assurance in their capacity to successfully complete the learning criteria for online courses.

Bandura (1997) defines self-efficacy as a characteristic that influences how well-aware an individual is of himself or herself and how his or her behavior develops, specifically in terms of the ability to plan the essential actions to successfully carry out a certain performance. Zimmerman and Kulikowich (2016) designed an instrument called Online Learning Self-Efficacy Scale (OLSES) to measure students' self-efficacy in online learning. In Turkey, Yavuzalp and Bahcivan (2019) tested the validity and reliability of OLSES. The original form of scale is in English and consists of 22 items that have three factors: learning in the online environment, time management, and technology used. After factor analysis, the second item, "find course syllabus online," was removed from the scale because it scored below 0.40, indicating exclusion from the scale. Gender and school-type variables were not statistically significant, according to the findings of the investigation.

Moreover, Bates and Khasawneh (2007) discovered that four factors influence self-efficacy in the context of online learning: (1) previous success with online learning, (2) pre-course training, (3) instructor feedback, and (4) online learning technology anxiety. Though in a different context, we can see that it is closely related to or derived from Bandura's self-efficacy theory. Their research proposed a mediated model in which a group of antecedent factors influenced students' self-efficacy for online learning, which in turn affected their expectations for their learning outcomes, their perceptions of their mastery, and the number of hours they allocated each week to using online learning technology to complete their university course assignments. The results are consistent with a partially mediated model in which the block of antecedents had an indirect effect on the outcomes via their influence on self-efficacy, a direct impact on the outcome measures, and a direct impact on the outcome measures. The data suggest that the relationships between self-efficacy, its precursors, and a number of outcomes of online learning are more nuanced than has previously been thought in studies.

Meanwhile, according to Alquarashi (2016), three categories of self-efficacy in online learning environments were discovered between 1997 and 2015: computer self-efficacy, internet and information-seeking self-efficacy, and LMS (Learning Management System) self-efficacy. The study of self-efficacy and computers is primarily concerned with learners' confidence in their ability to use computers and other types of technology (Alquarashi, 2016). Additionally, the findings of Jan's (2015) study revealed a positive and significant relationship between computer self-efficacy and prior online learning experience, academic self-efficacy and prior online learning experience, and academic self-efficacy and student satisfaction.

Lim (2001) discovered that computer self-efficacy is a statistically significant predictor of student satisfaction and that there is a positive relationship between student satisfaction and future intention to take online courses. Lim (2001) aims to create a model that predicts adult learners' satisfaction with a Web-based distance education course and their intention to engage in future Web-based distance education courses. Computer self-efficacy, academic self-concept, age, gender, academic position, years of computer use, frequency of computer use, computer training, Internet experience in a class, and participation in a Web-based course workshop were among the variables investigated. The only statistically significant predictor variable was computer self-efficacy.

Lee and Hwang (2007) proposed a model for measuring online learning effectiveness, claiming that computer self-efficacy is critical in student satisfaction with e-learning. Research on self-efficacy and the Internet, learners' confidence in their ability to use the Internet to seek information is related; this is similar to information-seeking self-efficacy in online learning (Alquarashi, 2016).

In web-based instruction, Joo et al. (2000) looked into the relationship between Internet self-efficacy and students' success on written and search assessments. In addition, the study of Kou et al. (2020) also shows that student performance was significantly associated with Internet self-efficacy. Adult students' Internet self-efficacy, self-regulation, and performance in online learning environments were investigated. The effect of student characteristics on Internet self-efficacy and self-regulation was determined using a quantitative approach to find the correlations between the variables. The participants of this study were African American students from a university in the United States. They participated in two web-based research courses offered in summer. An online survey was used to gather information. Student achievement was connected with Internet self-efficacy but not with self-regulation. Gender and age differences had no significant effect on Internet self-efficacy and self-regulation.

Their Internet self-efficacy predicted students' performance on the search exam. However, there was no significant relationship between Internet self-efficacy and students' performance on the written test. In a survey of 219 distance learners, Tang and Tseng (2013) discovered that individuals with higher self-efficacy for information searching and the ability to apply information also had better self-efficacy for online learning and had more awareness of online resources.

Martin and Tutty (2008) and Martin et al. (2010) found that the self-efficacy of online learners was significantly higher than hybrid learners. However, LMS self-efficacy does not significantly affect course performance for online learners, but it positively influences the course performance for the hybrid learners. More research into the role of self-efficacy in online learning environments is still needed (Alquarashi, 2016).

In addition, Tanius et al. (2020) studied the correlation between learners' motivation, computer anxiety, and social support with self-efficacy on online learning technology due to the COVID-19 pandemic. The result indicated that online learning technology experience, learners' attitudes, learners' motivation, computer anxiety, and social support correlate with self-efficacy in online learning technology. Furthermore, the finding revealed that male and female respondents and different ages have similar opinions on the factors that contribute to online learning technology. This study's most significant finding reveals that students have self-efficacy on online learning technology, even though this is the first time they use it as mandatory learning. The study also highlighted that social support in online learning.

Yantraprakorn and colleagues (2018) conducted a study on why some highly efficacious learners failed in an online foreign language course based on Bandura's theory of self-efficacy. The learning performance of six very effective distant language learners was examined at a reputable English language tutoring school in Bangkok, Thailand. Goal setting, attribution shifts, and insufficient feedback were found to be factors that may reduce online learners' efficacy and influence their decision to drop out of a program. The implications of this study provide recommendations on support to help online learners succeed.

In Mathematics, it is not enough to know how to perform the given task; self-efficacy in the appropriateness of its concepts and procedures is also required (Garfield & Ben-Zvi, 2009). For example, when doing calculations manually or by using a calculator, the element of self-efficacy is in it (Negara, et al., 2021). When people have low self-efficacy for a task, they are less likely to put forth an effort and finish it. Understanding self-efficacy in online learning is essential to improving online education, which can be a key component of academic success in distance education (Hodges, 2008). Negara et al., (2021) investigated the mathematics performance score on trigonometry and the Mathematics self-efficacy score of 75 students from one of Mataram's institutions. The findings revealed that the majority of respondents had a high level of mathematical self-efficacy when it came to online learning. Further research reveals a link between mathematics self-efficacy and math performance.

The previously unfamiliar new normal has become standard at almost all schools and universities where classes are held entirely online, requiring us to learn essential abilities and attitudes that will enable us to adapt and succeed in an uncertain future. Understanding the contributing factors of the student's learning process is a necessary part of improving their skills and academic performance. In determining the level of self-efficacy and academic performance of 183 out of 366 students, the study of Flores (2020) in Batangas City, Philippines, shows that increased self-efficacy also increases academic performance.

According to the literature, studies in the field show that self-efficacy has a significant and positive impact on math achievement (Aksu & Guzeller, 2016; Duran & Bekdemir, 2013; Ozcal, 2019; Özcan & Kültür, 2021). Moreover, Dullas (2010) implied that self-efficacy is a good predictor of academic performance in Mathematics. Also, Hasan et al. (2014), who found a positive relationship between self-efficacy and academic performance.

Kuo et al. (2014) present a case study on using a web-based videoconferencing tool (Interwise) for synchronous learning sessions in an industrial technology course offered by a university in northern Taiwan. Undergraduate students from two semesters of the same course were among those who participated in the study. They examined into students' perceptions of interactions with the instructor and other students, their confidence in using the Internet (Internet self-efficacy), and their overall satisfaction with Interwise's learning process. They also looked at how interactions and Internet self-efficacy affected student satisfaction. Overall, learners thought Interwise was a reasonably easy tool to use for synchronous learning, according to the findings. Interwise features like emotion icons, conversation, and raising a hand were preferred by students when interacting with their instructors. Learners expressed high confidence in gathering data and obtaining assistance via the Internet, but low confidence in resolving Internet-related issues. Learner-learner and learner-instructor interactions were both significant predictors of student satisfaction, although Internet self-efficacy had little bearing on satisfaction.

According to Bandura's four sources of self-efficacy information, Huang and Mayer (2018) investigated the effectiveness of adding four features of self-efficacy to an online statistics course. Results of analyses of variance showed that the treatment group performed better on practice ($d = 0.36$), retention ($d = 0.39$), and transfer ($d = 0.42$) tests as well as reporting higher self-efficacy ($d = 0.44$) and lower task anxiety ($d = -0.45$). In addition, mediation analyses revealed that task anxiety and self-efficacy fully mediated the effect of the treatment group on their performance. The findings justify the inclusion of self-efficacy features in online mathematics sessions when the goal is to improve learning outcomes by lowering anxiety and improving self-efficacy.

➢ *Mathematics Performance*

Collins and O'Brien (2011) define mathematics performance as a student's level of achievement in mathematics or on examinations meant to measure mastery of a subject matter. This refers to how well a person has completed specific educational goals in a school, college, or university. Examinations are frequently used to define and measure it (Cambridge University Reporter, 2003). It is critical to identify the elements that influence student performance because institutions and instructors must develop ways to improve student performance and motivate students to do better (Uyan & Gungormus, 2011).

As the usage of online education grows, there is a pressing need to understand better how students learn in this new environment (Picciano, 2002). In the traditional classroom, research has shown the relevance of learning methods, but it has yet to look into what tactics are relevant and beneficial in the online learning classroom (Weinstein et al., 2000). Research shows a significant relationship between learning strategies, motivation, self-efficacy, and student's performance in an online context (Wadsworth, L et al., 2007).

