Arab American University
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"Impact of Formative Assessment Strategies on Test Anxiety, Academic Performance, Self-Efficacy, and Self-Regulation among First-Year Nursing Students in Palestine: A Mixed-Methods Study"

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Thesis Approval

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Declaration

I, the undersigned Adam Marawa'a, authorize the Arab American University/ AAUP to provide copies of my thesis to libraries, institutions, or individuals upon their request, in accordance with the current instructions at the university. I acknowledge that I have complied with the laws, regulations, instructions, and decisions of the AAUP regarding the preparation of doctoral theses when I personally prepared my thesis entitled: “Impact of Formative Assessment on First-Year Nursing Students’ Anxiety, Performance, Self-Efficacy, and Self-Regulation in Palestine: A Mixed-Methods Study”. This is in line with the accepted scientific integrity in writing scientific theses.

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Dedication

I dedicate my dissertation to the land that has nurtured my roots and to the people who have shaped my journey, with the deepest gratitude and respect to Palestine, a land rich in history, resilience, and unwavering spirit. To my beloved family, whose endless love and support have been my guiding light in times of challenge and triumph, you are the foundation upon which my dreams are built.

This doctoral dissertation is dedicated to my beloved parents, thanks to the unwavering support and encouragement of those who have been by my side, I have found my guiding light throughout this journey. Their dedication, expertise, and unwavering support helped develop me into the person I am today.

I also extend this dedication to my brothers, whose camaraderie, humor, my strong work ethic and confidence in my abilities have always been a driving force for me.

To my family, for your love, guidance, and sacrifices, I am eternally grateful. This achievement is as much yours as it is mine.

To the resilient people of Palestine, who face adversity with courage and maintain hope amidst hardship. Your strength and perseverance inspire me to contribute meaningfully to our shared heritage and the global understanding of it.

This journey is not just my own but a reflection of our collective aspirations and enduring spirit. May this work contribute to the rich tapestry of Palestinian history and serve as a testament to the power of perseverance, education, and unwavering determination.

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Abstract

BACKGROUND: Improving education is crucial for enhancing student achievement. The Palestinian educational system faces challenges such as limited resources and political instability. The demanding nursing curriculum can lead to increased test anxiety, affecting academic performance, self-efficacy, and self-regulation. Formative assessment strategies in nursing education can help monitor student learning and provide feedback for both instructors and students, identifying strengths and weaknesses, and ensuring effective learning outcomes. While these assessments are used, understanding the impact of a combination of strategies on learning outcomes remains a challenge. There is a need for research to uncover the most effective strategies to maximize their benefits on educational outcomes.

AIM: to examine the impact of formative assessment strategies on test anxiety, academic performance, self-efficacy, and self-regulation of first-year nursing students in Palestine. **METHODS:** A mixed-methods study with a quasi-experimental design with a pretest and posttest-non-equivalent groups at the Modern University College in Palestine during the second semester of 2022-2023. A convenience sample of undergraduate nursing students enrolled in the Anatomy II course were recruited. Students were divided into intervention and control groups; pre-and post-test evaluations assessed anxiety, performance, self-efficacy, and self-regulation. Qualitative individual interviews were conducted with seven students from the intervention group. This selection continued until data saturation was achieved with six students. Quantitative data were analyzed using t-tests and ANOVA. The qualitative data were analyzed using thematic content analysis which involved systematically identifying and coding meaningful themes, patterns, and segments within the data.

RESULTS**:** Out of the 90 students who participated in the study, 46 were assigned to the intervention group and 44 to the control group. The intervention group exhibited a significant reduction in anxiety levels, with average scores decreasing from 17.2 to 10.4 ($p < 0.001$). Additionally, the intervention group outperformed the control group in the mean academic performance (29.7 vs. 32.0, $p < 0.01$). Self-efficacy and self-regulation also revealed substantial enhancements in the intervention group compared to the control group (mean self-efficacy: 32.2 vs. 39.6, $p < 0.0001$; mean self-regulation: 43.5 vs. 60.2, $p < 0.001$). The main theme that emerged from the content analysis was the strategies used in formative evaluation. These strategies included peer reviews, feedback, and open questions strategy. Academic performance is improved by addressing weaknesses, motivating, and stimulating critical thinking. Self-efficacy is improved by building confidence. Self-regulation is enhanced by goal setting, prioritizing, and time management.

CONCLUSIONS: The study found that first-year nursing students who used integrative formative assessments had lower test anxiety, improved academic performance, improved self-efficacy and self-regulation. This approach is very effective in cultivating competent and confident nursing students.

KEYWORDS: Formative assessment; Summative assessment; Nursing student, test anxiety, academic performance, self-efficacy, self-regulation**.**

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List of Abbreviations

Abbreviation	Definition
AAUP	Arab American University/ Palestine
GPA	Grade point average
ICT	Information and Communication Technology
IRB	Institutional Review Board
MCQs	Multiple-choice questions
MUC	Modern University College
OSCE	Objective Structured Clinical Examinations
SCT	Social cognitive theory
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences (SPSS)
SLR	Self-Regulation

CHAPTER ONE

1.1 Introduction and Background

All countries prioritize education improvement as an essential component for community progress. There is an urgent need to identify the best cost-effective methods of enhancing student accomplishment. The primary objective of education is for students to achieve an efficient learning experience. Most educational institutions utilize student performance evaluation; however, many of these purposes are primarily administrative rather than pedagogical. Assessment is a method that can help to improve learning, instructors, and the educational process. It is offered as a paradigm for developing a good classroom learning culture (Shepard, 2019). Self-regulated learning refers to a student's internal ability to monitor and alter effort, habits, motives, and learning processes in reaction to new information and feedback (Brandmo et al., 2020). Frey (2018) stated that classroom assessment is a process in which teachers and students collect, analyze, and use evidence of student learning for a variety of reasons, such as figuring out what students are good at and what they need to work on, evaluating student progress toward competence levels, giving grades, and giving feedback to parents.

