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FACTORS AFFECTING COLLEGE STUDENTS' PERFORMANCE IN THE APPLICATION OF NUMERACY MODULES: A CONCEPTUAL FRAMEWORK

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ABSTRACT

This conceptual paper explores the factors that potentially influence the performance of first-year students in the Numeracy Module at a higher education institution in Oman. Focusing on key variables such as demographic characteristics (age and gender), teaching methods and quality, academic support, the learning environment, and employment status, the paper provides a theoretical framework to understand how these elements affect student outcomes. Drawing on existing literature and theoretical models, this study aims to offer insights and propose strategies for enhancing numeracy education within the Arab educational context. The findings and recommendations will guide educators, curriculum developers, and policymakers in fostering more effective learning environments that better prepare students for academic and professional success.

Keywords: Numeracy Modules, Student performance, learning environment, academic support, teaching methods and quality, employment status, Arab Education Context. Higher Education, Conceptual Framework.

INTRODUCTION

Students' performance is among higher education's most frequently used terms (Hamoud *et al.,* 2018). It judges the educational institution (Rahman & Islam, 2017), the teacher's capability, qualifications, and performance (Caprara *et al.,* 2006; Buddin & Zamarro, 2009), and students' readiness and performance (Asamsama *et al.,* 2016). From the student's side, the literature identified the main student-level variables, which include teaching methods and quality (Ozer & Beycioglu, 2010), learning environment (Dorman, 2001), age (Richardson *et al.,* 2012), gender (Voyer & Voyer, 2014), employed students (Wenz, M., & Yu, 2010), and academic support (Habley & McClanahan, 2004). The student-level model takes these characteristics as fixed effects and predicts students' final performance in higher education, measured by AGP, retention, and withdrawal (Mishra & Agrawal, 2022; Friedman & Mandel, 2011; Mehra, 1973). These variables and concepts have been extensively studied, but there is no agreement on one model of the factors that make some students do better than others in reading this course. On the other hand, measuring students' performance can be done in different ways, for example, Academic Achievement (passing and failure rate, retention, withdrawal, understanding of course material) (Pascarella & Terenzini, 2005; Robbins *et al.,* 2004), Study Habits (Nonis & Hudson, 2010; Crede & Kuncel, 2008), Self-Efficacy and Motivation (Multon *et al.,* 1991; Pintrich *et al.,* 1990), and Feedback Utilization (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006). However, this paper outlines the approach to investigate the factors that may affect students' performance in the Numeracy Module. The section defines the background, problem-stated, study objective, research questions, research scope, and significance of the study. Additionally, different approaches were revealed and considered in the consultation, enabling us to solicit more informed views that contribute insight into the factors affecting students' performances. The research approach also outlines the approach and research strategy based upon investigation by employing quantitative survey analysis techniques. This is quite useful and appropriate for understanding the factors in depth.

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Background of the Study

This study's fundamental idea concerns first-year students' Numeracy performance. The starting point of any programmes running in the college under the Department of Business and Management Studies is fundamental modules in IT, English, academic skills, and Numeracy. Based on more rules and regulations, the students must begin studying at Level 3 and continue to study at Level 4 to earn a diploma, up to Level 5 to earn a higher Diploma, and to 6 to award a bachelor's degree. However, students must complete the Relevant Numeracy course in the Numeracy module at Level 3 in the first year. However, the "application of Numeracy" module aims to identify and fill gaps in students' Numeracyal knowledge and build confidence in the subject area. This module will allow time to locate and correct previous Numeracyal knowledge misunderstandings and develop an understanding of numeracy applications, including problem-solving, using real-world examples. However, this module is considered critical for the students in the first year. Literature in the Arab region showed that Numeracyal modules are one of the critical modules for university students (Waswa & Al-kassab, 2022; Moussa, N. M., & Saali, 2022; Jarrah, 2020; Al-Khateeb, 2017).

Research Problem

Studies showed that the numeracy module is critical as Numeracy is the stepping stone for students' analytical and problem-solving abilities (Pagliaro & Thom, 2021), which are essential in academic and professional settings (Wake, 2014). In first-year college, the acquired Numeracy skills are fundamental for success in subsequent courses and their role in practical decision-making in students' everyday lives and professional tasks (English & Gainsburg, 2015).

Numeracy is a significant and challenging subject in many Arab countries as it may result in students' stress, tension and decreased performance (Waswa & Al-kassab, 2022; Moussa & Saali, 2022). This situation is relevant in a diverse educational setting where students come from various backgrounds. Thus, their readiness for university-level Numeracy varies significantly (Alreshidi, 2016). On the same vein, Jarrah's (2020) study showed that the variations in students numerical readiness reflected to the academic performance easily, which supported by other studies which emphasize on the important of different factors on their roles in students' numerical performance. These studies highlighted that teaching methods and quality (**Zhu & Kaiser, 2022)**, learning environment (**Immordino-Yang et al., 2019)**, academic support (Tinto, 2012) are key factors that affect students' performance (Al-Khateeb, 2017), while other studies (Yousef , 2019; Abu-Hilal *et al.,* 2016; Abdullah, 2011) added the demographic characteristics if students (i.e., age and gender) Different literature indicated the role of teachers in employing effective teaching strategies that meet students' diverse learning needs (Awang-Hashim *et al.,* 2019). These studies showed a significant impact of teaching methods and quality on students' performance (Okwuduba & Okigbo, 2018). On the other hand, academic support from the lecturer plays a major role in enhancing the effectiveness of Numeracy education (Tinto, 2012); academic support activities include tutorials, class activities, and continuous mentoring and follow-ups (Manzar-Abbass *et al.,* 2017; Walsh *et al.,* 2009). However, studies showed that such academic support activities could bridge the gaps between students' understanding and academic performance (Stephens *et al.,* 2014).

It can be concluded from Arabic studies that numerical modules in the Arab countries faces different challenges in terms of teaching, support activities, and learning environment that need to be addressed by developing comprehensive approaches that take into account the previous issues (Ibrahim & Alhosani, 2020; Hitt *et al.,* 2014). Based on previous studies, it can be concluded that teaching methods and quality of teaching, academic support, self-motivation, learning environment within classrooms, demographic characteristics (i.e., gender and age), parental socioeconomic status, working students, and accommodation type are among the major factors that showed significant effects (Goldrick-Rab *et al.,* 2016; Voyer & Voyer, 2014; Richardson et al., 2012; Wenz *et al.,* 2010; Ozer & Beycioglu, 2010; Weaver & Qi, 2005; Habley & McClanahan, 2004; Dorman, 2001).

This research aims to identify the factors that may affect students' performance in applying the numeracy module. However, the education system in Oman is trying to find ways to improve the quality of human capital, which corresponds to the effectiveness of educational programs (Abdeldayem *et al.,* 2021). The educational system faces significant challenges in providing quality education to the country's students. The success of the national development program hinges upon a capable workforce in the real world and the educational system (OECD, 2023; World Bank, 2023). Numeracy education, one of the basic competencies that builds upon formal schooling, is a significant component in preparing students for the grown-up world (UNESCO, 2023).

Purpose of the Study

Most researchers have demonstrated that performance in mathematics courses is of crucial importance for success in undergraduate statistics courses. A series of reforms led to a Mathematics Diagnostic Test, which has been run annually since 2015. The intention of the test is to assess the readiness of the first-generation entrants mathematically. The reliance on traditional assessment resulted in large-scale, low-stakes testing with limited scope, mainly focusing on manipulating algebraic expressions, lines, and graphs. Further, an external scoring of multiple-choice items poses additional doubts on the comparability of results. The empirical performance benchmarks are provided based on the test data imposed on nearly 2000 first-year students. However, care has to be taken when applying these. Moreover, the growing popularity of remote open-take testing and interactive teaching has changed how to deal with mathematics in higher education to ensure accessibility (van der Merwe *et al.,* 2020).