The study of Uyan and Gungormus (2011) on determining the impact of eight variables, namely: gender, score in the university entrance examination, high school GPA, age, GPA, Math grade, Accounting Grade, and Attendance to students' mathematics performance in an accounting course, shows that gender and score in mathematics university examination are not significantly correlated. Additionally, the student's age has a statistically negative significant impact on their performance. Students' performance in the financial accounting course is influenced by their high school grade point average, prior understanding of accounting, grade point average, attendance, and math grade.

In a public national high school in Cebu, Philippines, Peteros et al. (2019) conducted descriptive correlational research between gender and self-concept on their students' mathematics performance. Results revealed that they had a moderate level of self-concept toward learning Mathematics. There was no gender difference in the respondents' self-concept. However, there was a strong association between self-concept and academic achievement in Mathematics. As a result, adopting and evaluating a Math performance improvement plan is strongly advised.

A cluster analysis approach in Zambia by Mulinga and Marban (2020) investigated the prospective online learning mathematics activities in the age of the COVID-19 pandemic. Cluster analysis results revealed that online learning mathematics activities have significant mean differences in clustering. Cluster 2 recorded the best performance, implying that students in this cluster exhibited excellent online learning skills for mathematics in technology-rich environments in which they will be forced to study and work in the future.

Obtaining information on a student's self-efficacy can offer the educator with more information about the student's subsequent performance. Nuruddin et al. (2020) investigated the link between self-efficacy and mathematics performance among university students studying Applied Science. The sample consisted of first-year Applied Science university students with matriculation and diploma backgrounds. Students were given two sets of survey questionnaires created by the researchers to assess their self-efficacy and competence to solve integral calculus problems. The questions were divided into four domains: the concept of calculus, translation from concept to formula, integration techniques, and recognition of functions. This study's findings did not provide sufficient evidence to support the view that positive self-efficacy beliefs in mathematics improve mathematics performance because there was no significant difference between what students perceived and what they actually scored. The study also showed that self–efficacy is correlated with all of the aspects of performance.

C. Theoretical Framework

This study draws on Social Cognitive Theory (SCT) to provide a comprehensive understanding of the relationship between students' self-efficacy, motivation and Mathematics performance in online learning. This theory emphasizes the role of self-efficacy in predicting behavior (Bandura, 1997). SCT suggests that learners' motivation and performance are influenced by their beliefs about their ability to perform well (self-efficacy) and the support they receive from their peers and instructors (Bandura, 1986). This theory will be used to investigate the level of students' self-efficacy and its relationship with mathematics performance.

In the context of online learning, where technology and digital resources have transformed educational practices, SCT provides a relevant framework for understanding the factors influencing students' Mathematics performance. SCT acknowledges the interplay between cognitive, behavioral, and environmental factors in shaping behavior.

The role of self-efficacy in students' mathematics performance is very important, it reflects their confidence in understanding and solving mathematical problems, significantly impacting their engagement and persistence. It means that having greater confidence in your skills will lead to a good mathematics performance.

Motivation plays a crucial role in driving students' active participation and investment in Mathematics learning online. Moreover, observational learning and social support mechanisms are particularly relevant in the online context, where the students can learn from the success and experience of their peers and instructors. This study aims to explore the interplay between self-efficacy, motivation and Mathematics performance in this educational setting.

The conceptual framework of the study in figure 1 presents the interplay of the variables in the study. It shows that motivation and self-efficacy would be measured and used to determine if those are significant predictors to students Mathematics performance in online learning mode.
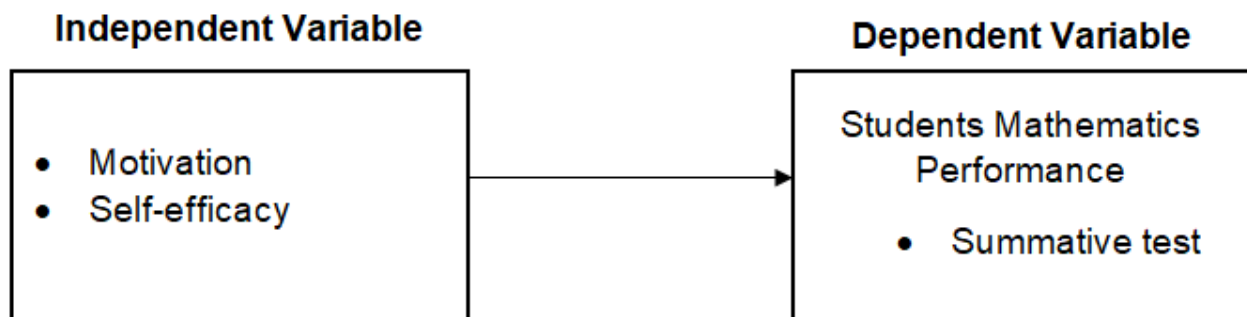
Fig 1 Conceptual Framework

D. Statement of the Problem

The purpose of this study is to determine the relationship between students' mathematics performance and self-efficacy and motivation in the online learning mode of the first-year mathematics major students at Davao De Oro State College, and it would seek to answer the following questions:

- What is the level of student's self-efficacy?
- What is the level of student's motivation?
- what is the level of mathematics performance of the students?
- is there a significant relationship between:

✓ 4.1. self-efficacy and mathematics performance?
✓ 4.2. motivation and mathematics performance?

- 5. Can motivation and self-efficacy predict the mathematics performance of the student?

E. Null Hypotheses

- H_o: There is no significant relationship between motivation and self-efficacy and the mathematics performance of the students.
- H_o: There is no significant influence between motivation and self-efficacy on the mathematics performance of the students.

F. Scope and Delimitation of the Study

This study focused on determining the relationship between motivation, self-efficacy, and mathematics performance of the selected students using universal sampling technique. It includes 104 first-year mathematics major students in all campuses of Davao De Oro State College who are currently enrolled in Mathematics of Investment subject for the first semester of 2022-2023. Moreover, the researcher wants to determine if motivation and self-efficacy can predict students' mathematics performance, specifically in the context of online learning.

G. Significance of the study

The findings of the study will benefit the following;

➢ *Students*

The finding of this study would help the students to better understand the importance of motivation and self-efficacy in mathematics learning, and how these factors can affect their performance in the subject. By knowing their own level of motivation and self-efficacy, students can develop strategies to improve their learning and achieve better outcomes in their mathematics courses.

➢ *Teachers*

The study results would inform the teachers about the design and implementation of effective instructional strategies that promote student motivation and self-efficacy in mathematics, especially in the context of online learning. Teachers can use the findings of this study to create learning materials that cater to different learning styles and preferences of their students, to incorporate motivational and self-efficacy enhancing techniques into their teaching practices.

➢ *School Administrators*

The study results would inform the development of policies and programs that promote effective online learning practices in mathematics education. The findings of this study may be used to evaluate and improve existing online learning programs and to design new ones that are tailored to the needs of students and teachers.

➢ *Future Researchers.*

The study would serve as a basis for further investigations into the relationship between motivation, self-efficacy, and mathematics performance in different contexts and populations. The findings of this study may also provide insights into the factors that contribute to successful online learning experiences in mathematics education, which can be further explored and developed.

H. Definition of terms

For the purpose of understanding how they are used in the study, the following words are defined operationally;

➢ *Motivation –*

It refers to a psychological state that drives an individual to engage in a particular behavior or activity.

➢ *Self-Efficacy –*

It refers to the level of learners' confidence in their ability to complete the learning requirements for online courses successfully.

➢ *Mathematics Performance –*

It refers to the summative test scores obtained by the students.

CHAPTER TWO
METHODOLOGY

This chapter presents the research design, locale, population and respondents of the study, research instruments, validation of the research instruments, data gathering procedure, scoring quantification of data, and the statistical treatment of the data.

A. Research Design.

This is a quantitative study. The research design employed was a descriptive correlational design. In which the researcher gathers information to assess whether there is a relationship or difference between or among specific variables (Capinding, 2022)

This study used a descriptive correlational research design since the researcher seeks to determine the student's level of motivation, self-efficacy, and performance. Also, to determine if motivation and self-efficacy have a significant relationship and will be able to predict students' mathematics performance in online learning.

B. Research Locale

This study was conducted in Davao De Oro where the four campuses of Davao de Oro State College (DDOSC) are located. Davao De Oro historacally known as Compostela Valley is located in the Davao region. It comprises 11 municipalities with stunning natural features such as rivers, lakes, waterfalls, caves, hot and cold springs, and mountain ranges.

Davao De Oro State College (DDOSC) formerly known as Compostela Valley State College (CVSC) by RA 11575. DDOSC is a public institution of higher learning located in the southern part of the Philippines. The college has four campuses, namely: Compostela (Main), New Bataan, Montevista, and Maragusan. All of these are offering Bachelor of Secondary Education major in Mathematics program where the researcher had gathered his data from.

The Compostela campus is located in the Municipality of Compostela, where the main administration building and the majority of the college's academic program are located, it is situated in a town that boasts of its natural attractions such as the famous Aliwagwag Falls, one of the highest waterfalls in the country.