Summative evaluations look at what students have learned, what they know, how well they can do something, or what they have accomplished at the end of a unit, course, or program. Summative tests are almost always scored formally and are often given a lot of weight, but they don't have to be. Formative assessment, on the other hand, refers to methods and tools that help find and evaluate learning gaps, problems, and misunderstandings along the way (Andrade & Brookhart, 2020).

Assessment is not just a minor component of classroom activities; it plays a crucial role beyond that. It is often used to hold schools and teachers accountable for their students' performance on standardized tests. Consequently, students' results on these tests can impact all aspects of their school life. As a matter of improvement and innovation for new learning methods, it is essential to assess classroom teaching with modern teaching and learning approaches. All modern learning methods emphasize student-centered learning, encouraging both student engagement and lecturer involvement during (Black & Wiliam, 2018). Formative assessment, including real-time electronic feedback, can significantly reduce test anxiety among nursing students, improving their academic performance and overall well-being. This approach provides continuous support and constructive feedback, reducing exam worry (Mastour et al., 2018), Also, Formative assessment significantly enhances nursing students' academic performance by providing timely feedback and identifying knowledge gaps. Studies show that students who participate in formative assessments achieve higher academic achievement, promoting academic success and personal development. They offer continuous feedback, boosting confidence in abilities. Higher self-efficacy leads to more challenging tasks and persistence (Ozan & Kincal, 2018).

In addition, it enhances self-regulation among nursing students, promoting goal setting, progress monitoring, and strategy adjustment. Participation in formative assessments leads to higher self-regulation, positively correlated with academic achievement and retention, thereby equipping students with lifelong learning skills (Meusen-Beekman et al., 2016).

The relationship between what students are taught and their resulting learning outcomes is complex. Teacher’s present topics and ideas, but it is ultimately up to the students to integrate this new information into their existing knowledge and beliefs using their unique learning styles.

Ideally, if students fully comprehended what was taught, there would be no need for testing. However, since students do not always absorb everything, they are taught, it is necessary to develop methods to identify and assess student achievement. From this point of view, there should be no conflict between formative and summative assessments. In fact, the distinction between the two becomes irrelevant, as the primary goal of all assessments is to draw meaningful conclusions about student learning (Fauth et al., 2019).

Sood & Singh argue that we need to recognize that summative evaluation (which is an overall assessment typically given at the end of a course or unit) is just a tool and not the ultimate goal. They emphasize that if we keep ignoring formative evaluation (which includes ongoing assessments aimed at providing feedback and guiding learning during the process), our students' success rates will remain low, and our assessments will not accurately measure or predict real-world performance (Sood & Singh, 2012).

1.2 Problem Statement

Assessment techniques used in nursing education are designed to determine the extent to which students are able to apply this knowledge and skills in real-life patient scenarios. This ensures that they are fully prepared to provide safe and effective care to individuals in a variety of healthcare settings (Immonen et al., 2019). The most effective strategies to employ in formative evaluation and their impacts on students' academic performance, self-efficacy, and confidence have not been extensively explored in the literature.

In terms of education, integrating formative assessment is an approach that aims to improve student learning, the quality of instruction, and educational outcomes. By improving formative assessment techniques teachers can provide ongoing, constructive feedback and opportunities for improvement while also measuring overall progress upon completion of a

teaching session. This can lead to a comprehensive understanding of a student's progress, monitoring it, and providing effective and timely guidance to educational methodologies (Moss & Brookhart, 2019).

In the context of education, the proper balance between summative and formative assessments is critical for ensuring a comprehensive evaluation of student progress. Summative assessments, such as final examinations or standardized tests, provide a concise summary of an individual's overall understanding and skill level in a particular subject. On the other hand, formative assessments, such as exams and class discussions, afford instructors the opportunity to promptly receive feedback and modify their lesson plans accordingly. Both types of evaluations can be effectively incorporated into the learning process to assist instructors in tracking students' development and adapting instruction to meet the unique needs of each individual (Mogboh & Okoye, 2019). Furthermore, the implementation of formative assessment classroom techniques sessions resulted in a statistically significant increase in students' scores across both lower-order and higher-order cognitive skill domains (Babinčáková et al., 2020).

Formative assessment, characterized by ongoing feedback and evaluation, reduces state anxiety and enhances skill development, both of which positively influence of performance for the students. Nevertheless, research has revealed that summative evaluations, which represent the final assessment of students' aptitudes relative to pre-established benchmarks, might intensify anxiety levels, potentially impairing academic achievement (Mastagli et al., 2020).

Throughout history, summative assessments, including final examinations and standardized tests, have been the most common technique utilized to evaluate students' progress. After a term, they are usually utilized to offer a final assessment of student learning. This insight prompted the emphasis to change towards conjunction of formative and summative evaluations

to produce a more thorough evaluation system that not only tracks but also improves student learning (Morris et al., 2021; Lean, 2022 ;Buck et al., 2023).

Hattie (2015) assessed the effect size of 800 meta-analysis papers on educational aspects. This evaluation comprised 52,637 papers and 146,142 effect sizes examining the influence of educational conditions on students' academic performance. According to the study findings, formative evaluation was the third most significant factor for student success out of 138 criteria (Hattie, 2015). The shift from summative to formative assessment in secondary schools is expected to significantly impact student performance and improve the quality of education (Ozan & Kincal, 2018). Different researchers recommend that more research be conducted to investigate how students respond when they receive formative assessment feedback alongside summative grades, as well as examine the perspectives and experiences of lecturers with formative assessment (Wing, 2018; Duers & Brown, 2009).

The importance of conjunction of summative and formative assessments in learning is crucial because it provides a more thorough method for assessing and improving student learning and covers a range of topics, including educational impact. By using both assessments, learning can be made more meaningful and engaging and knowledge may be retained and understood at a deeper level (Khaled & El Khatib, 2020) .Also, comprehensive educational evaluations help to produce more capable and skilled people, which benefits society in terms of the caliber of the labor force and the advancement of civilization (Lean, 2022). On the other hand, these assessments' use of technology such as formative assessments on digital platforms encourages creative teaching methods and gets students ready for a world driven by technology (Buck et al., 2023).