The present study attempts to investigate the factors affecting students' performance in applying a prescriptive numeracy module. It aims to compare the learners' demographic characteristics as performance predictors. The factors will include the learners' attitude, psychometric profile averages, the learners' prior mathematics experience, the environment in which the learners completed the module, the hours spent on the module, and the multicultural background of the learners as moderating variables. A secondary focus will also be on the Performance, Movement and Change intervention. The latter intends to address more positional skills, as well as movement, notion and concept skills. Performance did not significantly differ between Asia Pacific and South Africa, especially with regard to the Number of operations clusters (Pizon & Ytoc, 2021). However, it is notable that in Year 3, Asian-Pacific learners overall performed better than their South African-matched counterparts in Spatial skills.

The current study aims to investigate the various factors that may affect students' performance in the application of the numeracy module. The current study aim will be achieved through the following objectives:

1. Defining the demographic characteristics (Age and Gender) of the students and their impact on performance.
2. Theorizing the relationships between teaching methods and quality, academic support, learning environment, students' demographic variables, employment status, and student performance.
3. Proposing a new framework for understanding the interaction between teaching methods and quality, academic support, learning environment, students' demographic variables, employment status, and student performance without collecting and analyzing data.

Significance of the Study

This study aims to:

1. Develop a theoretical model to explain the impact of teaching methods and quality, academic support, employment status, learning environment, and demographic factors on students' performance in numerical modules.
2. Propose a conceptual framework to understand the roles of conceptual variables in enhancing students' academic performance in numerical models, specifically in the Arab context.
3. Theorize the relationships between model variables.
4. Provide recommendations for educators, the programme team, and decision-makers on improving the learning environment, academic support, teaching methods, and quality to enhance students' performance in numerical modules.

LITERATURE REVIEW

This section presents an analysis of previous relevant literature and studies related to the present paper. Galligan (2011) defined numeracy as the ability of the students to understand and work with numbers, and its application for enhancing their academic and non-academic life and support life-long learning (Ozola & Aļeksējeva, 2012). However, the literature emphasizes the significance of numeracy skills for the students specially for enhancing their performance in their specialization areas such as business and management (Wedage *et al.,* 2016), accounting and finance (Boateng, 2015), and business economics (Arnold & Straten, 2012). Meanwhile, other studies indicated that factors like teaching methods and quality, learning environment, academic support significantly impact students' performance in the numerical modules (Rienties & Toetenel, 2016). While previous studies have focused on students' performance in numeracy modules, there has been few studies exploring the impact of study factors on students' performance specifically in Arab context. Moreover, there is no studies measuring the mediating impact of employment status on students' performance. Based on the literature, a theoretical framework has been developed in this study to investigate the impact of study variable son students' performance, specifically in the numeracy module, to support the academia and decision-makers in the academic institutions with findings that help them in shaping their strategies and developing actions plans for benefiting their students and education system.

Definition of Numeracy

Numeracy is briefly defined as the ability to work with numbers and understand and apply mathematical concepts in the real world. The word "numeracy" can be found in a number games website in the following definition: Numeracy is the ability to work comfortably and accurately with numbers, especially in an everyday context; it is the ability to interpret numerical representations (J Forgasz *et al.,* 2017). Interestingly, while numeracy is often perceived as mathematical skills and knowledge, many aspects of it are not considered mathematical at all. The handling of physical objects, the awareness of space and direction, the keeping track of things and people, the understanding and controlling of money and time, and the recognition of power and odds are all aspects of numeracy which are common to most human groups, and which are not easily expressed in mathematical terms (Wilkins, 2016).

A basic understanding of numeracy therefore has to take into consideration not just the mathematical aspects of the word. However, since the question is posed in a very mathematical term, a brief mathematical definition has to be provided. In this sense, a person's numeracy is her level of competence with mathematical methods and results. This is merely a numerical estimate or an approximation of a person's mathematical capability. Basic numeracy would require adding, subtracting, multiplying and dividing reasonably small natural numbers. A higher level of numeracy would require knowledge of geometry, trigonometry, and maybe even calculus. Notably, modern numeracy tests often include mathematical treatments of statistics and financial mathematics, once regarded as higher mathematics.

Importance of Numeracy in College Education

Numerical abilities are integrated into the university and college curriculum (AR *et al.,* 2024) and are considered essential skills for employment for graduates, meaning they should not only have expertise in their field but also possess the generic skills required in professional settings (Damoah *et al.,* 2021). Literacy and numeracy skills are crucial for students at all levels of education, regardless of their areas of study (Gunderson *et al.,* 2017; Ball *et al.,* 2014). Research indicates that students lacking these skills may face barriers in accessing education equally (Melhuish *et al.,* 2008). Therefore, it is important for all students to be actively supported in developing their numeracy skills (Federici *et al.,* 2016) in order to become proficient problem solvers with a deep understanding, knowledge of strategies, a calm demeanor, and an optimistic outlook towards problem-solving (Peter, 2012).

Previous Studies on Numeracy and Student Performance

In 2007, Australia's science deans unanimously stated that Science and Numeracy are crucial for the country's future. To thrive, Australia will need a workforce that is proficient in science and numeracy (Wilkins, 2016). Numeracy, which refers to the confident and effective use of numbers in daily life (Goos *et al.,* 2011), is best developed by teaching it in real and relevant contexts (Geiger *et al.,* 2015; Kissane, 2012). However, Gleeson *et al.,* (2019) noted that many tertiary business students have poor numeracy skills upon entering university. There has been a widespread lack of skills in measurement, probabilities, percentage problems, and other business math analysis across various disciplines (Kohen & Orenstein, 2021; Fayyad & Hamutcu, 2020). Different studies focused on investigating the impact of teaching methods and quality, learning environments, demographic variables and academic support on students' performance. However, the majority of these studies indicated the significant impact of these variables on students' performance in numeracy modules (Ibrahim & Alhosani, 2020; Yousef, 2019; Rizvi *et al.,* 2019; Lovat & Darmawan, 2019; Aransi, 2018; Amro *et al.,* 2015). Meanwhile, other studies focused on students' employment status and its impact on their performance. Simón *et al.,* (2017) and Carney *et al.,* (2005) showed that employment status positively impacts students' performance. Their studies highlighted that employment reflected on their commitment and motivation compared with non-employed students (Grozev & Easterbrook, 2022; Peak, 2019). Furthermore, similar findings were obtained by studies in Arab context (Hanaysha *et al.,* 2023; Khalil & Aldridge, 2019).

THEORETICAL FRAMEWORK

The researchers in the current study aimed to develop a theoretical framework that employed different factors to determine their impact on students' performance. This framework focused on five specific factors. However, the theoretical framework will incorporate elements from previous studies, such as teaching methods and quality, learning environment, demographic factors, academic support, and employment status, to develop a comprehensive model for understanding how students perform using numeracy modules.

It is important in the academic field to study student performance (Bunce *et al.,* 2017) in order to evaluate teaching effectiveness (Marzano & Toth, 2013), academic curriculum, overall program (Rao *et al.,* 2017), lecturer capabilities (Darling-Hammond, 2013), in addition to student capabilities (Allensworth *et al.,* 2018). However, the literature indicated that teaching methods and quality have a significant impact on students' performance (Ambayon & Millenes, 2020). Authors in the academic field discussed that effective teaching includes giving learners clear, relevant instruction, and adopting appropriate teaching strategies and methodologies suitable for learners' abilities and capabilities levels (Stronge *et al.,* 2011). Additionally, Turhan *et al.,* (2019) added the ability and roles of tutors in inspiring and motivating their students. Accordingly, the current

study claims that teaching methods and quality can positively and significantly impact students' performance.