The New Bataan Campus is located in the Municipality of New Bataan is described as an ecological paradise, and is home to diverse flora and fauna species. The town is also famous for having Mount Pandadagsaan which is the 3rd highest peak in the Davao region and one of the best hiking destinations of Davo de Oro.

The Montevista Campus is situated in the Municipality of Montevista that features a one-stop adventure destination which is Jorge Town. A person can enjoy various activities such as a mini zoo, swan boat, zip line, and many more in just one destination.

The Maragusan campus is located in the Municipality of Maragusan and is often referred to as the "Summer Capital of Davao" due to its cool climate and natural attractions such as the Tagbibinta Falls, Marangig Falls, and the Mainit hot Spring. The town is also known for its eco-tourism sites, including the Mount Candalaga Range, which is a popular hiking destination, and the many sea of clouds observation decks that bring breathtaking sceneries.

Figure 2 presents the location of the study: Compostela (Main), New Bataan, Montevista, and Maragusan campus.
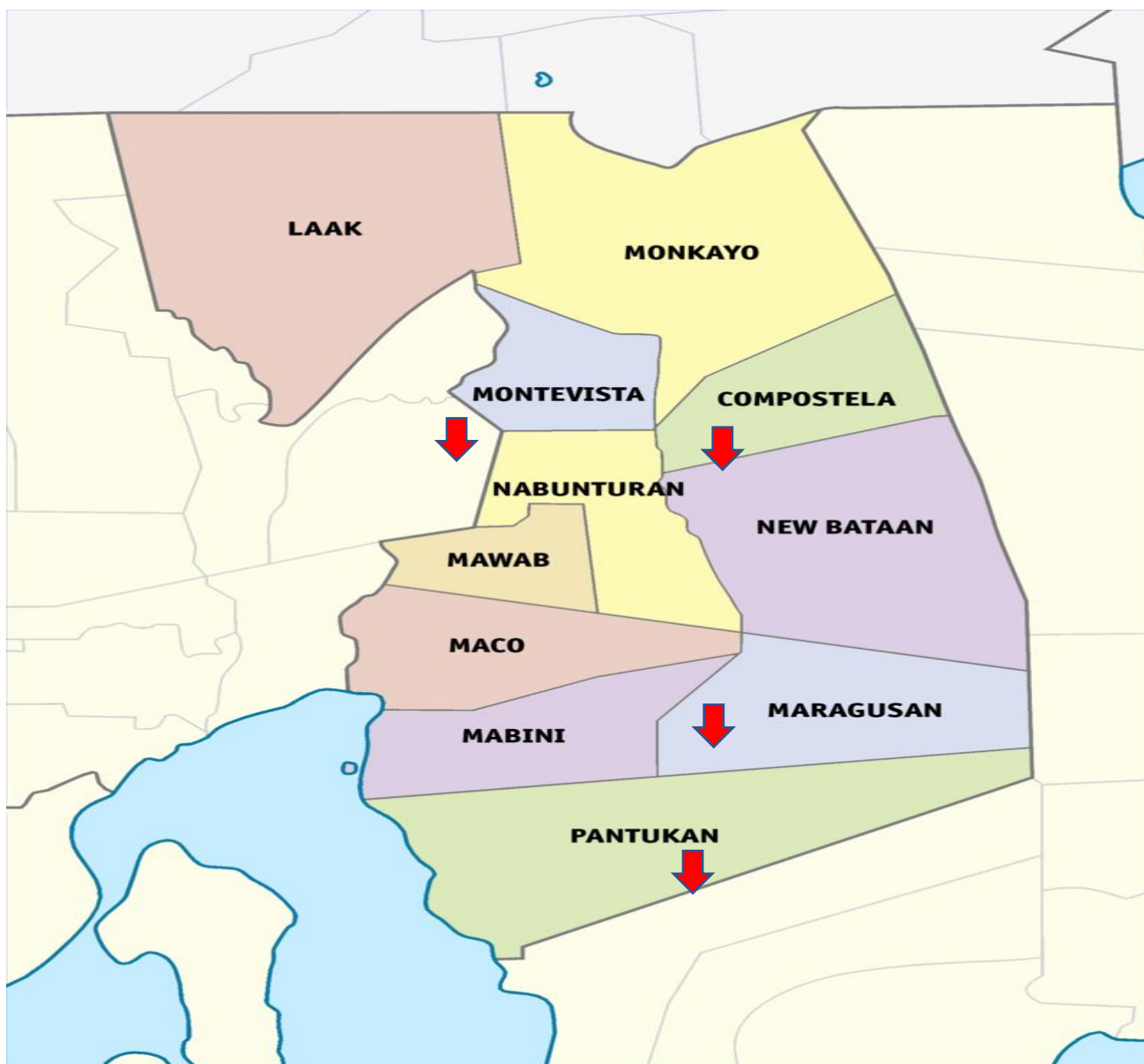
Fig 2 The Map of Davao De Oro Showing Location of Four Municipalities Namely Compostela, New Bataan, Montivista, and Maragusan where Each of the Campuses Of Davao De Oro State College are Located.

C. Research Respondents

The respondents of this study were the 1st year Mathematics major students who are currently taking the subject Mathematics of Investment in the 2nd semester of the Academic Year 2022-2023 in the selected school Davao De Oro State College. There are a total of 104 enrolled students of the target respondents. The samples are all the 1st year Mathematics major students using the universal sampling technique.

Table 1 Subjects of the Study

Campus	TOTAL	
	N	%
Davao De Oro State College-Compostela	30	29
Davao De Oro State College-New Bataan	26	25
Davao De Oro State College-Montevista	21	20
Davao De Oro State College-Maragusan	27	26
TOTAL	104	100

D. Research Instruments

The instruments used in this study were a researcher-made test and an adapted instrument. The researcher used the Academic Motivation Scale (AMS) adapted from Valerland et al. (1993) questionnaire consisting of 16 items. Each item is measured using a Likert scale of four points, ranging from strongly disagree (1) to strongly agree (4). The researcher also used the Online

Learning Self-Efficacy Scale (OLSES) adopted from Zimmerman and Kulikowich's (2016) questionnaire consisting of 17 items. Each item is measured using a Likert scale consisting of four points, ranging from strongly disagree (1) to strongly agree (4). The researcher-made summative test was used consisting of 45 items.

E. Validation of the Instrument

The research instrument such as Motivation, Self-efficacy, and Summative tests were presented to the researcher's validators and research adviser for comments and suggestions. After validation, the researcher revised the instruments based on the given comments and suggestions. The summative test was syllabus based and with a Table of Specifications (TOS).

The summative test was meticulously crafted and organized, it included the presentation of a TOS to ensure that the test items were distributed properly. Pilot testing of the said test questionnaire to the 2nd year mathematics students was conducted to test the reliability of the questionnaire. The sample respondents are selected who are not connected but with the same characteristics as the identified respondents. Using a suitable statistical tool, the result showed a reliability index of 0.710.

F. Research Procedures

The researcher will write a formal request letter to the School research office outlining the study's purpose, objectives, and methodology. The letter will be accompanied by a copy of the research proposal, content forms, and any relevant documents required by the school.

The researcher will seek ethical clearance from the school's Research Ethics Committee. The committee will review the proposal and ensure that the study complies with ethical guidelines for research involving human participants. The research will address any concerns raised by the committee and obtain the necessary approvals before proceeding.

Once permission has been granted, the researcher will set a schedule for data collection. The researcher will inform the selected schools and obtain permission from the school administrators and teachers to conduct the study.

A brief orientation will be conducted with the class advisers on the nature and scope of the study, emphasizing the importance of maintaining confidentiality and the voluntary participation of the students. The participants will be informed that their participation is completely voluntary and that they may withdraw from the study at any time without consequence. The participants will also be assured that their anonymity and confidentiality will be protected throughout the study.

The data collection activity will take place on the scheduled date. The class advisers will administer the research questionnaire to the students via Google Forms. The respondents will answer the research questionnaire within 1 hr and 30 minutes. After administering the said activity the researcher will ensure the privacy of the participants is protected.

The data will be tabulated and analyzed statistically. The researcher will ensure that the data is anonymous and that the privacy and confidentiality of the participants are maintained throughout the data analysis and reporting stage.

Finally, the researcher will prepare a report detailing the findings of the study and present it to the School Research Office. The researcher will acknowledge the contributions of the school and the participants in the study.

G. Statistical Treatment of Data

After collecting quantifiable information, the researcher will use the mean, standard deviation, and frequency distribution table to analyze the levels of measurement of motivation, self-efficacy, and mathematics performance of the students. The Pearson product-moment correlation will be employed to determine the correlation between motivation, self-efficacy, and mathematics performance. Multiple regression analysis will be applied to determine if motivation and self-efficacy can predict mathematics performance. The significance level will be set at $p<0.05$. All statistical analysis will be performed using the Statistical Package for the Social Sciences (SPSS).

➢ Mean
This statistical tool will determine the level of students' self-efficacy, motivation, and Mathematics Performance.

➢ Standard deviation
This will be used to measure how dispersed the data is in relation to the mean.

➢ Correlation
This statistical tool will determine the significant relationship between self-efficacy and Mathematics performance, and motivation and Mathematics performance.

➢ Multiple Regression
This is used to analyze the predictive power of self-efficacy and motivation to the students' Mathematics performance.