This prompted research into more ongoing, process-based evaluation methods. Within the

discipline of educational assessment, there is a significant gap in knowledge regarding the most effective way to integrate summative and formative assessments to improve learning outcomes for students. Summative assessments typically compare student learning at the end of a unit of instruction to a benchmark or standard to determine what the students have learned. In contrast, formative evaluations allow instructors to assess student learning and provide continuous feedback, which students can use to enhance their independent learning. Despite their different goals, there is limited research, especially in the Palestinian context, on how to integrate these two assessment styles to maximize their respective advantages (Buchholtz et al., 2018). Many experts education show that summative and formative assessments should be used together ((Rol & McPhersn, 1995; McLaughlin et al., 2005 Taras, 2008 and Carrillo-de-la-Peña et al., 2009).

1.3 Purpose of the study

This study aimed to examine the impact of formative assessment on first-year nursing Students' Test Anxiety, Academic Performance, Self-Efficacy, and Self-Regulation in Palestine.

1.4 Specific Objectives

1. To evaluate the difference between pretest and posttest of test anxiety, academic performance, self-efficacy, and self-regulation among control group (receiving summative assessment) at Modern College University.
2. To evaluate the difference between pretest and posttest of test anxiety, academic performance, self-efficacy, and self-regulation among intervention group (receiving summative and formative assessments) at Modern College University.
3. To evaluate the difference in the posttest of test anxiety, academic performance, self-efficacy, and self-regulation posttest between the intervention group (receiving summative

and formative assessment) and control (receiving formative assessment) at Modern College University.

4. To assess the insight and perceptions of the students receiving summative and formative assessments at the Modern College University.

1.5 Significance of the study

Theorists and educators agree that self-directed learning communities are significant, and they emphasize that effective evaluation is essential to helping students recognize their knowledge gaps and develop into lifelong learners (Beach, 2017).

Educators' assessments of their students are a key part of figuring out how well their teaching is working. Assessment is a key part of good teaching, and the assessment process is the best way to find out if instructional goals have led to the expected learning results. Also, the information learned from assessment results is only useful if teachers are willing to change their courses to help and guide their students' future performance. The goal of this study is to determine whether formative assessment can be observed and measured in the real world. The main problem with a summative assessment is that it may complicate the learning process by focusing on output post-examination amidst constraints or challenges; this provides no certainty that the desired outcomes will be achieved. Even when considering learning, this approach does not offer a precise representation. Consequently, formative evaluation must be integrated within the educational process to tailor the curriculum and bolster learning outcomes (Salas Vicente et al., 2021)

Formative assessment should be used effectively to guide lecturer instruction and student participants. As per the previous literature, an effective formative assessment system that influences student achievement will have its purpose, procedures, and adherence strategically

defined. In order to better reflect and promote student development, formative assessment is receiving more attention from educational makers, students, and academics (Sood & Singh, 2012).

The study can potentially identify effective methods to alleviate test anxiety among first-year nursing students in Palestinian universities, leading to improved psychological well-being and academic performance. The issue of academic achievement holds significant importance for educators and policymakers in the Palestinian context. Examining the function of formative assessment as an adjunctive methodology can provide insights into its capacity to effectively impact student learning outcomes, resulting in enhanced academic accomplishments. Achieving success is of utmost importance for fostering academic motivation and sustaining tenacity. Through an examination of the effects of formative assessment, this research aims to uncover insights into how this particular assessment method can effectively enhance the sense of empowerment among first-year nursing students in Palestine. This, in turn, can contribute to the development of higher levels of self-efficacy and self-confidence among these students ((Wing, 2018)

The learning of self-regulation skills is crucial for students to proficiently oversee and control their educational endeavors. Understanding the role of formative assessment in boosting self-regulation among nursing students in Palestine can facilitate the creation of customized educational interventions that promote self-directed and autonomous learning. The higher education system in Palestine consistently endeavors to enhance pedagogical and instructional methodologies, and the findings of this study provide useful insights into the efficacy of formative assessment procedures. These insights can guide curriculum writers and educators in improving instructional methodologies for nursing students. First-year nursing students often

encounter numerous difficulties during their transition from high school to university. This study aims to examine the potential of formative assessment methodologies to support and facilitate this transition process, ultimately leading to higher rates of student retention and academic achievement (Faber et al., 2017).

The utilization of evidence-based decision-making holds potential benefits for policymakers and educational institutions in Palestine. The results of this study can serve as a foundation for the application of formative assessment strategies at the institutional level, fostering a data-driven and quality-oriented educational environment. The significance of nursing education research lies in its ability to improve the caliber of healthcare providers. Through an examination of the influence of formative assessment on the academic achievements of nursing students, this research contributes to the current pool of information in the field of nursing education and has the potential to offer valuable insights for the development of optimal instructional strategies on a regional and global scale (Gikandi & Gikandi, 2015)

1.6 Research Questions

1. Is there difference in the mean pretest and posttest of test anxiety, academic performance, self-efficacy, and self-regulation among control groups (receiving summative assessment) at Modern College University?
2. Is there difference in the mean pretest and posttest of test anxiety, academic performance, self-efficacy, and self-regulation among intervention groups (receiving summative assessment and formative assessment) at Modern College University?
3. Is there a difference in the posttest of test anxiety, academic performance, self-efficacy, and self-regulation between the intervention and control at Modern College University?

4. What are the student's perceptions toward the impact of summative and formative assessments on their learning experience at Modern College University?

1.7 Research Hypothesis

H11. There is a significant difference in the mean test anxiety, academic performance, self-efficacy, and self-regulation between the pre-test and post-test results in the control group.

H12. There is a significant difference in the mean test anxiety, academic performance, self-efficacy, and self-regulation between the pre-test and post-test results in the intervention group.

H13. There is a significant difference in the mean test anxiety, academic performance, self-efficacy, and self-regulation in the post-test between the intervention and control groups.

1.8 Conceptual and operational Definitions

The following are the conceptual and operational definitions of the study variables;

Test anxiety is characterized by feelings of negativity, worry, physical arousal, and behavioral reactions that arise from concerns about failing or feeling inadequate during an exam or other evaluative scenario (Bembenutty, 2009) , From an operational perspective, test anxiety is commonly assessed using the Test Anxiety Scale (Pintrich & De Groot, 1990).