Also, different studies indicated the significant impact of the learning environment on students' academic performance (Malik & Rizvi, 2018). Positive and effective learning environments include using technologies and platforms (Moreno *et al.,* 2017) and collaborative and interactive teaching approaches (Aiken *et al.,* 2005). Thus, the current study and based on previous studies suggest that having a positive teaching environment supported by adapting technologies can positively impact students' performance. Moreover, factors such as age, gender (Ibrahim & Alhosani, 2020; Yousef, 2019; Rizvi *et al.,* 2019), and employment status (Simón *et al.,* 2017; Carney *et al.,* 2005) have been addressed and highlighted as significant factors influencing students' academic achievement. For that, the current study aims to investigate the impact of these factors on students' performance in the application of the numeracy module.

However, the comprehensive model developed in the current study aims to integrate the factors mentioned above to examine their combined effects on student performance. This approach, grounded on different relevant studies, considered that student performance is influenced by not focusing on students' cognitive abilities but moving the focus on the environmental, educational, and socio-demographic factors. Thus, the theoretical framework can enhance the understanding of how different factors affect student performance, providing insights for educators and decision-makers to develop new strategies and action plans for improving students' academic success in the numeracy module.

Cognitive Theories of Learning

Cognitive theories of learning aim to understand the mental processes that impact student learning (Shuell, 1989). Understanding these theories offers the researcher valuable insight into the mechanisms of learning pertinent to student performance (Pintrich, 2003). In terms of numeracy, grasping the cognitive processes involved in learning and intervention tasks is crucial to understanding how individual differences in performance can emerge and how performance can be improved. The nature and mechanisms of cognitive control are not fully understood (Botvinick & Braver, 2015), as this cognitive processing involves coordinating and monitoring cognitive processes (Quinlan *et al.,* 2012).

Mathematical Self-Efficacy Theory

Mathematical self-efficacy theory is based on the Bandura's social cognitive theory (Grigg *et al.,* 2018).This theory involves a learners' confidence in their ability to accomplish a specific task and subject (Schunk, D. H., & DiBenedetto, 2016), in addition to the impact of learners' effort and mental involvement in accomplishing the task or subject (Schunk *et al.,* 2016). Positive self-efficacy beliefs increase confidence in using mathematics daily, while negative beliefs can lead to avoidance or disengagement in math-related tasks. Self-efficacy reinforces cognitive factors and task-related goals, maintains effort and persistence over time, and can be applied to similar tasks. It is developed through experience with math-related tasks and is influenced by various factors such as encouragement from others, feedback on math performance, observing others successfully tackling math-related activities, and perceiving negative feedback as just a natural part of life's imperfections. However, this theory significantly influences how well students perform and is connected to their own expectations and a two-step process for making decisions (Omar *et al.,* 2019). In the first step, students evaluate their own performance in a specific task, and in the second step, they act according to those beliefs. This means that students who have low expectations may have trouble achieving success. In terms of numeracy, self-efficacy is demonstrated through confidence and skill in using numerical methods, thinking through numerical problems, doing mathematical calculations, and working with statistics (A Fleurizard & R Young, 2018; Yu *et al.,* 2023)

RESEARCH METHODOLOGY

This section is aimed to discuss the research approach and design. Also, a discussion of the model development and relevant hypotheses were included.

Research Design

The conceptual research design is used in the current study to examine the impact of five factors (four independents and one mediator) on students' performance in the "application of numeracy" Module. However, this research design allows the researcher to identify the variables that can significantly affect students' performance (Van der Waldt, 2020), in addition to explaining the relationships among the study variables (Ngulube *et al.,* 2015). Moreover, it develops a theoretical framework that can be successfully evaluated in future studies (Kivunja, 2018).

Research Approach

The researchers in the current research developed their study based on cognitive and Self-Efficacy theories. These theories provide an in-depth understanding of the learning process and the various factors that impact students' performance, helping the researcher develop the model and relevant hypotheses. However, the key relevant theories that support the research are the Cognitive Theories of Learning and Mathematical Self-Efficacy Theory, which offer valuable insight into how students can gain and improve their numerical skills through the learning process (Simamora & Saragih, 2019), as these theories give a strong foundation for examining the main influencing elements in numerical learning (i.e., cognitive, emotional, and environmental elements) (Grigg *et al.,* 2018). However, the conceptual framework developed in this study aims to help courseware developers adjust their curriculums in a way that best fits learning environments, in addition to helping the decision-makers and lecturers understand the main factors that impact their students' performance, specifically in numerical modules. The researcher in the current study aimed to develop a conceptual approach to bring existing knowledge and theoretical perspectives together to come up with a new insight into the research problem. This approach identified the main critical variables, such as teaching methods and quality, learning environment, demographic factors, academic support, and employment status, in order to understand students' performance in the "application of numeracy" Module.

Research Model and Hypothesis

The study framework includes five key factors, namely demographic factors (age, gender), teaching methods and quality, educational support, employment situation, and learning environment, in order to explain how these factors can impact and affect students' performance in the "application of numeracy" module. This framework is rooted in previous studies and literature related to the same field. However, the research variables are four variables that work as independent (students' demographic characteristics, teaching methods and quality, learning environment, and academic support) and one mediator (employment status) in addition to one dependent (students' performance). Based on previous studies and literature, the

researchers addressed that these variables have been found to have a significant impact on student performance in various disciplines. Therefore, the researcher developed a model that aims to investigate the impact of the selected variables on students' performance (Figure 1.1).

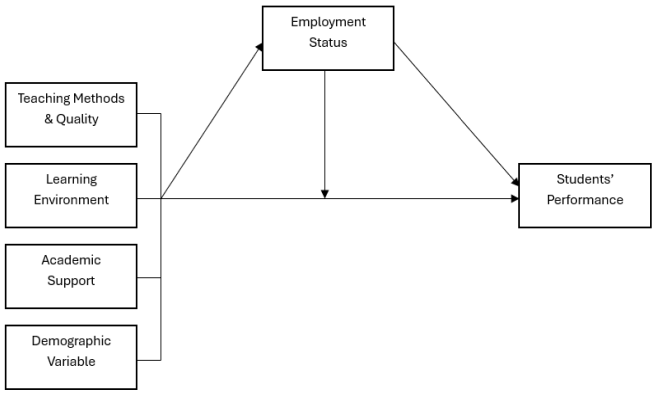

Figure 1.1: Research Model developed by the researchers

(a) The relationship between Students' Demographic Characteristics and Performance

Demographic characteristics (age and gender) are considered the main variables that are related to students' performance in the academic field (Aransi, 2018; Eze *et al.,* 2015). However, two demographic variables were selected in this study as previous studies significantly affected students' performance and success. The study by Richardson *et al.,* (2012) showed a substantial effect of age and gender on students' performance. These findings were also supported by Aransi's (2018) and Voyer and Voyer's (2014) studies, where their findings indicated the impact of age and gender on students' performance and outcomes. Moreover, these studies also showed that older students are more engaged and committed to their studies than younger students. Additionally, the study (Mwingi, 2014) concluded that gender effects varied due to the subject; his study showed that male students performed much better than female students in science subjects, while girls performed better in languages. Other studies showed that female students outperformed males in different subjects (Parajuli & Thapa, 2017) in everyday situations, while males outperformed females under pressure (Montolio & Taberner, 2021).

Differently, the study (Dania, 2014) showed no significant effect of gender on students' achievement in Social Studies subjects. However, based on previous studies, it can be concluded that differences in gender impact could be associated with variations in cognitive development, subjects, teaching quality and methods, and life experiences. Accordingly, recognizing the impact of demographic factors (age and gender) is essential in designing a theoretical framework. Based on the above studies, this study hypothesizes that:

H_1: There is a significant relationship between Students' demographic characteristics (age and gender) and their performance in the Numeracy Module

(b) The relationship between Teaching Methods and Quality and students Performance

Different studies have widely discussed the impact of teaching methods and the quality of teaching on students' performance. For example, studies by Caprara *et al.,* (2006) and Hattie (2009) showed that adopting successful teaching methods (clear communication, students' engagement, flipping classrooms, motivating students) is directly connected with better student performance. Another study by Bakare and Orji (2019) proved that instructional support employed by tutors significantly contributed to learners' performance and success. Moreover, enhancing students' participation, using collaborative teaching, and integrating technology in teaching are also reported in many studies (Martin, 2022; Dahri *et al.,* 2021; Schwallier, 2016; Nickel, 2010). Therefore, this study hypothesizes:

H_2: Teaching methods and quality positively impact students' performance in the Numeracy Module.