CHAPTER THREE
RESULTS

The data that were acquired using the study's research instruments are presented in this chapter. It also provides the statistical analysis and the interpretation of data to answer the problems stated in the problems of the study.

A. The Level of Students' Self-efficacy
The table below shows the level of self-efficacy of the students.

Table 2 Level of Students' Self-efficacy

Items	Weighted Mean	Descriptive Rating
I am confident in my ability to navigate online course materials efficiently	2.64	Agree
I believe that I can communicate effectively with technical support via e-mail, telephone, or live online chat.	2.75	Agree
I am confident that I can submit assignments to an online Dropbox. (i.e., google drive)	2.94	Agree
I am confident in my ability to overcome technical difficulties on my own.	2.71	Agree
I believe that I can navigate the online grade book. (i.e., scores or grades in google forms quizzes)	2.66	Agree
I am confident that I can manage time effectively.	2.68	Agree
I believe that I can complete all assignments on time.	2.86	Agree
I am confident in my ability to learn to use a new type of technology efficiently	2.86	Agree
I believe that I can learn without being in the same room as the instructor	2.55	Agree
I am confident that I can learn without being in the same room as other students.	2.63	Agree
I believe that I can search the Internet to find the answer to a course-related question.	2.77	Agree
I am confident that I can meet deadlines with very few reminders.	2.72	Agree
I believe that I can complete a group project entirely online.	2.58	Agree
I am confident that I can use synchronous technology to communicate with others (i.e., messenger, google meet, zoom).	2.86	Agree
I believe that I can focus on schoolwork when faced with distractions.	2.47	Agree
I am confident that I can develop and follow a plan for completing all required work on time.	2.72	Agree
I believe that I can promptly ask questions in the appropriate forum (e-mail, google classroom, discussion board, etc.) when a problem arises.	2.65	Agree
Overall Weighted Responses	2.71	Agree

Table 2 shows the level of students' self-efficacy in online learning. "I am confident that I can submit assignments to an online Dropbox. (i.e., google drive)" has the highest mean of 2.94 and has a descriptive rating of "Agree". This means that the students are familiar with and have sufficient knowledge of using this platform when submitting tasks online. On the other hand, the "I believe that I can focus on schoolwork when faced with distractions" has the lowest mean of 2.47 and has a descriptive rating of "Agree". This shows that only some students are confident that they can focus on their school works online due to the many distractions that online learning may bring such as social media, online games, and many more.

The overall mean is 2.71 which has a descriptive rating of "Agree". This mean score suggests that the students have a moderate level of self-efficacy in online learning. Based on the result, the majority of the students have a moderate level of self-efficacy. It means that they have some confidence in their abilities related to the various situations and feel moderately capable in online learning tasks. In addition, It implies that they require occasional support and guidance. Also, it entails that there is a need to increase their level of self-efficacy.

Similar results from the study on the level of self-efficacy in online learning have been reported by Ali (2021). In the study, it is said that online learners had a moderate level of self-efficacy and suggested that to improve students' self-efficacy a course in ICT may be offered to all online learners as a prerequisite for any online course.

As online learning is student-centered and self-directed, it is necessary for students to improve their self-efficacy to perform well in online learning. There are studies for measuring self-efficacy in online learning. The study of Lai et al (2021) shows that students with a higher level of self-efficacy are more likely to experience learning satisfaction.

B. The Level of Students' Motivation

Data on the level of students' motivation are presented in the Table below.

Table 3 Level of Students' Motivation

Items	Weighted Mean	Descriptive Rating
I really feel that I am wasting my time in school	3.54	Strongly Disagree
I once had good reasons for going to school; however, now I wonder whether I should continue	3.17	Agree
I cannot see why I go to school and frankly, I could not care less.	3.38	Agree
I cannot understand what I am doing in school	3.46	Agree
I believe that without good grades in Mathematics, I will not be able to find a high-paying job.	2.71	Agree
In order to obtain a more prestigious job later on.	2.73	Agree
I want to have "the good life" later on.	3.40	Agree
I want to prove to myself that I am capable of completing my college degree.	3.39	Agree
I feel important when I succeed in school.	3.29	Agree
It is to show myself that I am an intelligent person.	2.66	Agree
I want to show myself that I can succeed in my studies.	3.35	Agree
This will help me make a better choice regarding my career orientation.	3.13	Agree
Eventually, it will enable me to enter the job market in a field that I like.	3.02	Agree
I believe that my college education will improve my competence as a worker.	3.28	Agree
I experience pleasure and satisfaction while learning new things.	3.13	Agree
I experience pleasure and satisfaction in broadening my knowledge about Mathematics.	3.10	Agree
Overall Weighted Responses	3.17	Agree

As presented in Table 3, "I really feel that I am wasting my time in school" has the highest mean of 3.54 which has descriptive of "Strong Disagree". It implies that students think that attending school is a worthwhile and beneficial thing to do. The statement "I believe that without good grades in Mathematics, I will not be able to find a high-paying job" has the lowest mean and has a descriptive rating of "Agree". It means that some of the students believe that it is necessary to have good grades to find high-paying jobs in the future.

The responses gave an overall mean of 3.17 which has a descriptive rating of "Agree". This suggests that the students possess a moderate level of motivation in their academic pursuits. In addition, this means that the students generally display an average level of interest and engagement. Almost the same result was found by Basar et al. (2021) that students motivation in online learning was low. This shows that students require additional support or strategies to enhance their motivation.

According to Ozer & Badem (2022) who exclaimed that students who have high motivation tend to have higher grades. This is because they are more engaged in the learning process, especially in an online platform. Hence, they were also able to grasp the content of the subject matter, regardless of the challenges of online learning. Moreover, the study of Aduayi-Akue et al., (2017) also supports this claim stating that motivation has a significant effect on students' performance in online learning. Motivation plays a significant role in education, especially in increasing the performance of the learners.

C. The Level of Students' Mathematics Performance

The table below shows the level of students' Mathematics performance in a summative test.

Table 4 Level of Students' Mathematics Performance

	Mean	Standard Deviation	Proficiency	Descriptive rating
Summative test	24.43	10.51	54.29%	Did Not Meet Expectations

Table 4 describes the students' average score of 24.3 and proficiency level of 54.29% this implies that, on average, the students attained half of the total possible score. It suggests that the students did not meet the expected level of proficiency in the Mathematics subject. This shows that students may have faced various challenges in learning mathematics in online learning.

Bringula and colleagues (2021) found that internet connectivity and power outages are the most problematic aspects of online learning. Furthermore, Mamolo (2022) said that students are struggling to learn in this online learning context because they lack the motivation to do self-study and have a lot of household activities and chores. These issues make it tough for students to learn.

Nevertheless, Gürsul and Keser (2009) found that students perform better in online learning when compared to face-to-face. As online learning will be permanently integrated into the education system it is necessary to address the challenges to help improve the teaching-learning process in this type of learning modality.

D. The Significant Relationship between Motivation and Mathematics Performance

➢ *The Significant Relationship between Self-Efficacy and Mathematics Performance*
    The table below shows the correlation analysis of Self-Efficacy and Mathematics Performance.

Table 5 Significant Relationship between Self-Efficacy and Mathematics Performance

Variables	Correlation Coefficient	P-value	Remarks
Self-efficacy	.020	.838	Not Significant
Mathematics Performance			

Table 5 revealed a negligible positive relationship between self-efficacy and Mathematics performance (r = .020, p =.838). The magnitude of the r suggests a negligible relationship between these variables. Furthermore, the p-value of .838 indicates that the observed correlation is not statistically significant.

Contrary to the initial hypothesis, the results of the correlation analysis did not support a significant relationship between self-efficacy and Mathematics performance. The weak and non-significant correlation suggests that the level of self-efficacy among the students' had minimal influence on their Mathematics performance in online learning. These findings align with some previous studies that reported weak or inconsistent associations between self-efficacy and Mathematics performance.

According to Mijares III (2022), students' mathematics performance is not significantly affected by self-efficacy. The same result with the correlation between motivation and mathematics performance, it is fascinating since it contradicts the vast majority of academic research that asserts motivation has a significant relationship on students' mathematics performance (Wang et al., 2017; Kou et al., 2020; Flores, 2020; Aksu & Guzeller, 2016; Delioglu, 2017; Duran & Bekdemir, 2013).

Whatever the outcome, it is also necessary to improve students' self-efficacy during online learning, as supported by much literary evidence. According to Watsons (2015), students with higher self-efficacy are more successful in mathematics because they can perform better cognitively, have more motivation to continue in the face of difficulties, have less math anxiety, and are more likely to study mathematics.

The table below shows the correlation analysis of Motivation and Mathematics Performance.

Table 6 Significant Relationship between Motivation and Mathematics Performance

Variables	Correlation Coefficient	P-value	Remarks
Motivation	.074	.454	Not Significant
Mathematics Performance			

Table 6 revealed a negligible positive relationship between motivation and Mathematics performance (r = .074, p=.454). The magnitude of the r suggests a negligible relationship between these variables. Furthermore, the p-value of .454 indicates that the observed correlation is not statistically significant.