Academic Performance: This is typically measured by the level of achievement students reach in their studies, which is demonstrated through grades, scores on standardized tests, or teacher assessments (Wang et al., 2023). Operationally, academic performance is quantified through various indicators, such as the Academic Performance Scale (Odida et al., 2022) ,offering a measurable perspective of students' academic success.

Self-efficacy: This is a fundamental aspect of one's mindset, influencing how they approach goals, tasks, and challenges. It revolves around the belief in one's ability to succeed in specific

situations or accomplish a task (*Self-Efficacy Beliefs in Academic Settings - Frank Pajares, 1996*).From an operational point of view, this belief is evaluated using self-efficacy questionnaires(Pintrich & De Groot, 1990) that measure an individual's confidence in carrying out particular tasks or attaining specific results. These questionnaires offer a concrete way to assess one's self-assurance in their abilities.

Self-Regulation: The process of self-regulation involves individuals effectively managing their thoughts, emotions, and behaviors in order to achieve their long-term goals. This includes practices such as self-monitoring, setting goals, and making necessary adjustments to behaviors to meet objectives. This process is typically assessed by examining the strategies used for learning, such as planning, goal-setting, self-monitoring, and adjusting efforts based on performance feedback (Beer & Mulder, 2020).These strategies offer a practical framework for understanding and measuring how individuals effectively manage and direct their efforts to achieve desired outcomes through a self-regulation scale (Pintrich & De Groot, 1990).

Summative assessment: The utilization of summative evaluation often involves assigning learners a number score accompanied by minimal commentary. Hence, summative evaluation is frequently employed as a means of evaluating learning outcomes, while it’s utility as a tool for facilitating learning is hardly observed. Educators have the ability to enhance the formative nature of summative assessments by providing learners with the opportunity to derive educational value from examinations (Viana et al., 2022), In other words, summative evaluation is a reflection of what students have already learned, also a summative evaluation is a conclusion that "encapsulates all the pieces of evidence to a particular point. This "specified point" can be a specific time period that is used for an exam or test (Abbas et al., 2020).

Formative assessment: Formative assessment and feedback are essential components of the learning process since there is consensus that feedback plays a crucial role within a broader framework of formative assessment (Morris et al., 2021). Both fields of study share an identical emphasis on the collection and dissemination of information relative to a student's present performance or comprehension, with the ultimate aim of enhancing the student's learning experience. Formative assessment refers to the regular and interactive evaluation of students' progress and comprehension in order to identify their individual requirements and adapt learning methods accordingly (Viana et al., 2022). Throughout the learning process, there is a continuous process called formative assessment. It attempts to provide feedback to both teachers and students so that they may modify their methods of instruction and learning tactics. The main objective is to improve learning by identifying areas in which students may be having difficulty and then altering the curriculum appropriately. In addition, technology and teacher inquiry together can result in more individualized and efficient formative assessment procedures, thus enhancing the educational experience of students as a whole (Luckin, 2017).

1.11 Summary

The chapter begins by explaining summative assessment as an assessment method commonly employed after a learning period to assess student achievement based on specific criteria. On the other hand, formative assessment has been viewed as a continuous process that involves providing students with regular feedback to help them recognize their areas of strength and areas for improvement. This feedback is instrumental in enhancing their learning experience and can result in positive student outcomes such as test anxiety, academic performance, self-efficacy, and self-regulation. The conceptual frameworks, purpose, and significance of the study served as a guide for this investigation, with study questions, hypotheses, and definitions related

to the assessment method discussed in this chapter. The next chapter will introduce research evidence and identify gaps in the literature related to the conjunction method as a teaching strategy in nursing education.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the existing literature concerned with using the conjunction method of assessment on nursing students, examining the impact on anxiety, performance, self-efficacy, and self-regulation. The literature review provides an overview of the studies conducted in different settings and their findings on the impact of formative assessment. In addition, it delves into the theoretical frameworks and models utilized to comprehend the connection between formative assessment and its outcomes in nursing education. The following sections thoroughly examine the main findings, discussing their significance in advancing our current knowledge and proposing potential avenues for future research.

In this chapter, the goal is to offer a thorough understanding of the current knowledge and areas of research that need further exploration about formative assessment in nursing education.

2.2 The Search Strategy

Databases including EHINARY, Medline, CINAHL, Science Direct, PubMed with Full Text, and Nursing and Allied Health Database were used to search the academic literature. Peer-reviewed journal papers with full text that were published within the previous six years from 2017-2023, in English, and that dealt specifically with nursing at the undergraduate level were among the inclusion criteria. Databases were searched using specific search terms to find publications about graduate nurse practitioner programs and diploma-to-degree bridging programs.

This scoping review employed a systematic approach to identify key search terms and develop search strings for querying databases. The search strings included terms such as "Classroom

assessment" or "Nursing Education," "Nursing students" or "Nursing undergraduates," "Formative assessment" or "Summative assessment," "Test Anxiety," "Academic Performance" or "Education," and "Self-Efficacy" and "Self-Regulation." In this search, a total of 52 articles were obtained from ERIC (OVID), 64 articles from PubMed, 40 articles from CINAHL Plus with Full Text, and 24 articles from the Nursing and Allied Health Database.

A total of 180 records were obtained from the database searches. After eliminating duplicate entries, a total of 169 articles were identified as possibly relevant. Following the screening of titles and abstracts, an additional 84 papers were deemed ineligible for inclusion. After conducting a thorough examination of the whole texts, an additional 48 papers were deemed ineligible and subsequently omitted from the scoping review. As a result, a total of 36 documents were included in the final selection for analysis.

Within the 36 research publications that were assessed, there were 7 qualitative studies, 13 quantitative projects, and 16 mixed methods projects. The articles were published between 2016 and 2023, with roughly half of them appearing in the previous four years.