(c) The relationship between Academic Support and Student Performance

Support services such as tutoring, mentoring, and counselling significantly enhance the educational system. Research by Hably and McClanahan (2004) suggests that these services can aid students in overcoming challenges in understanding course materials, leading to improved academic performance. In the context of numeracy education, additional support can be particularly beneficial in helping students grasp abstract concepts and develop their skills. Furthermore, robust academic support mechanisms can also contribute to boosting students' self-efficacy, in line with Bandura's social cognitive theory, by increasing their confidence in dealing with complex numerical tasks (Bandura, 1997). Therefore, the third hypothesis is:

H_3: Academic support positively influences students' performance in the "Application of Numeracy" Module.

(d) The relationship between Employment Status and Students' Academic Performance

Literature showed a positive impact of employment status on students 'performance. Academic performance. The studies of Wenz & Yu (20100 and Carney *et al.,* (2005) showed that students who have a job and work during their academic journey may be struggling to find an appropriate balance between their job responsibilities and their academic commitments and responsibilities, which can lead to time constraints, less studying hours, more stress, which led to a negative impact on their academic performance. Differently, Grozev & Easterbrook's (2022) study showed that employed students may have more time management skills and a greater sense of responsibility, which led to more outstanding academic commitment, engagement and performance. Similarly, Simón *et al.,* (2017) added that worker students are more motivated thannon-workers. However, other studies such as Parvizi *et al.,* (2021), Salley, W., & Shaw (2015) showed the positive impact of employment status on students; performance. This study examines the effects of employment status on students' academic performance. Therefore, the hypothesis is:

H_4: Employment status significantly affects students' performance in the "Application of Numeracy" Module compared to non-employed students

(e) The relationship between Learning environment and Students Performance

The learning environment is a critical and complex concept that significantly affects the teaching process and learners (Sinakou *et al.,* 2019). The learning environment includes classroom facilities and resources (Hanaysha *et al.,* 2023), the psychological environment, the social and cultural environment (Shmeleva *et al.,* 2015), and the interaction between students and teachers (Fraser & Walberg, 2005). These factors showed a significant role in influencing students' performance. Different studies in the same field emphasized the

importance of having a supportive and well-structured learning environment for enhancing students' academic performance. Literature shows that a positive learning environment can assist students in acquiring knowledge and applying this knowledge effectively (D'Souza *et al.,* 2013). Thus, based on the previous studies and literature, the hypothesis is:

H_6: The learning environment in the classroom significantly enhances students' performance in the "Application of Numeracy" Modules

(f) The mediating impact of Employment Status on the relationship between Teaching Methods and Quality and Students Performance.

The quality and methods of teaching adopted by lecturers directly affect students' engagement, motivation, and attraction, thus enhancing their performance (Zainuddin, 2018; Taurina, 2015). On the other hand, literature shows that working students could have different opinions on the teaching methods and quality due to time constraints and stress (Triventi, 2014). Triventi's study indicated that working students have different perceptions and experiences on teaching methods and quality used by their tutors as those students are asking for more flexibility in teaching methods as well as preferring more practical and direct applications. The same findings were concluded by previous studies by Robotham (2009) and Carney *et al.,* (2005). These two studies concluded that working students experience high levels of work and family stress and more time constraints than non-worker students, and due to that, they demand more flexibility, direct and more accommodating with their scheduling and time constraints. Moreover, the two studies also showed that working students are more committed to their studies, and their performance is usually much better than non-worker students. In the Arab context, few studies have addressed this point. One Arabic study in KSA for Al-Ahmadi (2015) showed that part-time students face more challenges and circumstances that require them to balance their responsibilities and studying, leading to increased stress. The study also concluded that Arab worker students have different perceptions of teaching methods, quality, and methods, demanding more flexibility and class activities in addition to concentrating on the application part of their curriculum.

Therefore, it can be concluded that employment status could influence the students' perception of teaching methods and quality, thus impacting their academic performance. Thus, the hypothesis is:

H_7: Employment status positively mediates the relationship between "teaching methods and quality" and students' performance in the Application of Numeracy Modules

(g) The mediating impact of Employment Status on the relationship between Learning Environment and student performance.

Literature on the educational field showed the impact of employment status on the learning environment and students' performance. However, several studies showed that working students require a different learning environment than non-worker students (D'Aloisio, 2020; Manthei & Gilmore, 2005). Based on their conclusion, it was suggested that more supportive learning environments, such as online classes, increased library hours and activities, and using technology and digital platforms. Moreover, Callender and Wilkinson's study (2013) found that employment status significantly influences how students perceive, engage and interact with learning environments. Additionally, their study suggests that employment status could act as a mediator factor as it may alter how students interact with their educational system as well as how they manage their academic responsibilities. Furthermore, similar findings were obtained by Robotham study. Robotham's (2012) study showed that employment status moderates the relationship between the learning environment and student performance. The study highlighted that working students are more likely to have stress and fatigue compared with non-worker students, which can limit their ability to engage in academic activities effectively. However, the study concluded that academic institutions need to consider students' employment status while designing learning environments in order to enhance and support students' performance.

In the Arab context, Hanaysha et al. (2023) study found that the learning environment and facilities significantly impact student engagement, participation, commitment and performance. The study also concluded that employment affects students' positive involvement and experience. Therefore, based on previous literature, the current study hypothesizes that:

H_8: Employment status positively mediates the relationship between the learning environment and students' performance in the Application of Numeracy Modules.

5.3.1 (h) The mediating impact of Employment Status on the relationship between Students' Demographic Characteristics and Performance.

Many studies in the academic field showed that students' demographic variables, Age and gender specifically, affect students' performance and success (Richardson *et al.,* 2012; Voyer & Voyer, 2014). However, in the case of working students, Beerkens *et al.,* (2011) study concluded that students' employment status partially mediates the relationship between demographic factors and their academic performance. Oppositely, the study of Hovdhaugen (2015) showed that older working students face risks and academic difficulties, which may lead to withdrawal and dropout of modules. Another study by Nonis, S. A., & Hudson (2010) showed that female working students tend to have better academic performance than male working students. Similarly, Curtis, S., & Shani (2002) study showed that female working students maintain higher grade points than male working students. However, studies in the Arab context showed that gender and employment status can influence students' outcomes and performance (Alreshidi, 2016; Saleh & Al-Salmi, 2024). Therefore, the study hypothesizes:

H_9: Employment status mediates the relationship between Students' demographic variables (age and gender) and students' performance in the Numeracy Module.

(i) The mediating impact of Employment Status on the relationship between Academic Support and student performance.

Academic support services, such as class activities, tutorials, discussion groups, and mentoring, are crucial for students' performance and success (Collings *et al.,* 2014; Bettinger *et al.,* 2013), specifically in numerical subjects (Habley & McClanahan, 2004).

However, the study by Cheng & Alcántara (2007) examined students' employment effects on using academic support services and their impact on academic performance. The study concluded that working students are less engaged in different support activities (discussion

groups, homework, class activities and tutorials, and library tasks) due to time constraints, negatively impacting their academic performance. Also, employment status mediated the relationship between students' accessibility to academic support and its impact on their performance. The findings showed that working students often struggle to balance their work commitments and being active with the academic support system. Newer studies also find similar results. For example, Kim and Tamborini's (2019) study showed a negative impact of students' employment status on their effective use and utilisation of academic support services due to time constraints and mental energy.