In contrast to the first hypothesis, the results of the correlation analysis did not support a significant relationship between motivation and mathematics performance. The weak and non-significant correlation suggests that the level of motivation among the students had minimal influence on their Mathematics performance in online learning. These findings align with some previous studies that reported weak or inconsistent associations between motivation and mathematics performance.

Mijares III (2022) asserts that motivation does not significantly affect students' mathematics performance. It is intriguing since it goes against the great majority of academic studies that claim motivation has a big influence on students' performance (Schunk et al., 2008; Paas et al., 2005; Ugwuanyi et al., 2020).

Regardless of the result, it is still necessary to improve learners' motivation to help students engage in the online classroom. Also, the importance of good teachers in encouraging student motivation is one of the key factors to having a successful academic performance.

E. The Self-efficacy and Motivation as Predictors of Students' Mathematics Performance
    The table below shows the Multiple regression analysis results to determine the predictive power of self-efficacy and motivation to the students' Mathematics performance.

Table 7 Self-Efficacy and Motivation as Predictors of Students' Mathematics Performance

Model	R	R Square	Adjusted R square	F	Sig.
1	.080	.006	-.013	.329	.720

Note: $\alpha = 0.05$

The above table revealed a negligible positive correlation (R=.080) between self-efficacy, motivation, and Mathematics performance. The coefficient of determination (R Square) indicated that .6% of the variance in Mathematics performance could be explained by the predictors. However, after adjusting for the number of predictors, the variance in Mathematics performance was not meaningful. Furthermore, the F-test results showed that the model as a whole was not statistically significant (F=.329, p=.720) at the alpha level of .05.

The coefficient table below was the result of multiple regression analysis it provides information about the individual predictors in the model and their relationship with the dependent variable.

Table 8 Self-Efficacy and Motivation as Predictors of Students' Mathematics Performance Coefficient Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	constant	19.547	7.791		2.509	.014
	Motivation	2.308	2.938	.098	.786	.434
	Self-efficacy	-.900	2.873	-.039	-.313	.755

Dependent Variable: Mathematics Performance

Regarding the predictor variables presented in the table above, it showed that motivation had a non-significant relationship with Mathematics performance (B=2.308, t=.786, p=.434). Similarly, self-efficacy also exhibited a non-significant relationship with Mathematics performance (B=-.900, t=-.313, p=.755).

The result shows that while self-efficacy and motivation have a negligible relationship with Mathematics performance, they may not be strong predictors in online learning. The low adjusted R square value indicates the addition of self-efficacy and motivation to the model did not significantly contribute to explaining the variance in Mathematics performance.

However, this still shows that self-efficacy and motivation contribute to online learning lowly. Özcan and Gümüş (2019) show that mathematics motivation predicts mathematics self-efficacy which in turn predicts retrospective metacognitive experience i.e,., students' narrative of their metacognitive activities after solving a mathematics task. Understanding self-efficacy in online learning is essential to improving online education, which can be a key component of academic success in distance education (Hodges, 2008).

CHAPTER FOUR
DISCUSSION AND CONCLUSION

This chapter presents the summary of findings of the study, conclusions and recommendations of the conducted study.

A. Summary of Findings
The results of the data analysis and interpretation were as follows:

- The students' self-efficacy was at a moderate level.
- The students' motivation was at a moderate level.
- The students' mathematics performance did not meet the level of expected proficiency level.
- There is a negligible relationship between the level of students' self-efficacy and mathematics performance.
- There is a negligible relationship between the level of students' motivation and mathematics performance.
- The level of students' self-efficacy and motivation were not significant predictors of students' mathematics performance.

B. Conclusion
World Health Organization chief declares the end to Covid-19 as a global health emergency, this virus changes the education system globally. To continue education one of the learning modes in education is online learning during the time of pandemic. Though in the present time, most schools transitioned back to face-to-face classes, still online learning is the new alternative way of delivering instructions. In fact, some of the schools also remained in a full online learning mode. Thus, the findings of this study are very important. This will be an essential help for the school administrators to revisit their curriculum and course syllabi in adjusting to the new normal. Through this, students may be able to adapt whenever there is an urgent need to switch back to online learning vis-à-vis.

In summary, the student's level of self-efficacy and motivation was at a moderate level. Students had moderate levels of self-efficacy and motivation to perform academic tasks in an online learning environment. The study concluded that both motivation and self-efficacy have a negligible relationship and are not statistically significant. Also, motivation and self-efficacy were not significant predictors of students' Mathematics performance.

C. Recommendations
Based on the conclusions derived from the study, the following recommendations are hereby presented:

- There is a need to improve students' self-efficacy and motivation. Students should develop their own personal strategies to improve self-efficacy and motivation in learning Mathematics in an online learning mode.
- Teachers should design and implement an effective strategy that can improve students' motivation and self-efficacy in Mathematics, especially in the context of online learning. Teachers should create learning materials that can cater to different learning styles and preferences of the students, to incorporate motivational and self-efficacy-enhancing techniques into their teaching practices.
- The school administrator should develop policies and programs that promote effective online learning practices in Mathematics education. Based on the results, they should revisit the existing online learning programs to cater the needs of students and teachers.
- This study is recommended for future researchers as a basis to investigate further the relationship between motivation and self-efficacy toward Mathematics performance in different contexts and populations. This study also provides insights into the factors that contribute to successful online learning experiences in Mathematics, which can be further explored and developed.

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APPENDICES

ASSUMPTION COLLEGE OF NABUNTURAN

Nabunturan, Davao de Oro

GRADUATE STUDIES DEPARTMENT

15 October 2021

CHRISTIE JEAN VILLANUEVA-GANIERA, EdD., CESE
College President
Davao de Oro State College-Main Campus
Compostela, Davao De Oro
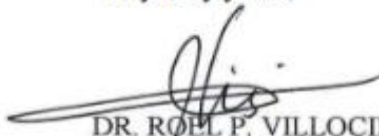
MADAM:

One of your teachers in the person of **MR. JAYSON KITTS C. POQUITA,** who is connected with the Davao de Oro State College-Maragusan Branch, Maragusan, Davao de Oro is our student in the Graduate Studies. Motivated by his desire to finish the Master's Degree, he is currently working on his thesis **"Motivation and Self Efficacy as Predictors to Mathematics Performance in Online Learning".** Taking cognizance of the nature and scope of the study, the research committee did not see any implications inimical to the vision and thrust of the school. Nonetheless, the result of the study might even be beneficial to people who have stakes in the educative process.

The undersigned, through the Graduate Studies Department, is making this **endorsement** for said student to embark on the subject he intends to explore for his thesis as partial fulfillment of the requirements leading to the degree Master of Arts in Education Major in Mathematics. As Assumption College of Nabunturan envisions for the overall professional development of its students, the undersigned hopes this endorsement merits it.

Anticipating on your positive response to this matter, I am

Very truly yours,

DR. ROEL P. VILLOCINO
Dean of Graduate School

Appendix A
Endorsement letter

DDOSC-REC Form 2.6
Certificate of Approval

Republic of the Philippines
Davao De Oro State College
RESEARCH ETHICS COMMITTEE

CERTIFICATE OF APPROVAL
DDOSC-REC Control No. DDOSC3902023

This is to certify that the study entitled **"MOTIVATION AND SELF EFFICACY AS PREDICTORS TO MATHEMATICS PERFORMANCE IN ONLINE LEARNING"** with REC Protocol Code: **339-04-2023** by **JAYSON KITTS C. POQUITA**, a graduate school student of the Assumption College of Nabunturan, has been examined by the Davao de Oro State College – Research Ethics Committee (DdOSC-REC) as **EXPEDITED** both for the initial submission and resubmission and has been evaluated to have adequately complied the requirements for the study ethics protocol and is, therefore, cleared for implementation using universally scientific procedures and internationally accepted ethical guidelines **effective May 24, 2023, until October 23, 2023.**

During this period, the researcher is expected to comply with the following responsibilities:

- Submit protocol amendments for DdOSC-REC approval before implementing them (if any);
- Submit SAE/SUSARs/RNE reports to the DdOSC-REC (if any);
- Submit a progress report if the research needs to be extended beyond the period covered by the initial approval;
- Report protocol deviations/violations (if any);
- Submit final report after completion of protocol procedures at the study site;
- Comply with all relevant international and national guidelines and regulations; and
- Abide by the principles of the National Ethical Guidelines (2017).

Given this 24th day of May 2023 at the DDOSC-REC Office, Main Building, Davao De Oro State College-Main Campus, Compostela, Davao de Oro, Philippines.

LILYBETH M. MATUNHAY, Ph.D.
Chair, Research Ethics Committee

"Ability, Motivation, Attitude: ETHICS"

Appendix B
Certificate of Approval of Davao De Oro State Research Ethics Committee

DDOSC-REC Form 2.6
Certificate of Approval

Republic of the Philippines
Davao De Oro State College
RESEARCH ETHICS COMMITTEE

CERTIFICATE OF APPROVAL
DDOSC-REC Control No. DDOSC3902023

This is to certify that the study entitled **"MOTIVATION AND SELF EFFICACY AS PREDICTORS TO MATHEMATICS PERFORMANCE IN ONLINE LEARNING"** with REC Protocol Code: **339-04-2023** by **JAYSON KITTS C. POQUITA**, a graduate school student of the Assumption College of Nabunturan, has been examined by the Davao de Oro State College – Research Ethics Committee (DdOSC-REC) as **EXPEDITED** both for the initial submission and resubmission and has been evaluated to have adequately complied the requirements for the study ethics protocol and is, therefore, cleared for implementation using universally scientific procedures and internationally accepted ethical guidelines **effective May 24, 2023, until October 23, 2023.**

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- Submit a progress report if the research needs to be extended beyond the period covered by the initial approval;
- Report protocol deviations/violations (if any);
- Submit final report after completion of protocol procedures at the study site;
- Comply with all relevant international and national guidelines and regulations; and
- Abide by the principles of the National Ethical Guidelines (2017).