2.3 Overview of content themes

Data from this extensive review was interpreted and organized into 5 content themes. The themes include:

2.3.1 Formative Assessment Strategies in the Context of Nursing Education

Formative assessment, usually referred to as assessment to enhance learning, is an ongoing interaction between learning and evaluation. It entails analyzing assessment data to identify competency, gaps, and progress and allowing students and teachers to adjust their learning and teaching tactics as necessary. To ascertain mastery, formative assessment, which is frequent and concentrated, and the 'Assessment Purpose Triangle' framework—Conversations,

Observations, Products—suggest that educational assessments should strike a balance between these three purposes: summative, formative, and diagnostic. This balance ensures that assessment isn't solely focused on measuring outcomes (summative) but also supports the learning process (formative) and identifies where learning support is needed (diagnostic). The framework acknowledges that these purposes are interconnected and contribute to a holistic understanding of educational assessment's role in promoting effective teaching and learning (Archer, 2017).

In addition, Archer (2017) assumes that educational institutions and instructors can use this framework to design assessment strategies that encompass all three purposes, leading to improved learning outcomes and a better understanding of students' progress and needs throughout their educational journey (Archer, 2017). In contrast, Paul Black and Dylan Wiliam emphasize the importance of formative assessment as a way to enhance teaching and learning in classroom assessment and pedagogy. They contend that evaluation should be utilized to encourage student growth and improve the caliber of education in addition to being used for grading. Black and Wiliam define formative assessment as the continual process of acquiring and analyzing evidence of student learning to guide instructional decisions. It entails giving prompt feedback, determining areas of strength and weakness, and modifying instructional strategies as necessary. With this strategy, the emphasis shifts from just giving out marks to actively encouraging student growth and establishing a culture of ongoing improvement. By incorporating formative assessment into routine teaching procedures, teachers can foster student engagement, motivation, and accomplishment (Black et al., 2018).

However, Using a framework known as the "Teacher Formative Assessment Practice Scale," the study aims to assess and gauge teachers' formative assessment practices. This tool will assist in quantifying the various methods teachers employ to foster student learning and

development. The research intends to offer insights into best practices and areas for improvement in formative assessment implementation, in order to better understand how instructors' techniques affect educational outcomes and raise the standard of classroom assessment procedures. The results indicated that both self-assessment and peer-assessment have a positive impact on students' academic performance. Specifically, self-assessment was found to significantly enhance students' ability to understand and monitor their learning processes, leading to better academic outcomes. Peer-assessment also contributed positively, promoting collaborative learning and critical thinking skills (Yan et al., 2022).

Also, it can help students understand their learning process, identify areas for improvement, and take corrective action to improve their skills (Chan, 2021) In addition, Ismail (2022) studied The impacts of formative evaluations on the writing abilities of EFL students at Abdel Elhamid ibn Badis University in Mostaganem. The results showed that students' writing skills could improve a lot if they were graded in a formative way (Ismail et al., 2022).

The study likely investigates how language teachers' understanding of students' formative assessment impacts their approach to summative assessment. Formative assessment involves ongoing assessments that inform instruction and support students' learning progress (Vera, 2022). The author might explore whether language teachers' awareness of formative assessment affects the way they design and conduct summative assessments, examining if teachers who are more knowledgeable about formative assessment tend to use more student-centered and tailored approaches in their summative assessments. The study found that language teachers who were more aware and knowledgeable about formative assessment practices demonstrated a deeper understanding of their students' learning needs and progress. These teachers were able to use

formative assessments to gather continuous feedback, which informed their teaching strategies and helped in identifying areas where students needed additional support (Ahmed et al., 2019). Summative evaluation is a high-stakes, high-stress evaluation with little bearing on learning. It offers little opportunity for trainees to receive feedback since it is only a means—not the goal—to an end. On the other hand, formative assessment continuously monitors trainees' learning progress while offering chances for feedback. The learner-centered methodology promotes learning and has a big influence on the medical industry. Formative evaluation encourages exploration and experimenting, which produces desirable results when accompanied with good feedback (Esezobor, 2021), Our comprehensive literature review reveals that classroom assessments significantly influence the planning, monitoring, and feedback stages of education. These assessments aid teachers and students in setting objectives, evaluating performance, adjusting teaching strategies, and fostering a sense of ownership. Additionally, they help students develop self-assessment and self-regulation skills while promoting a growth mindset by teaching that mistakes and failures are opportunities for improvement (Andrade & Brookhart, 2020).

During each learner's educational journey, formative assessment involves coaching and leading them. This evaluation technique may be official or casual. Using resources like instructor’s use of structured exercises, online tests, self-evaluation forms, and questionnaires Conversely, it is informal when it is done through class questions and group discussions without the use of any special tools. Traditional "paper-and-pencil" assessments with instructor grading have historically been used to implement the formal variety of this strategy. This kind of formative evaluation, however, does not encourage immediate responses or active student involvement in the assessment process. As an alternative to the traditional formative assessment

approaches, utilizing information and communication technologies (ICT) and the internet is suggested (Lajane et al., 2020).

Moreover, formative assessments are used to modify instruction and help students grow, while summative evaluations are used to assign grades. A well-articulated learning model must logically connect these two types of evaluations. Sociocultural theory, which combines cognitive growth and motivation, aims to create equal learning environments. To foster a positive learning environment in the classroom, it is suggested to emphasize ambitious teaching techniques and minimize the negative consequences of grading. For professional growth, it is essential that instructors receive support as they master various evaluation techniques (Shepard, 2019), Also, the progress-based model of a culture of learning in the classroom in terms of integrating formative assessment practices with ambitious teaching in educational settings is discussed in the same research, and its conclusions focus heavily on blending rigorous instruction with formative assessment strategies in educational settings. It strongly emphasizes continuous assessment, real-time adjustments, and flexible teaching strategies. The methodology enables teachers to adapt teaching to students' strengths and weaknesses by bridging the gap between assessment and teaching. It requires a cultural shift and leverages assessment data for continuous development with a focus on guiding and enhancing the learning experience (Furtak et al., 2016).