However, the previous studies agreed that working students may struggle to find time to utilize academic resources effectively and may prioritize their jobs over academic support (Darolia, 2014; Riggert *et al.,* 2006). These findings support the call for offering flexible academic support services (such as online platforms) that consider students' employment status and lead to enhanced academic performance. In the Arab context, Al-Khateeb (2017) and Alkhateeb (2023) studies emphasized the significance of support systems in education in the Arab region, where tailored assistance for employed students could enhance their numerical abilities. Taking into account the discussion above and literature, the hypothesis is:

> ***H_{10}: Employment status mediates the relationship between academic support and students' performance in the Numeracy Module***).

CONCLUSION

This conceptual paper has identified and examined the critical factors that influence students' performance in the Numeracy Module, emphasizing the significance of a well-rounded approach that considers both individual and contextual variables. The proposed theoretical framework highlights the interplay between demographic characteristics, teaching quality, academic support, and the learning environment, with a particular focus on the mediating role of employment status. By addressing these factors within the Arab educational context, the paper provides valuable insights for stakeholders aiming to enhance numeracy education. The conclusions drawn underscore the need for strategic interventions that cater to the diverse needs of students, thereby promoting better academic outcomes and equipping students with the necessary skills for their future academic and professional endeavors.

REFERENCES

Abdeldayem, M. M., Aldulaimi, S. H., & Kharabsheh, R. (2021). Development of human capital resources to increasing economic growth and innovation in the GCC Countries. International Journal of Green Management and Business Studies, 1(1), 62-79.

Abdullah, A. M. (2011). Factors affecting business students' performance in Arab Open University: The case of Kuwait. International Journal of Business and Management, 6(5), 146.

Abu-Hilal, M. M., Aldhafri, S., Al-Bahrani, M., & Kamali, M. (2016). The Arab culture and the Arab self: Emphasis on gender. The Psychology of Asian Learners: A Festschrift in Honor of David Watkins, 125-138.

Ahmad, M. F., & Zayed, K. (2023). Numeracy education in the Middle East: Challenges and opportunities. Middle East Journal of Education, 29(2), 58-72. Available at Middle East Journal of Education.

Aiken, R. M., Bessagnet, M. N., & Israel, J. (2005). Interaction and collaboration using an intelligent collaborative learning environment. Education and Information Technologies, 10, 67-82.

Akpan, J. P., & Beard, L. A. (2016). Using constructivist teaching strategies to enhance academic outcomes of students with special needs. Universal Journal of Educational Research, 4(2), 392-398.

Al-Ahmadi, Khalid. (2015). "The Impact of Part-Time Employment on University Students' Academic Performance: A Case Study of King Abdulaziz University." *Journal of Educational and Psychological Sciences*, 12(1), 88-102.

Alkhateeb, H. M. (2023). Numeracy anxiety among students in the Arab world: Causes, effects, and solutions. Journal of Education and Practice, 14(5), 21-35. Available at Journal of Education and Practice.

Al-Khateeb, M. A. (2017). Factors influencing students' Numeracyal achievements. *Journal of Institutional Research South East Asia, 15*(2).

Allensworth, E. M., Nagaoka, J., & Johnson, D. W. (2018). High School Graduation and College Readiness Indicator Systems: What We Know, What We Need to Know. Concept Paper for Research and Practice. University of Chicago Consortium on School Research.

Alreshidi, N. A. K. (2016). Investigating problem-based learning in Saudi Arabian Numeracy education: a TIMSS-related study. *Doctoral dissertation, University of Glasgow*.

Ambayon, E. E., & Millenes, C. (2020). Modular-based approach and students' achievement in literature. Available at SSRN 3723644.

Amro, H. J., Mundy, M. A., & Kupczynski, L. (2015). The effects of Age and Gender on student achievement in face-to-face and online college algebra classes. Research in Higher Education Journal, 27.

Antonenko, P. D. (2015). The instrumental value of conceptual frameworks in educational technology research. Educational Technology Research and Development, 63, 53-71.

AR, M. M., Asmoni, A., Aini, K., & Wardi, M. (2024). The Relationship of the 5th Batch Campus Teaching Program to Literacy and Numeracy Skills in Elementary Schools. AL-ISHLAH: Jurnal Pendidikan, 16(2), 1999-2011. staihubbulwathan.id

Aransi, W. O. (2018). Impact of age and gender on high school students' academic performance in economics: a case study analysis. *International Journal for Innovative Research in Multidisciplinary Field, 4*(1), 8-15.

Arnold, I. J., & Straten, J. T. (2012). Motivation and math skills as determinants of first-year performance in economics. The Journal of Economic Education, 43(1), 33-47.

Asamsama, O.I.P.H., Mayo, D., Stillman, J., Mathews, C., Schnorr, D. and Nelson, B., 2016. Predictors of high school students' performance and college readiness. Journal of Educational Research and Innovation, 5(1), p.3.

Aunio, P., & Räsänen, P. (2016). Core numerical skills for learning Numeracy in children aged five to eight years–a working model for educators. European early childhood education research journal, 24(5), 684-704.

Awang-Hashim, R., Kaur, A., & Valdez, N. P. (2019). Strategizing inclusivity in teaching diverse learners in higher education. Malaysian Journal of Learning and Instruction, 16(1), 105-128.

Bakare, J., & Orji, C. T. (2019). Effects of reciprocal peer tutoring and direct learning environment on sophomores' academic achievement in electronic and computer fundamentals. Education and Information Technologies, 24(2), 1035-1055.

Ball, J., Paris, S. G., & Govinda, R. (2014). Literacy and numeracy skills among children in developing countries. In Learning and education in developing countries: Research and policy for the post-2015 UN development goals (pp. 26-41). New York: Palgrave Macmillan US.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* W.H. Freeman.

Beerkens, M., Magi, E., & Lill, L. (2011). University studies as a side job: causes and consequences of massive student employment in Estonia. Higher Education, 61(6), 679-692.

Bettinger, E. P., Boatman, A., & Long, B. T. (2013). Student supports: Developmental education and other academic programs. The future of children, 93-115.

Boaler, J. (2023). Numeracyal Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching. Jossey-Bass. Boaler offers practical strategies for fostering a growth mindset in Numeracy classrooms.

Boateng, C. O. (2015). The influence of mathematics ability on students' academic performance in financial accounting (Doctoral dissertation, university of cape coast).

Botvinick, M., & Braver, T. (2015). Motivation and cognitive control: from behavior to neural mechanism. Annual review of psychology, 66(1), 83-113.

Buddin, R., & Zamarro, G. (2009). Teacher qualifications and student achievement in urban elementary schools. Journal of Urban Economics, 66(2), 103-115.

Bunce, L., Baird, A., & Jones, S. E. (2017). The student-as-consumer approach in higher education and its effects on academic performance. Studies in Higher Education, 42(11), 1958-1978.

Burgos, C., Campanario, M. L., de la Peña, D., Lara, J. A., Lizcano, D., & Martínez, M. A. (2023). Factors Affecting Students' Performance in Higher Education: A Systematic Review of Predictive Data Mining Techniques. Technology, Knowledge and Learning. DOI: 10.1007/s10758-022-09568-0.

Callender, C., & Wilkinson, D. (2013). Student perceptions of part-time work and its impact on their academic and social lives. Journal of Education and Work, 26(2), 141-162.

Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology, 44*(6), 473-490.

Carney, C., McNeish, S., & McColl, J. (2005). "The impact of part-time employment on students' health and academic performance: A Scottish perspective." Journal of Further and Higher Education, 29(4), 307-319. doi:10.1080/03098770500353300.

Cheng, D. X., & Alcántara, L. (2007). Assessing working students' college experiences: A grounded theory approach. Journal of College Student Development, 48(1), 39-56.

Collings, R., Swanson, V., & Watkins, R. (2014). The impact of peer mentoring on levels of student well-being, integration, and retention: A controlled mixed methods study. Higher Education, 68(6), 927-942.