Given this 24th day of May 2023 at the DDOSC-REC Office, Main Building, Davao De Oro State College-Main Campus, Compostela, Davao de Oro, Philippines.

LILYBETH M. MATUNHAY, Ph.D.
Chair, Research Ethics Committee

"Ability, Motivation, Attitude: ETHICS"

Appendix C
Conduct of Research Approval Form

Davao de Oro State College
Compostela / Maragusan / Montevista / New Bataan

Document Code No.			
FM-DDOSC-OCP-RDD-012			
Issue Status	Rev No.	Effective Date	Page No.
04	00	04.04.2023	1 of 2

CONDUCT OF RESEARCH APPROVAL FORM

To reduce survey fatigue Research and Development Division regulates all research conducted on students at DDOSC. Please complete this form and attach all documentation.

Date: May 25, 2023

Principal Investigator/Researcher: JAYSON KITTS C. POQUITA Email: jaysonkitts.poquita@ddosc.edu.ph
College/ unit/ or other institution: Assumption College of Nabunturan   Contact No.: 09971980597
Campus/Institution's Address: Purok 1 Arellano Street, Poblacion, Nabunturan, Davao De Oro
Title of research project/study: Motivation and Self-Efficacy as Predictors to Mathematics Performance in Online Learning
Start and end dates of data gathering/ administration of Instruments: May 26-31, 2023
Type of data gathering (e.g., random sample, complete enumeration, etc.): Universal Sampling
No. of DDOSC students/faculty/staff involved: 200 students
Will data be used ONLY for internal purposes by your department or unit? ☐ Yes ☒ No
  If no, please seek DDOSC-REC approval.
  If yes, please attach a copy of study protocol/instruments.

Note: All non-DDOSC entities are required to submit their institution's Ethics Board Approval/Clearance or letter of exemption.

Have you prepared a DDOSC-REC request? ☒ Yes ☐ No
If yes, PLEASE ATTACH A COPY OF ALL THE DDOSC-REC FORMS.

1. Please briefly stipulate the following:
   a. Goal(s) of the project/study: *determine if motivation and self-efficacy can be a predictor of students' performance in an online learning context. In addition, the researcher aims to determine if motivation and self-efficacy can predict students' mathematics performance and identify any factors that may influence it. By examining this topic, students can better understand the importance of motivation and self-efficacy in their academic performance.*
   b. Inclusion and exclusion criteria of students/faculty & staff: *The respondents of this study are the 1 st year Mathematics major students who are currently taking the subject Mathematics of Investment in the 2nd semester of Academic Year 2022-2023 in the selected school Davao De Oro State College. Also, to ensure the relevance and appropriateness of the study sample the following exclusion criteria must be applied: non mathematics major students, students not enrolled in Mathematics of Investment subject, students from other academic years or semesters.*
   c. Cost to the students (include how much time the project will take): 1.5 hours
   d. Risk to students (if any negative consequences include how they will be mitigated): The possible risks in conducting the study are the ongoing pandemic that can make changes in conducting the study, but the researchers made sure that the safety of the respondents would not be compromised because the researchers follow IATF and the school's health protocols.
   e. Benefits to students: *The possible risks in conducting the study are the ongoing pandemic that can make changes in conducting the study but the researchers made sure that the safety of the respondents would not be compromised because the researchers follow IATF and the school's health protocols.*
   f. Funding source for the project/study: Self-funded

JAYSON KITTS C. POQUITA   May 25, 2023
Principal Investigator/Researcher (Signature over printed name)   Date

ROMULO DORONIO   May 25, 2023
Principal Investigator's/Researcher's Adviser   Date
(required if PI is a student/otherwise optional)

Appendix D:
Research Questionnaire

	Document Code No.			
	FM-DDOSC-OCP-RDD-012			
Issue Status	Rev No.	Effective Date		Page No.
04	00	04.04.2023		2 of 2

Davao de Oro State College
Compostela / Maragusan / Montevista / New Bataan

Additional Researcher(s) (if any)   Date

_____   _____

Additional Researcher(s) (if any)   Date

Recommending for Approval:

JESON N. GEROCHE, MSc
Director for R&D

Approved by: Digitally signed by
                      Ganiera Christie
                      Jean Villanueva
CHRISTIE JEAN V. GANIERA, Ed.D., CESE
College President Date: 2023.06.07
                    16:09:03 +08'00'

➢ *Motivation*

Academic Motivation Scale (AMS) adopted from Vallerland et al. (1993)

The instrument uses the 4-points Likert Scale with a categorical response;

4-Strongly Agree
3-Agree
2-Disagree
1-Strongly Disagree

Table 9 Why do you spend time studying Mathematics?

Items	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
I really feel that I am wasting my time in school				
I once had good reasons for going to school; however, now I wonder whether I should continue				
I cannot see why I go to school and frankly, I could not care less.				
I cannot understand what I am doing in school				
I believe that without good grades in Mathematics, I will not be able to find a high-paying job.				
In order to obtain a more prestigious job later on.				
I want to have "the good life" later on.				
I want to prove to myself that I am capable of completing my college degree.				
I feel important when I succeed in school.				
It is to show myself that I am an intelligent person.				
I want to show myself that I can succeed in my studies.				
This will help me make a better choice regarding my career orientation.				
Eventually, it will enable me to enter the job market in a field that I like.				
I believe that my college education will improve my competence as a worker.				
I experience pleasure and satisfaction while learning new things.				
I experience pleasure and satisfaction in broadening my knowledge about Mathematics.				

Table 10 Level of Motivation

Point	Scale Range	Description	Interpretation
4	3.50 – 4.00	Strongly Agree	The respondent strongly agrees that the statement or item accurately represents their academic motivation. They fully identify with and endorse the motivation described.
3	2.50 – 3.49	Agree	The respondent agrees to some extent with the statement or item. They identify with and endorse certain aspects of motivation described, but there may be room for improvement or further alignment.
2	1.50 – 2.49	Disagree	The respondent disagrees to some extent with the statement or item. While they may acknowledge certain aspects of the motivation described, they do not fully agree with it.
1	1.00 – 1.49	Strongly Disagree	The respondent strongly disagrees that the statement or item accurately represents their academic motivation. They do not identify with the motivation described in the item

➢ *Self-Efficacy*

Online Learning Self-Efficacy Scale (OLSES) adapted from Zimmerman and Kulikowich (2016)

The instrument uses the 4-point Likert Scale with a categorical response;

4-Strongly Agree
3-Agree
2--Disagree
1-Strongly Disagree

Table 11 The Instrument uses the 4-Point Likert Scale with a Categorical Response

Items	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
I am confident in my ability to navigate online course materials efficiently				
I believe that I can communicate effectively with technical support via e-mail, telephone, or live online chat.				
I am confident that I can submit assignments to an online Dropbox. (i.e., google drive)				
I am confident in my ability to overcome technical difficulties on my own.				
I believe that I can navigate the online grade book. (i.e., scores or grades in google forms quizzes)				
I am confident that I can manage time effectively.				
I believe that I can complete all assignments on time.				
I am confident in my ability to learn to use a new type of technology efficiently				
I believe that I can learn without being in the same room as the instructor				
I am confident that I can learn without being in the same room as other students.				
I believe that I can search the Internet to find the answer to a course-related question.				
I am confident that I can meet deadlines with very few reminders.				
I believe that I can complete a group project entirely online.				
I am confident that I can use synchronous technology to communicate with others (i.e., messenger, google meet, zoom).				
I believe that I can focus on schoolwork when faced with distractions.				
I am confident that I can develop and follow a plan for completing all required work on time.				
I believe that I can promptly ask questions in the appropriate forum (e-mail, google classroom, discussion board, etc.) when a problem arises.				

Table 12 Level of Self-Efficacy

Point	Scale Range	Description	Interpretation
4	3.50 – 4.00	Strongly Agree	The respondent strongly agrees that the statement or item accurately represents their level of self-efficacy. They fully identify with and endorse the level of self-efficacy described.
3	2.50 – 3.49	Agree	The respondent agrees to some extent with the statement or item. They identify with and endorse certain aspects of the level of self-efficacy described, but there may be room for improvement or further alignment.
2	1.50 – 2.49	Disagree	The respondent disagrees to some extent with the statement or item. While they may acknowledge certain aspects of the level of self-efficacy described, they do not fully agree with it.
1	1.00 – 1.49	Strongly Disagree	The respondent strongly disagrees that the statement or item accurately represents their level of self-efficacy. They do not identify with the level of self-efficacy described in the item.

SUMMATIVE TEST

TEST QUESTIONNAIRE

I. Multiple Choice

GENERAL INSTRUCTION: Read the directions carefully before answering.