Ontiveros (2017) explored strategies to help schools and districts achieve state-set milestones. The study concluded that this implementation would involve establishing a standardized curriculum, allocating resources for teaching aids, and providing professional development opportunities for teachers. With the support of specific professional development and tools like computer software or mathematics coaches, the emphasis should be on enhancing mathematics instruction. The study highlighted the importance of using formative tests to

monitor learning progress and identify areas of improvement. These tests facilitate the effective dissemination of concepts among teachers and encourage reflective analysis of student data. However, the study also emphasized that student engagement is just as critical as academic achievement. Teachers should encourage students to take ownership of their learning and maintain a record of their progress on a recording sheet. The study emphasized the significance of quality teaching, data-driven decision making, standards-aligned assessments, and active student participation in the formative assessment system (Ontiveros, 2017).

Education officials, educators, and academics are coming to understand the importance of formative assessment as a tool for student learning and accomplishing academic goals (Ozan & Kincal, 2018).

In a recent study conducted by Ahmad and colleagues(2019), the researchers investigated the relationship between language teachers' knowledge of students' formative assessments and their approach to summative assessment practices. The study found that language teachers who had a strong awareness and understanding of their students' formative assessments were more likely to adopt more effective and tailored approaches to conducting summative examinations. This, in turn, led to enhanced learning outcomes for students. The researchers emphasized the importance of bridging the gap between formative and summative assessment techniques in language teaching in order to improve the overall assessment process and support student learning. Additionally, the study highlighted the notion that both formative and summative evaluations can serve as both formative and summative assessments, shifting the focus from quality control to quality assurance in the learning process. The researchers recommended that instructors continuously evaluate student progress throughout instruction in order to make necessary modifications to their teaching methods (Ahmed et al., 2019).

Formative assessment exhibits a notably less formal character when contrasted with summative evaluation. Daşkın and Hatipoğlu (2019) argue that formative assessment has a distinct role in the process of test-taking by facilitating the elicitation of student knowledge through informal frameworks. Various methods can be employed to assess students' knowledge, including but not limited to engaging in group discussions, engaging in discourse with teachers, posing reflective questions, and evaluating students' progress throughout classroom activities. Given that feedback is mostly derived from empirical study, it is also commonly delivered in an informal manner (Can Daşkın & Hatipoğlu, 2019).

According to Bacquet, there is a growing body of literature that emphasizes the significance of summative and formative assessment procedures being integrated into the Japanese educational system. The improvement of student learning outcomes, the promotion of a more comprehensive knowledge of student development, and support for educational changes in Japan are all considered to be dependent on this integration. The evaluation also emphasizes the necessity of ongoing study and the actual use of balanced assessment systems to suit the changing demands of Japanese education (Bacquet, 2020).

Furthermore, A study was conducted on how formative assessment affects the writing abilities of students of English as a foreign language at the University of Mostaganem, and the study supported the idea that formative assessment enhances writing outputs and increases the efficiency of the writing process, and the results supported the value of formative assessment in the writing process because it helps students to see their strengths and shortcomings The study added that teachers of written expression reduce writing problems and provide opportunities for practice to encourage students to create high-quality written texts. The study viewed continuous

feedback during the writing process as an excellent method for inspiring students and pushing them to produce high-quality work (Burner, 2016).

According to Buchholtz et al. (2018), the integration of formative and summative assessment strategies in mathematics teacher education can significantly increase the efficacy of teacher preparation programs. Buchholtz conducted a study on combining and integrating formative and summative assessment in mathematics teacher education. This integration aids aspiring math educators in gaining a greater comprehension of both subject matter and instructional strategies, improving the caliber of instruction and student learning results. To better prepare educators for the complex problems of effectively teaching mathematics, the research underlines the significance of matching assessment procedures with the objectives of teacher education programs (Nortvedt & Buchholtz, 2018), Furthermore, effective assessment processes should take these factors into account, according to Lau's (2016) study of the dichotomy in assessment literature., The dichotomy between summative and formative evaluation in education is criticized, with the suggestion that they should complement one another. It contends that formative evaluation, So ‘Formative good, summative bad?’. The conventional dichotomy of classifying assessments as either "formative" or "summative" is unnecessarily simple and fails to adequately convey the diversity and potential of assessment procedures in education, in conclusion, divide between formative and summative exams should be understood as flexible rather than rigid since both may play important roles in assisting student development. A well-designed blend of formative and summative tests may improve the entire learning experience for students (Lau & Education, 2016).

Based on students' perspectives on exam-based and task-based approaches in education, a recent study by Levent and Ertok (2020) indicates that students generally favor the task-based

approach as a formative evaluation method over the exam-based approach as a summative evaluation method. According to the study, students believe that task-based evaluations offer a more beneficial educational experience as they encourage active participation, critical thinking, and the practical application of knowledge in real-world scenarios. The research suggests that teachers should consider incorporating more formative evaluation techniques, such as assignments and projects, into their lesson plans to enhance the overall educational experience and increase student satisfaction (Uzun & Ertok, 2020).Additionally, the study explores the attitudes, beliefs, and emotions of lecturers in response to feedback from students through teaching evaluations, which is a common practice in higher education. It is likely that the research employs qualitative methods such as interviews or surveys to gain insights into how lecturers perceive and respond to student feedback. Possible research inquiries may include exploring lecturers' perceptions of the value and accuracy of these evaluations, their emotional reactions to positive and negative feedback, and how they utilize feedback to improve their teaching methods. The findings of this study could shed light on how lecturers utilize these evaluations for professional growth and integrate feedback into their teaching strategies. This research contributes to the ongoing discussions about the role of student evaluations in faculty development, particularly in the context of nursing education (Chikazinga, 2018).

Summative evaluations, according to a study, provide a retrospective look at a teacher's performance and insights on long-term progress and outcomes. On the other hand, formative assessments, which are ongoing and common, enable quick feedback and adjustments, improving the teaching process as a whole. Likewise, integrating the two assessment kinds results in a comprehensive evaluation framework that considers both the overall results and the teaching strategies used by EFL teachers. This strategy can result in more helpful and precise

feedback for teachers, fostering their professional development and improving teaching techniques (Wei, 2015).