Crede, M., & Kuncel, N. R. (2008). Study habits, skills, and attitudes: The third pillar supporting collegiate academic performance. Perspectives on Psychological Science, 3(6), 425-453.

Curtis, S., & Shani, N. (2002). The effect of taking paid employment during term-time on students' academic studies. Journal of Further and Higher Education, 26(2), 129-138.

D'Aloisio, K. D. (2020). The impact of work on college students' academic performance and social involvement. Journal of College Student Development, 61(3), 301-315.

D'Souza, M. S., Venkatesaperumal, R., Radhakrishnan, J., & Balachandran, S. (2013). Engagement in clinical learning environment among nursing students: Role of nurse educators.

Dahri, N. A., Vighio, M. S., Bather, J. D., & Arain, A. A. (2021). Factors influencing the acceptance of mobile collaborative learning for the continuous professional development of teachers. Sustainability, 13(23), 13222.

Damoah, O. B. O., Peprah, A. A., & Brefo, K. O. (2021). Does higher education equip graduate students with the employability skills employers require? The perceptions of employers in Ghana. Journal of Further and Higher Education, 45(10), 1311-1324. ug.edu.gh

Dania, P. O. (2014). Effect of gender on students academic achievement in secondary school social studies. Journal of Education and Practice, 5(21).

Darling-Hammond, L., & Falk, B. (2013). Teacher Learning through Assessment: How Student-Performance Assessments Can Support Teacher Learning. Center for American Progress.

Darolia, R. (2014). Working (and studying) day and night: Heterogeneous effects of working on the academic performance of full-time and part-time students. Economics of Education Review, 38, 38-50.

Dorman, J. P. (2001). Associations between classroom environment and academic efficacy. Learning Environments Research, 4(3), 243-257.

Duchhardt, C., Jordan, A. K., & Ehmke, T. (2017). Adults' use of Numeracy and its influence on Numeracyal competence. International Journal of Science and Numeracy Education, 15, 155-174.

Dweck, C. S. (2006). *Mindset: The New Psychology of Success.* Random House.

Dweck, C. S. (2023). Mindset: The New Psychology of Success. Ballantine Books.

English, L. D., & Gainsburg, J. (2015). Problem solving in a 21st-century Numeracy curriculum. In Handbook of international research in Numeracy education (pp. 313-335). Routledge.

Eze, T. I., Ezenwafor, J. I., & Obi, M. N. (2015). Effects of age and gender on academic achievement of vocational and technical education (VTE) students of a Nigerian university. Journal of Emerging Trends in Educational Research and Policy Studies, 6(1), 96-101.

Fayyad, U. & Hamutcu, H. (2020). Toward foundations for data science and analytics: A knowledge framework for professional standards. Harvard Data Science Review. pubpub.org

Federici, R. A., Caspersen, J., & Wendelborg, C. (2016). Students' Perceptions of Teacher Support, Numeracy, and Assessment for Learning: Relations with Motivational Responses and Mastery Experiences. International education studies, 9(10), 1-15.

Fitriningrum, A., Pulungan, A. H., Saraswati, N. K. C. D., & Surjadi, S. R. (2024). Developing entrepreneurial mindset through financial literacy training for educators and parents at adventure school. Abdimas: Jurnal Pengabdian Masyarakat Universitas Merdeka Malang, 9(2), 397-411.

Fraser, B. J., & Walberg, H. J. (2005). Research on teacher–student relationships and learning environments: Context, retrospect and prospect. International Journal of educational research, 43(1-2), 103-109.

Friedman, B. A., & Mandel, R. G. (2011). Motivation predictors of college student academic performance and retention. Journal of College Student Retention: Research, Theory & Practice, 13(1), 1-15.

Galligan, L. A. (2011). Developing a model of embedding academic numeracy in university programs: A case study from nursing (Doctoral dissertation, Queensland University of Technology).

Geiger, V., Goos, M., & Forgasz, H. (2015). A rich interpretation of numeracy for the 21st century: A survey of the state of the field. ZDM, 47, 531-548.

Gleeson, A., Fisher, G., Dianati, S., & Smale, N. (2019). First-year undergraduate business students' choice of different sources of learning support for assumed math skills. Cogent Education, 6(1), 1616654.

Goldrick-Rab, S., Kelchen, R., Harris, D. N., & Benson, J. (2016). Reducing income inequality in educational attainment: Experimental evidence on the impact of financial aid on college completion. American Journal of Sociology, 121(6), 1762-1817.

Goos, M., Geiger, V., & Dole, S. (2011). Teachers' personal conceptions of numeracy. C tf DD, 500.

Grigg, S., Perera, H. N., McIlveen, P., & Svetleff, Z. (2018). Relations among math self efficacy, interest, intentions, and achievement: A social cognitive perspective. Contemporary Educational Psychology, 53, 73-86.

Grootenboer, P., Grootenboer, & Marshman, M. (2015). Numeracy, affect and learning. Springer Singapore.

Grozev, V. H., & Easterbrook, M. J. (2022). The relationships of employed students to non□employed students and non□student work colleagues: Identity implications. Analyses of Social Issues and Public Policy, 22(2), 712-734.

Gunderson, E. A., Hamdan, N., Sorhagen, N. S., & D'Esterre, A. P. (2017). Who needs innate ability to succeed in math and literacy? Academic-domain-specific theories of intelligence about peers versus adults. Developmental Psychology, 53(6), 1188.

Habley, W. R., & McClanahan, R. (2004). What works in student retention? Review of Higher Education, 27(2), 245-264.

Hamoud, A., Hashim, A.S. and Awadh, W.A., 2018. Predicting student performance in higher education institutions using decision tree analysis. International Journal of Interactive Multimedia and Artificial Intelligence, 5, pp.26-31.

Hanaysha, J. R., Shriedeh, F. B., & In'airat, M. (2023). Impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic performance. International Journal of Information Management Data Insights, 3(2), 100188.

Hanaysha, J. R., Shriedeh, F. B., & In'airat, M. (2023). Impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic performance. International Journal of Information Management Data Insights, 3(2), 100188.

Hattie, J. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement.* Routledge.

Hilton, M. L., & Pellegrino, J. W. (Eds.). (2013). Education for life and work: Developing transferable knowledge and skills in the 21st century. National Academies Press.

Hitt, G. W., Isakovic, A. F., Fawwaz, O., Bawa'Aneh, M. S., El-Kork, N., Makkiyil, S., & Qattan, I. A. (2014). Secondary implementation of interactive engagement teaching techniques: Choices and challenges in a Gulf Arab context. Physical Review Special Topics-Physics Education Research, 10(2), 020123.

Hovdhaugen, E. (2015). Working while studying: The impact of term-time employment on dropout rates. Journal of Education and Work, 28(6), 631-651.

Ibrahim, A., & Alhosani, N. (2020). Impact of language and curriculum on student international exam performances in the United Arab Emirates. Cogent Education, 7(1), 1808284.

Immordino-Yang, M. H., Darling-Hammond, L., & Krone, C. R. (2019). Nurturing nature: How brain development is inherently social and emotional, and what this means for education. Educational Psychologist, 54(3), 185-204.

Jablonka, E. (2015). The evolvement of numeracy and Numeracyal literacy curricula and the construction of hierarchies of numerate or Numeracyally literate subjects. ZDM, 47, 599-609.

Jarrah, A. M. (2020). The challenges faced by pre-service Numeracy teachers during their teaching practice in the UAE: Implications for teacher education programs. International Journal of Learning, Teaching and Educational Research, 19(7), 23-34.

Jarrah, A. M., Fayez, K., Almarashdi, H., & Fidalgo, P. (2024). Enhancing Numeracy education in the UAE: Elementary teachers' views on distance education.

Juhaevah, F. (2022). Developing Numeracy problems using local wisdom context of Maluku to improve students' numeracy. Jurnal Elemen. academia.edu

Khalil, N., & Aldridge, J. (2019). Assessing students' perceptions of their learning environment in science classes in the United Arab Emirates. Learning Environments Research, 22, 365-386.