Direction: Read the following items carefully. Encircle the letter of the correct answer.

1. What is the correct formula for time if we use Banker's Rule?
a. $\frac{t_o}{I_o}$; approximate time divided by ordinary interest
b. $\frac{t_o}{I_e}$; approximate time divided by exact interest
c. $\frac{t_e}{I_o}$; exact time divided by ordinary interest
d. $\frac{t_e}{I_e}$; exact time divided by exact interest

2. It refers to a method in remembering the number of days in every months.
a. Banker's Rule
b. Knuckle Mnemonic
c. Approximate Time
d. Exact Interest

3. What is the number of exact days of the year 2020?
a. 365
b. 360
c. 366
d. 361

4. Which of the following simple interest formula gives more Interest (I)?
a. $I = Pr(\frac{approximate\ time}{ordinary\ interest})$
b. $I = Pr(\frac{exact\ time}{ordinary\ interest})$
c. $I = Pr(\frac{approximate\ time}{exact\ interest})$
d. $I = Pr(\frac{exact\ time}{exact\ interest})$

5. Which of the following value of time is **NOT** equal with $2\frac{2}{3}$ years?
a. $2\frac{8}{12}$ years
b. $\frac{8}{3}$ years
c. 2.666666667 years
d. 1.333333333 years

6. Compare the following statement. Which of the following best describes simple interest?
  I.   The simple interest can be found by subtracting the Future value from the Principal value.
 II.   Simple interest is interest calculated on the original principal of a loan or on the amount of an account.
III.   The simple interest on a principal is inversely proportional to the time principal the principal is invested or loaned.
IV.   Simple interest does not compound.
a. I, II, & IV
b. I & IV only
c. II, III & IV
d. All of the above

7. Find the principal (P) if:
F = Php 20,000.00   r = 9 %   t = 5 years
a. P = Php 434.78
b. P = Php 29,000.00
c. P = Php 13,793.10
d. P = Php 9,000.00

8. Joana borrowed money from the bank on January 2, 2016, and paid it on April 6, 2016. Find the exact time of the given situation.
a. 71 days
b. 72 days
c. 94 days
d. 95 days

9. What sum will accumulate an interest of ₱ 35,000 in 5 years at 16% simple interest?
a. ₱ 630,000.00
b. ₱ 63,000.00
c. ₱ 28,000.00
d. ₱ 19,444.44

10. Sandra needs ₱ 750,000.00 to buy her dream car after 4 years. How much should she invest in a company with a 12% simple interest rate? What is given and asked in the problem?
a. Given: Principal amount, interest rate, and maturity date
    Required: Future amount
b. Given: Principal amount, interest rate, and maturity date
Required: Interest
c. Given: Future amount, interest rate, and maturity date
    Required: Principal amount
d. Given: Principal amount, interest rate, and issue date
    Required: Future amount

11. What formula should be applied if the given situation is that Racquel wants to buy a computer, so she borrowed Php 20,000.00 at 5% interest rate for 5 years, how much money should she pay back?
a. $I = Prt$
b. $P = F - I$
c. $P = \dfrac{F}{1+rt}$
d. $F = P(1 + rt)$

12. Let the accumulated money be ₱ 76,600 when ₱ 50,000 is invested at 11% simple interest. How long should we wait for our invested money to accumulate that much?
a. $4.7 \; years$
b. $\dfrac{52}{11} \; years$
c. $\dfrac{152}{11} \; years$
d. $\dfrac{266}{55} \; years$

13. Assess which of the following values of r or simple interest rate is correct if F = ₱ 110,000 and P = ₱ 100,000 during 36 months.
a. $r = \dfrac{1}{360}$
b. $r = \dfrac{1}{360}\%$
c. $r = \dfrac{1}{30}$
d. $r = 0.33$

14. Evaluate and identify which of the following statement is **TRUE**.
a. The interest is ₱ 874.27 on ₱ 15,800 at 12 % from January 9, 2017, to June 24 of the same year, using actual time and ordinary interest.
b. The interest is ₱ 862.29 on ₱ 15,800 at 12 % from January 9, 2017, to June 24 of the same year, using actual time and ordinary interest.
c. The interest is ₱ 900.60 on ₱ 15,800 at 12 % from January 9, 2017, to June 24 of the same year, using actual time and ordinary interest.
d. The interest is ₱ 830.00 on ₱ 15,800 at 12 % from January 9, 2017, to June 24 of the same year, using actual time and ordinary interest.

15. Which values of Interest value (I), Principal (P), and time (t) suffice to prove that the value of interest rate (r) is 10%.
a. $I = 233,750; P = 85,000; and\ t = \frac{99}{360}\ years$
b. $I = 2,125; P = 85,000; and\ t = \frac{99}{360}\ years$
c. $I = 318,750; P = 85,000; and\ t = \frac{99}{360}\ years$
d. $I = 2,125; P = 85,000; and\ t = 90\ months$

16. If the interest that is deducted is a discount, what is the actual amount that is given to the borrower?
a. Principal
b. Proceeds
c. Future amount
d. Discount interest

17. It is the addition of the discount and proceed.
a. Face value
b. Bank discount
c. Rate of discount
d. Time period

18. What is the correct formula for getting the time in a simple discount?
a. $t = \frac{d}{FD}$
b. $t = \frac{I}{Pr}$
c. $t = \frac{D}{Fd}$
d. $t = \frac{r}{PI}$

19. Compare the following statements and determine which is **NOT TRUE**.
   I.   For a simple discount, the face value and the maturity are not the same.
   II. For simple interest, the face value and the maturity are not the same.
   III. The formula for calculating the discount is similar to the interest formula
a. I & II
b. I only
c. II & III
d. All of the statements are not true.

20. Simon decides to continue schooling, but for him to go to school, he needs to have at least a motorcycle worth Php 73,000.00. And to have that amount, he decides to borrow the money at a local savings bank, for 14 months, at a 12% discount rate. How much does he need to apply for? What does this underlined question mean?
a. The Discount
b. The Proceeds
c. The Face Value
d. The Discount Note

21. Douglas signed a <u>Php 20,500 discount note</u> on April 3, 2019. The bank charges an 18% discount rate, and the proceeds are Php 15,500. When will the note mature? In this problem, what does the underlined phrase means?
a. The Discount
b. The Proceeds
c. The Face Value
d. The Discount Rate

22. Soledad borrowed Php 18,000 for 8 months from a rural bank so that she could buy an oven for baking. The banker discounts the note at 9%. Find the amount of the discount.
a. Php 1,080.00
b. Php 12,960.00
c. Php 10,800.00
d. Php 16,920.00

23. Sasha decides to go back to school. To get to school, she buys a small car, Php 180,000. She decides to borrow the money at the local savings bank for 14 months at a 12% discount rate. Find the face value of the loan so she will have Php 180,000.
a. Php 154, 800.00
b. Php 15,480.00
c. Php 20,930.23
d. Php 209,302.33

24. Marlon signed a Php 41,000 note at a discount rate of 8%. He was told it would have Php 3,200 interest. Find the length of the loan.
a. 0.95 years
b. $\frac{40}{41}$ years
c. 160.16 years
d. $\frac{5125}{32}$ years

25. Which could be the correct value of the discount rate (d) if the Php 1,200 note will mature in 90 days and the proceeds were Php 1,179.
a. $d = 7$
b. $d = 0.07$
c. $d = 4.07$
d. $d = 0.0407\%$

26. Which of the following shows the correct formula for getting the maturity value in a simple discount?
  I. $F = \frac{D}{Ft}$
  II. $F = P + D$
  III. $F = \frac{P}{1-dt}$
  IV. $F = P - D$
a. I,II,& III
b. II & IV
c. II & III
d. I & II

27. Nico received Php 25,756.50 after applying for a loan last Jan 23. He will pay his loan after 2 years. If the bank charges a 13% simple discount, how much did Bistro apply for? In this problem, what is/are the given and unknown value/s.
a. Given: Proceed, interest rate, and maturity date
 Required: Future amount
b. Given: Proceed, discount rate, and maturity date
 Required: Face Value
c. Given: Principal amount, interest rate, and maturity date
 Required: Face Value
d. Given: Face Value, discount rate, and maturity date
 Required: Discount Note

28. Evaluate and identify which of the following statement is **TRUE**.
a. The face value is Php 28,703.70 if the proceeds is Php 15,500 at 18% discount rate for 3 years.
b. The face value is Php 7,130.00 if the proceeds is Php 15,500 at 18% discount rate for 3 years.
c. The face value is Php 20,500.00 if the proceeds is Php 15,500 at 18% discount rate for 3 years.
d. The face value is Php 33,695.65 if the proceeds is Php 15,500 at 18% discount rate for 3 years.