Diving into the intricacies of Japanese education, this study embarks on a deep dive into the existing literature to unravel the usage and impact of assessment methods. Aiming to shed light on the application and perception of summative and formative assessments in Japan, the article explores their implications on student learning, teaching practices, and educational policies. Jennifer Ngan Bacquet discusses how summative evaluations, often conducted at the end of lessons, influence high-stakes decisions like grading and university admissions. In contrast, formative assessments, which provide ongoing feedback, play a crucial role in enhancing student improvement and engagement. The review highlights the similarities and differences between Japanese assessment practices and those in other educational systems, considering cultural and contextual factors. Ultimately, this study enriches the understanding of how assessment practices shape education in Japan, offering valuable insights for educators, academics, and policymakers (Bacquet, 2020).

Formative assessment has the potential to be strategically developed to align with various levels of Bloom's Taxonomy (Na et al., 2021). so, fostering the development of higher-order cognitive skills among first-year nursing students. This deliberate approach has the capacity to have favorable effects on their academic achievements and self-perceived capabilities (Choudhury & Freemont, 2017).

Moreover, Multiple Choice Questions (MCQs) are a formative assessment tool that can be introduced at the end of each lecture to reinforce learning in first-year medical students. This approach has been shown to improve academic performance and cognitive skills (Hessels et al., 2019).

2.3.2 Formative Assessment and its Effect on Test Anxiety

Test anxiety may be lowered by formative exams because they are less high-stakes and more geared toward growth. When they see evaluations as a necessary component of the learning process, students are more likely to experience less pressure and anxiety. citation Summative evaluations, particularly if they are given too much weight, may raise test anxiety levels, While (Alahmadi et al., 2019) found that formative assessment helped Saudi learners solve the problems they encountered in speaking tests.

A study conducted by Piroozmanesh and Imanipour (2018) investigated the impact of formative assessment on test anxiety among nursing students. The primary finding of the study was that formative assessment methods can significantly reduce test anxiety in nursing students. This suggests that implementing formative evaluation strategies can help nursing students better manage their anxiety levels and improve their overall academic performance. The research also revealed a correlation between higher levels of test anxiety and academic struggles and stress among students. Thus, reducing test anxiety not only enhances academic achievement but also contributes to the general well-being of nursing students. To further address exam anxiety in nursing education, the researchers recommended the implementation of stress management techniques and support systems. The study also emphasized the importance of creating an inclusive and supportive learning environment that fosters student interaction and promotes self-regulated learning. By incorporating these recommendations, nursing education programs can effectively reduce exam anxiety and improve student learning outcomes (Piroozmanesh & Imanipour, 2018).

The study conducted by Ismail et al. (2022) in Iran revealed that the implementation of formative assessments had a good influence on academic motivation, learning attitude, decrease

of test anxiety, and development of self-regulation abilities among Iranian English as a Foreign Language (EFL) students. The study proposes that instructors should integrate formative assessments into their educational approaches in order to receive ongoing feedback, hence improving student engagement and self-assessment strategies (Ismail et al., 2022).

These low-stakes formative examinations can give students experience and boost their self-confidence, which can help them feel less anxious before high-stakes exams. Additionally, teachers can foster a supportive and upbeat environment that encourages students to believe in their own abilities by including such assessments in their instruction. This is what was confirmed by Malespina and Singh in "Gender differences in test anxiety and self-efficacy: Why instructors should emphasize low-stakes formative assessments in physics courses": that there are notable gender differences in test anxiety and self-efficacy among students in physics courses. These discrepancies suggest that teachers should think about including low-stakes formative assessments in their lesson plans in order to reduce test anxiety and boost self-efficacy, especially among female students. By doing this, teachers may improve the inclusiveness and effectiveness of the learning environment in physics classes, which will ultimately help all students—regardless of gender—achieve greater academic results (Malespina & Singh, 2022).

Students were able to create a more welcoming and familiar testing atmosphere due to the shift to remote learning. In traditional classroom settings, peer pressure and the fear of criticism often increased students' pressure and anxiety. This was highlighted by Ewel et al. My own study revealed that during the COVID-19 pandemic, students reported lower levels of test anxiety. This reduction in test anxiety can be attributed to several factors, including changes in assessment methodologies, a decrease in in-person testing venues, and improved scheduling flexibility. These modifications to educational practices and the transition to online learning led

to a significant reduction in reported test anxiety compared to pre-pandemic times (Ewell et al., 2022).

The degree to which a student feels social support from peers, teachers, and mentors can have a big impact on how anxious they feel during tests. Medical schools can encourage students to ask for help and express their concerns by providing a supportive and inclusive learning environment. Implementing stress-reduction methods like mindfulness exercises and relaxation techniques can help to further ease exam anxiety. Wadi and others' "qualitative analysis of medical students' viewpoints" conclude that a complicated interplay of various elements affects how nervousness about tests affects medical students. These variables cover both human traits, such as coping mechanisms and self-efficacy, as well as environmental variables, such as the academic setting, instructional methodologies, and assessment formats. The development of successful therapies and support systems to help medical students manage and relieve test anxiety, eventually increasing their well-being and academic achievement, depends on a thorough understanding of these complex impacts (Wadi et al., 2022), Allowing students test-taking tips and tricks to reduce stress is one feasible intervention that may be put into place. Additionally, fostering an environment of support and encouragement throughout the OSCEs may help to lessen test anxiety and enhance performance, this is the statement verified by Hadi et al. A cross-sectional survey" is that test anxiety has a sizable impact on how well pharmacy students perform in OSCEs. According to the research, pharmacy students who experience more test anxiety perform worse on their OSCEs, underscoring the need for interventions and assistance to help students control and reduce test anxiety and improve their performance on clinical exams (Hadi et al., 2005).