Kim, J., & Tamborini, C. R. (2019). Are they complementary or contradictory? The impact of employment on students' academic achievement in higher education. Research in Higher Education, 60(3), 281-304.

Kissane, B. (2012). Numeracy: connecting Numeracy. In Reasoning, Communication And Connections In Numeracy: Yearbook 2012, Association of Numeracy Educators (pp. 261-287).

Kivunja, C. (2018). Distinguishing between theory, theoretical framework, and conceptual framework: A systematic review of lessons from the field. International journal of higher education, 7(6), 44-53.

Kohen, Z. & Orenstein, D. (2021). Numeracyal modeling of tech-related real-world problems for secondary school-level Numeracy. Educational Studies in Numeracy. springer.com

LeFevre, J. A., Skwarchuk, S. L., Smith-Chant, B. L., Fast, L., Kamawar, D., & Bisanz, J. (2009). Home numeracy experiences and children's math performance in the early school years. Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 41(2), 55.

Lovat, A., & Darmawan, I. G. N. (2019). The academic performance of vocational education and training pathway university students and the effects of gender and age. Australian Journal of Education, 63(3), 307-321.

Malik, R. H., & Rizvi, A. A. (2018). Effect of Classroom Learning Environment on Students' Academic Achievement in Mathematics at Secondary Level. Bulletin of Education and research, 40(2), 207-218.

Manthei, R. J., & Gilmore, A. (2005). The effect of paid employment on university students' lives. Education + Training, 47(3), 202-215.

Manzar-Abbass, S. S., Malik, N. A., Khurshid, M. A., & Ahmad, S. (2017). Impact of mentoring on teachers' professional development: Mentees' perceptions. New Horizons, 11(1), 85.

Martin, E. L. (2022). The Impact of Technology Integration on Secondary Student Learning.

Marzano, R. J., & Toth, M. D. (2013). Teacher evaluation that makes a difference: A new model for teacher growth and student achievement. ASCD.

Mehra, N. (1973). Retention and Withdrawal of University Students. (A Study of Academic Performance of a Freshman Class).

Melhuish, E. C., Phan, M. B., Sylva, K., Sammons, P., Siraj□Blatchford, I., & Taggart, B. (2008). Effects of the home learning environment and preschool center experience upon literacy and numeracy development in early primary school. Journal of Social Issues, 64(1), 95-114.

Mishra, A., & Agrawal, A. (2022). Investigating report cards to predict the academic performance of new MBA students.

Montolio, D., & Taberner, P. A. (2021). Gender differences under test pressure and their impact on academic performance: a quasi-experimental design. Journal of Economic Behavior & Organization, 191, 1065-1090.

Moreno, V., Cavazotte, F., & Alves, I. (2017). Explaining university students' effective use of e□learning platforms. British Journal of Educational Technology, 48(4), 995-1009.

Moussa, N. M., & Saali, T. (2022). Factors affecting attitude toward learning Numeracy: A case of higher education institutions in the Gulf Region. SAGE Open, 12(3), 21582440221123023.

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. Journal of Counseling Psychology, 38(1), 30-38.

Mutaf Yıldız, B., Sasanguie, D., De Smedt, B., & Reynvoet, B. (2018). Frequency of home numeracy activities is differentially related to basic number processing and calculation skills in kindergartners. Frontiers in psychology, 9, 340.

Mwingi, J. W. (2014). The Impact of Gender Differences on Student's Academic Performance in Secondary Schools in Ndumberi Division, Kiambu County, Kenya in Science Subjects and Languages.

Nadelson, L. S., & Seifert, A. L. (2014). Business and finance students' attitudes and beliefs about the role of Numeracy in their future careers. International Journal of Business Education, 157(2), 47-59.

Ngulube, P., Mathipa, E. R., & Gumbo, M. T. (2015). Theoretical and conceptual frameworks in the social and management sciences. Addressing research challenges: Making headway in developing researchers, 2015, 43-66.

Nickel, C. E. (2010). The effects of cooperative and collaborative strategies on student achievement and satisfaction in blended and online learning environments. Old Dominion University.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. Studies in Higher Education, 31(2), 199-218.

Nonis, S. A., & Hudson, G. I. (2010). Performance of college students: Impact of study time and study habits. Journal of Education for Business, 85(4), 229-238.

OECD. (2023). Skills Outlook 2023: First Results from the Survey of Adult Skills. OECD Publishing.

Okwuduba, E. N., & Okigbo, E. C. (2018). EFFECT OF TEACHING METHODS ON STUDENTS'ACADEMIC PERFORMANCE IN CHEMISTRY IN NIGERIA: META-ANALYTIC REVIEW. Bulgarian Journal of Science and Education Policy, 12(2), 418-434.

Omar, N. A., Shah, N. U., Hasan, N. A., & Ali, M. H. (2019). THE INFLUENCE OF SELF-EFFICACY, MOTIVATION, AND INDEPENDENCE ON STUDENTS'ENTREPRENEURIAL INTENTIONS. Journal of Nusantara Studies (JONUS), 4(2), 1-28.

Ozer, B., & Beycioglu, K. (2010). The relationship between teacher professional development and teaching practices: The mediating role of self-efficacy. Educational Studies, 36(3), 311-321.

Ozola, L., & Aļeksējeva, M. (2012). THE IMPACT OF ACADEMIC VERSUS NON-ACADEMIC PERFORMANCE ON THE UNDERGRADUATE PROSPECTS OF THE FIRST EMPLOYMENT: THE CASE OF SSE RIGA.

Pagliaro, C. M., & Thom, J. S. (2021). A new stepping-stone on the path to Numeracy success for DHH learners. American Annals of the Deaf, 166(3), 309-317.

Parajuli, M., & Thapa, A. (2017). Gender differences in the academic performance of students. Journal of Development and Social Engineering, 3(1), 39-47.

Parvizi, F., Lotfi, M. H., Fararouei, M., & Fallahzadeh, H. (2021). Relationship of pupils' quality of life and academic achievement with the employment status of their mothers. Journal of preventive medicine and hygiene, 62(1), E164.

Pascarella, E. T., & Terenzini, P. T. (2005). How college affects students: A third decade of research. Review of Higher Education, 27(2), 245-288.

Peak, K. R. (2019). The Academic Impact of Student Employment: A Pilot Study. Radiologic Science & Education, 24(1).

Peter, E. E. (2012). Critical thinking: Essence for teaching Numeracy and Numeracy problem solving skills. African Journal of Numeracy and Computer Science Research, 5(3), 39-43.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. Journal of educational Psychology, 95(4), 667.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psychology, 82(1), 33-40.

Purnomo, H., Sa'dijah, C., Hidayanto, E., Permadi, H., & Anwar, L. (2022). Development of Instrument Numeracy Skills Test of Minimum Competency Assessment (MCA) in Indonesia. International Journal of Instruction, 15(3), 635-648.

Quinlan, T., Loncke, M., Leijten, M., & Van Waes, L. (2012). Coordinating the cognitive processes of writing: The role of the monitor. Written Communication, 29(3), 345-368.

Rahman, M.H. and Islam, M.R., 2017, December. Predict student's academic performance and evaluate the impact of different attributes on the performance using data mining techniques. In 2017 2nd International Conference on Electrical & Electronic Engineering (ICEEE) (pp. 1-4). IEEE.

Rao, D. H., Mangalwede, S. R., & Deshmukh, V. B. (2017, December). Student performance evaluation model based on scoring rubric tool for network analysis subject using fuzzy logic. In 2017 International Conference on Electrical, Electronics, Communication, Computer, and Optimization Techniques (ICEECCOT) (pp. 1-5). IEEE.

Reyna, V. F., & Brainerd, C. J. (2008). Numeracy, ratio bias, and denominator neglect in judgments of risk and probability. Learning and individual differences, 18(1), 89-107.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. Psychological Bulletin, 138(2), 353-387.