29. Which values of Face value (F), discount rate (d), and time (t) suffice to prove that the value of Proceeds (P) is Php 162,750
a. Face value (F) = Php 126,131.25; discount rate (d) = 9%; and time (t) = 2.5 years
b. Face value (F) = Php 36,618.75; discount rate (d) = 9%; and time (t) = 2.5 years
c. Face value (F) = Php 210,000; discount rate (d) = 9%; and time (t) = 2.5 years
d. Face value (F) = Php 162,325.11; discount rate (d) = 9%; and time (t) = 2.5 years

30. Assess which of the following values of d or discount rate is **CORRECT** if F = ₱ 13,500, P = ₱ 9,450 and will mature in 2.5 years.
a. $d = 12$
b. $d = 0.12$
c. $d = -\frac{6}{35}$
d. $d = 0.12\%$

31. It is the procedure in which interest is periodically calculated and added to the principal.
a. Simple interest
b. Nominal interest
c. Ordinary interest
d. Compound interest

32. Which of the following is the stated annual interest rate based on the compound interest calculation?
a. Simple interest rate
b. Nominal rate
c. Periodic interest rate
d. Rate

33. It is the rate of interest earned in one conversion period.
a. Simple interest rate
b. Nominal rate
c. Periodic interest rate
d. Rate

34. Virgilio Secundo borrows P47,400 with interest at 18% <u>compounded quarterly</u>. How much should he pay to the creditor after 3 years to pay off his debt? What do these underlined words refer to?
a. Compound interest (I)
b. Nominal interest rate (j)
c. Periodic interest rate (i)
d. Number of conversions per year (m)

35. If (Principal) P = Php 47,700.00, (Nominal rate) j = 18%, (number of conversion per year) m = 4, and (time) t = 3 years, what is the value of (Future amount) F?
a. F = Php 80,893.54
b. F = Php 33,193.54
c. F = Php 50,340.52
d. F = Php 79,706.43

36. Which of the following statement is **CORRECT** in compounding frequencies and periods?
a. The conversion per year of quarterly is 3 because it is every 4 months
b. The conversion per year of bimonthly is 2 because it is every 6 months
c. The conversion per year of quarterly is 4 because it is every 3 months
d. The conversion per year of bimonthly is 6 because it is every 3 months

37. If you deposit ₱10,000 into an account paying 2.5% annual interest compounded quarterly, how much money will be in the account after 5 years?
a. $P = ₱2,974.55$
b. $F = ₱33,618.53$
c. $P = ₱8,828.40$
d. $F = ₱11,327.08$

38. Doggy invested in a company with an interest rate of 6.2% compounded monthly. If, after 10 years, the account balance is ₱ 37,839.45, how much was the beginning investment?
a. ☐=₱20,150.43
b. ☐=₱40,259.11
c. ☐=₱20,388.04
d. ☐=₱77,228.63

39. Find the interest earned of a Php 100,000.00 at the end of 6 months at 13% compounded semiannually.
a. Php 106,500.00
b. Php 212,909.62
c. Php 6,500.00
d. Php 112,909.62

40. A note with a maturity value of Php 42,560 is due in 4 years and 9 months. What is the principal amount at 5.6% compounded semiannually? In this problem, what is/are the given and unknown value/s
a. Given: Principal amount, equivalent interest rate, maturity date, and number of   conversions per year
   Required: Future amount
b. Given: Principal amount, equivalent interest rate, maturity date, and number of   conversions per year
   Required: Face value
c. Given: Principal amount, nominal interest rate, and number of   conversions per year
   Required: Future amount
d. Given: Principal amount, nominal interest rate, maturity date, and number of conversions per year
   Required: Future amount

41. How long will it take for Php 11,250.50 to become Php 15,119.73 at 12 % compounded quarterly?
a. t = 2.5
b. t = 2 years and 5 months
c. t = 2.5 months
d. t = 2.5 years

42. The maturity value of an 8 year, Php 60,000 compound-interest investment certificate was Php 80,000. What quarterly compounded rate did the investment certificate earn?
a) 3.6 %
b) 6.3 %
c) 3.3 %
d) 3.9 %

43. Evaluate and identify which of the following statement is **TRUE**.
a. The future value of a principal amount of Php 27,000 invested for 2 years at 9% compounded monthly is Php 31,960.00.
b. The future value of a principal amount of Php 27,000 invested for 2 years at 9% compounded monthly is Php 32,303.17.
c. The future value of a principal amount of Php 27,000 invested for 2 years at 9% compounded monthly is Php 33,203.17.
d. The future value of a principal amount of Php 27,000 invested for 2 years at 9% compounded monthly is Php 153,167.60.

44. Which values of Future amount (F), nominal rate (j),number of conversion per year (m), and time (t) suffice to prove that the value of Principal amount (P) is Php 73,516.46
a. F = Php 63,392.62; j = 5%; m = 2; and time (t) = 3 years
b. F = Php 11,740.02; j = 5%; m = 2; and time (t) = 3 years
c. F = Php 85,526.55; j = 5%; m = 2; and time (t) = 3 years
d. F = Php 85,256.55; j = 5%; m = 2; and time (t) = 3 years

45. Assess which of the following values of F or Future value is **CORRECT** if Principal (P) = Php 25,324.00 ; nominal rat (j) = 3.5%;number of conversion per year (m)= 4; and time (t) = 5 years
a. F = 21,274.60
b. F = 30,144.17
c. F = 4,820.17
d. F = 135,555.65

Appendix E
Summary of Validation Results

Name of Researcher: <u>JAYSON KITTS C. POQUITA</u> Degree Enrolled: <u>MAED-Math</u>
Title of Research: <u>MOTIVATION AND SELF EFFICACY AS PREDICTORS TO MATHEMATICS PERFORMANCE IN ONLINE LEARNING</u>

Motivation						
Items						
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	**Descriptive Rating**
1	3	3	1	4	4	Good
2	3	4	1	4	1	Fair
3	3	3	1	4	1	Fair
4	3	3	1	4	4	Good
5	3	4	1	4	4	Good
6	3	4	1	4	4	Good
7	3	3	1	4	1	Fair
8	3	3	1	4	1	Fair
9	3	4	1	4	1	Fair
10	3	3	1	4	4	Good
11	3	3	1	4	1	Fair
12	3	4	1	4	4	Good
13	3	4	1	4	1	Fair
14	3	4	1	4	4	Good
15	3	4	1	4	1	Fair
16	3	4	1	4	4	Good
17	3	4	1	4	4	Good
18	3	4	1	4	1	Fair
19	3	3	1	4	4	Good
20	3	4	1	4	1	Fair

Self-efficacy						
Items						
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	**Descriptive Rating**
1	3	4	1	4	4	Good
2	3	3	1	4	1	Fair
3	3	3	1	4	4	Good
4	4	4	1	4	4	Good
5	3	3	1	4	4	Good
6	3	3	1	4	4	Good
7	4	4	1	4	4	Good
8	4	4	1	4	4	Good
9	3	4	1	4	4	Good
10	3	4	1	4	4	Good
11	3	3	1	4	4	Good
12	4	4	1	4	4	Good
13	4	3	1	4	1	Fair
14	3	4	1	4	1	Fair
15	4	3	1	4	4	Good
16	3	3	1	4	4	Good
17	4	4	1	4	4	Good
18	4	3	1	4	4	Good
19	4	4	1	4	4	Good
20	3	3	1	4	1	Fair
21	4	4	1	4	4	Good

Panel of Validators:

Validated by: _____ , Enc... Position of Validator: _____

Signature over Printed Name

Date of Validation: 4.12.22

Validated by: DR. LAARNI T. EVANGELID Position of Validator: INSTRUCTOR

Signature over Printed Name

Date of Validation: APRIL 12, 2022

Validated by: _____ Position of Validator: _____

Signature over Printed Name

Date of Validation: _____

Copyright: rpvillocino, EdD

Validated by: RUEL R. VILLOCINO, EdD Position of Validator: DEAN

Signature over Printed Name

Date of Validation: 04/12/22

Validated by: PATRIK C. PAINAGA, Ph.D Position of Validator: part time profess

Signature over Printed Name

Date of Validation: April 12, 2022

5 experts rated 3 or 4-Excellent
4 experts rated 3 or 4-Good
3 experts rated 3 or 4-Fair
2 experts rated 3 or 4-Discard

Appendix F
Summative Test TOS

TABLE OF SPECIFICATIONS

| Program/Major | BSED - MATHEMATICS | | Course Code & Title | MATH 16 – MATHEMATICS OF INVESTMENTS |

Content/Topic	No. of Hours	Type of Test	No. of Items	Item Placement / Location						Total	%
				Remember	Understand	Apply	Analyze	Evaluate	Create		
Simple Interest	6	Multiple Choice	15	1,2,3	4,5,6	7,8,9	10,11,12	13,14,15		15	1/3%
Simple Discount Notes	6	Multiple Choice	15	16,17,18	19,20,21	22,23,24	25,26,27	28,29,30		15	1/3 %
Basic Concept of Compound Interest	6	Multiple Choice	15	31,32,33,	34,35,36	37,38,39	40,41,42	43,44,45		15	1/3%
Overall	18		45	9	9	9	9	9	0	45	100%
Percentage	100 %		100 %	20%	20 %	20%	20 %	20%	0%	100 %	100 %

Prepared by: <u>JAYSON KITTS C. POQUITA</u>

Appendix G
Survey and Test Results

Respondents	Motivation															
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
1	4	4	4	4	2	3	3	4	3	3	4	3	4	4	4	4
2	3	3	4	4	3	3	4	4	4	3	3	3	4	3	3	3
3	4	4	4	4	1	1	1	1	1	2	1	1	1	3	2	1
4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4
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6	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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Respondents	Self-Efficacy																
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Mathematics Performance Respondents	Scores
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Appendix H
Photo Documentation