Rienties, B., & Toetenel, L. (2016). The impact of learning design on student behaviour, satisfaction and performance: A cross-institutional comparison across 151 modules. Computers in Human Behavior, 60, 333-341.

Riggert, S. C., Boyle, M., Petrosko, J. M., Ash, D., & Rude-Parkins, C. (2006). Student employment and higher education: Empiricism and contradiction. Review of Educational Research, 76(1), 63-92.

Rizvi, S., Rienties, B., & Khoja, S. A. (2019). The role of demographics in online learning; A decision tree based approach. Computers & Education, 137, 32-47.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. Psychological Bulletin, 130(2), 261-288.

Robotham, D. (2009). "Combining study and employment: A step too far?" Education + Training, 51(4), 322-332. doi:10.1108/00400910910968337.

Robotham, D. (2012). Student part-time employment: Characteristics and consequences. Education + Training, 54(1), 65-75.

Rodríguez, M. F., Nussbaum, M., Yunis, L., Reyes, T., Alvares, D., Joublan, J., & Navarrete, P. (2022). Using scaffolded feedforward and peer feedback to improve problem-based learning in large classes. Computers & Education, 182, 104446.

Saleh, M., & Al-Salmi, R. (2024). Impact of Numeracy anxiety on academic performance among Arab students. International Journal of Educational Research, 82, 100-112. Available at International Journal of Educational Research.

Salley, W., & Shaw, M. (2015). Employment status, teaching load, and student performance in online community college courses. Online Journal of Distance Learning Administration, 18(2), 2.

Salminen, J., Khanolainen, D., Koponen, T., Torppa, M., & Lerkkanen, M. K. (2021, October). Development of numeracy and literacy skills in early childhood—A longitudinal study on the roles of home environment and familial risk for reading and math difficulties. In Frontiers in Education (Vol. 6, p. 725337). Frontiers Media SA.

Schunk, D. H., & DiBenedetto, M. K. (2016). Self-efficacy theory in education. In Handbook of motivation at school (pp. 34-54). Routledge.

Schwallier, P. R. (2016). Preparing for 1: 1 technology: Impact on collaboration, instruction, and student learning.

Shmeleva, E. A., Kislyakov, P. A., Luneva, L. F., & Maltseva, L. D. (2015). Psychological factors of the readiness of teachers to ensure social security in the educational environment. Psychology in Russia, 8(1), 74.

Shuell, T. J. (1986). Cognitive conceptions of learning. Review of educational research, 56(4), 411-436.

Simamora, R. E., & Saragih, S. (2019). Improving Students' Mathematical Problem Solving Ability and Self-Efficacy through Guided Discovery Learning in Local Culture Context. International Electronic Journal of Mathematics Education, 14(1), 61-72.

Simón, H., Díaz, J. M. C., & Costa, J. L. C. (2017). Analysis of university student employment and its impact on academic performance. Electronic Journal of Research in Educational Psychology, 15(2), 281-306.

Sinakou, E., Donche, V., Boeve-de Pauw, J., & Van Petegem, P. (2019). Designing powerful learning environments in education for sustainable development: A conceptual framework. Sustainability, 11(21), 5994.

Stephens, N. M., Hamedani, M. G., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. Psychological science, 25(4), 943-953.

Stronge, J. H., Ward, T. J., & Grant, L. W. (2011). What makes good teachers good? A cross-case analysis of the connection between teacher effectiveness and student achievement. Journal of teacher Education, 62(4), 339-355.

Taurina, Z. (2015). Students' motivation and learning outcomes: Significant factors in internal study quality assurance system. International Journal for Cross-Disciplinary Subjects in Education (IJCDSE), 5(4), 2625-2630.

Triventi, M. (2014). "Does working during higher education affect students' academic progression?" Economics of Education Review, 41, 1-13. doi:10.1016/j.econedurev.2014.02.006.

Turhan, N. S., Parlakyildiz, B., Arslan, N., Gocen, G., & Bingo, T. Y. (2019). A Research on the Characteristics of the Inspiring Teacher. International Journal of Educational Methodology, 5(1), 1-18.

UNESCO. (2023). Global Education Monitoring Report 2023: Inclusion and Education – All Means All. United Nations Educational, Scientific and Cultural Organization. Available at UNESCO Digital Library.

van der Merwe, R. L., Groenewald, M. E., Venter, C., Scrimnger-Christian, C., & Bolofo, M. (2020). Relating student perceptions of readiness to student success: A case study of a Numeracy module. ncbi.nlm.nih.gov

Van der Waldt, G. (2020). Constructing conceptual frameworks in social science research. TD: The Journal for Transdisciplinary Research in Southern Africa, 16(1), 1-9.

Velten, K., Schmidt, D. M., & Kahlen, K. (2024). Numeracyal modeling and simulation: introduction for scientists and engineers. John Wiley & Sons.

Venkatesh, S., Rao, Y. K., Nagaraja, H., Woolley, T., Alele, F. O., & Malau-Aduli, B. S. (2020). Factors influencing medical students' experiences and satisfaction with blended integrated E-learning. Medical Principles and Practice, 29(4), 396-402. karger.com

Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic achievement: A meta-analysis. Psychological Bulletin, 140(4), 1174-1204.

Wake, G. (2014). Making sense of and with Numeracy: The interface between academic Numeracy and Numeracy in practice. Educational Studies in Numeracy, 86(2), 271-290.

Walsh, C., Larsen, C., & Parry, D. (2009). Academic tutors at the frontline of student support in a cohort of students succeeding in higher education. Educational Studies, 35(4), 405-424.

Waswa, D. W., & Al-kassab, M. M. (2022, May). Numeracy Learning Challenges and Difficulties: A Students' Perspective. In International Conference on Numeracy and Computations (pp. 311-323). Singapore: Springer Nature Singapore.

Weaver, R. R., & Qi, J. (2005). Classroom organization and participation: College students' perceptions. The Journal of Higher Education, 76(5), 570-601.

Wedage, D. M. E. (2016). Mathematics and Statistics Courses in Management Undergraduate Programmes in Srilanka: A Study on Curriculum, Purpose and Practices.

Wenz, M., & Yu, W. C. (2010). Term-time employment and the academic performance of undergraduates. Journal of Education Finance, 358-373.

World Bank. (2023). Education for Development: A Policy Research Report. The World Bank. Retrieved from World Bank Documents. This document emphasizes the role of education in national development and highlights the challenges faced by educational systems in delivering quality education.

Wright, K. (2007). A written assessment is an invalid test of numeracy skills. British Journal of Nursing, 16(13), 828-831.

Yang, C., & Siow, L. S. (2015). Numeracyal skills and business education: The importance of numeracy in financial analysis. Journal of Education for Business, 90(6), 312-318. doi:10.1080/08832323.2015.1034064.

Yatim, S. S. K. M., Saleh, S., & Zulnaidi, H. (2021). ICT-Based Teaching Aid Materials in Rural High School Additional Numeracy Learning: Needs Analysis. Malaysian Journal of Education (0126-6020), 46

Yousef, D. A. (2019). Determinants of the academic performance of undergraduate students in statistics bachelor's degree program: A study in an Arabic setting. Quality Assurance in Education, 27(1), 13-23.

Yousef, D. A. (2019). Determinants of the academic performance of undergraduate students in statistics bachelor's degree program: A study in an Arabic setting. Quality Assurance in Education, 27(1), 13-23.

Zainuddin, Z. (2018). Students' learning performance and perceived motivation in gamified flipped-class instruction. Computers & education, 126, 75-88.

Zhu, Y., & Kaiser, G. (2022). Impacts of classroom teaching practices on students' Numeracy learning interest, Numeracy self-efficacy and Numeracy test achievements: a secondary analysis of Shanghai data from the international video study Global Teaching InSights. ZDM–Numeracy Education, 54(3), 581-593

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