Regular feedback and self-reflection play a crucial role in monitoring progress and addressing areas of weakness or anxiety, bolstering students' confidence and enriching their overall learning experience. Bayat et al. investigated the effects of formative assessment on anxiety levels and listening proficiency in a sample of 60 Iranian English as a Foreign Language learners. The findings of the study indicated a statistically significant disparity in anxiety levels and listening effectiveness between the interventional group and the control group. The research indicates that the implementation of formative assessment has the potential to greatly augment the acquisition of knowledge and mitigate levels of anxiety experienced by learners (Bayat et al., 2017), The implementation of appropriate study preparation has been found to have a substantial impact on reducing test anxiety and improving overall test performance. The present study used a quasi-interventional research design to examine the relationship between comprehensive study preparation tactics and test anxiety levels among students. The findings indicate that students who actively engage in these strategies demonstrate a significant reduction in test anxiety, which subsequently contributes to enhanced performance on assessments. The aforementioned discovery underscores the significance of cultivating and executing efficient study methodologies as a strategy to mitigate test-related anxiousness and augment scholastic performance (Yusefzadeh et al., 2019) , " suggests that Quizzes demonstrates efficacy as a formative assessment tool inside German classrooms. The empirical evidence indicates that the utilization of Quizzes has a positive impact on student engagement, fostering active involvement in the learning process. Additionally, it offers vital feedback to both educators and learners. This digital technology not only facilitates the learning process but also enables educators to customize their lessons to cater to individual student requirements, hence enhancing the entire

learning experience within the domain of German language education (Permana & Permatawati, 2020).

2.3.3 Empowering Academic Performance through Formative Assessment

Academic achievement is the degree of success and accomplishment that students achieve in their academic activities. This can include performance in courses, assignments, tests, and general subject-matter understanding (Delfino, 2019). Formative assessments can have a beneficial effect on students' motivation since they place a strong emphasis on feedback and learning development. Students are more likely to feel driven to improve when they get helpful criticism about their progress. If formative assessments do not balance out summative evaluations, learning may suffer in favor of grades (Faber et al., 2017). In addition, it was shown to be the most important element for students' academic achievement in Hattie's meta-analysis of 800 studies. Formative assessment is the continual process of compiling data on students' learning development in order to give prompt feedback and modify training. Summative assessment, which evaluates students' learning after a unit or course, is sometimes contrasted with this kind of evaluation. According to Hattie's study, when teachers employ formative assessment techniques consistently in their classes, student academic attainment greatly increases, followed by feedback (Yan & Pastore, 2022).

Ashdale (2020) concluded that there were no significant differences between interventional and control groups based on pre-test and post-test scores, but the interventional group had a significant number of students with at least a 60% accomplishment growth (Ashdale, 2020). Persaud (D. Y. K. Singh & Dubey, 2021) revealed that quizzes and mock examinations positively affected the accomplishment of working adult learners, with the "mock exam" group exceeding the "quizzes and mock exams" group, In additionally practices for formative

evaluation have been demonstrated to greatly improve students' self-control, attitude toward learning, and academic performance. Formative assessment was designed with constructivist learning theory to prioritize process evaluation over product assessment in Turkey's educational system. This method improves students' attitudes and academic performance by evaluating them according to their developmental stages without comparison. The use of formative assessment helps students manage challenging circumstances, such as high test and grading standards, and take ownership of their learning. In the classroom, group projects encourage collaboration and unity (Ozan & Kincal, 2018).

In a study conducted by Ahmed et al. (2019), the researchers examined the impact of language teachers' understanding of formative assessment, specifically classroom performance, on the variation in summative assessment. The findings of the study indicated a notable disparity in the grades assigned by teachers who were knowledgeable about their students' classroom performances compared to those who were unaware of their student's performance in the class. Feedback and formative evaluation go hand in hand since the former emphasizes student work and other signs of effective learning. Assessment and information delivery have an impact on the quality of formative assessment, and feedback literacy development is essential, Students can enhance their learning by identifying their strengths and shortcomings by receiving feedback on their performance (Ahmed et al., 2019). Formative assessment gives teachers insightful information about the efficiency of their lesson plans and curricula, enabling them to make the required changes to improve student learning outcomes and performance (McCallum & Milner, 2021).

According to Wing (2018), using a well-balanced synergist of formative and summative evaluations in an online healthcare course can improve a variety of characteristics of student

performance and engagement. According to the study, in the context of online healthcare education, such an approach promotes more student connectedness, higher levels of satisfaction, improved learning outcomes, and improved academic achievement (Ozan & Kincal, 2018). The effects of formative assessment on academic achievement, attitudes toward the lesson, and self-regulation skills.

Many methodologies and theories in the field of assessment converge on the fundamental notion that assessment information serves as instructional feedback for students, therefore enhancing their learning process. In this manner, both educators and learners may benefit from formative assessment. Specifically, instructors can utilize the information gathered on students' achievements and development to inform their instructional insights. Simultaneously, students can gain insights into their areas of proficiency and areas requiring improvement, enabling them to take appropriate measures for enhancement. The formative assessment facilitates the cultivation of a development mindset and fosters active student engagement through the use of prompts and teachers. Additionally, this technology enables educators to customize their instructional approaches according to the unique requirements of each student, eventually resulting in improved student performance and overall academic attainment (Lipnevich & Smith, 2018), Additionally, a mixed study conducted at the University of Manchester, "An Evaluation of Formative Feedback and its Impact on Undergraduate Student Nurse Academic Achievement, by Mackintosh-Franklin (2021), reveals that the provision of effective formative feedback has a significant and positive influence on the academic achievement of undergraduate student nurses. This study underscores the importance of timely and constructive feedback in improving learning outcomes and highlights the need for educators and institutions to prioritize the implementation

of robust feedback mechanisms to support student success in nursing education (Mackintosh-Franklin, 2021).

Bhat and Bhat (2019) conducted a study and revealed that formative assessment is an ongoing and significant instrument to assess the development of students during the instructional process, with a specific emphasis on the acquisition of knowledge rather than the attainment of final grades. It provides students with an opportunity to engage in practice activities that are similar to meaningful homework assignments. In contrast, summative evaluations play a crucial role in facilitating enhancements in pedagogical approaches and promoting a culture of collaboration among educational practitioners. In the event that summative exams consistently expose disparities between student knowledge and learning objectives, educational institutions may elect to change or implement new curricula in order to rectify these deficiencies. Summative assessments are often administered at the conclusion of an academic semester and encompass a variety of evaluative methods, including examinations, standardized tests, projects, essays, presentations, reports, and the assignment of final marks.

A research initiative was conducted to investigate the impact of formative assessments on students' acquisition of knowledge in the field of United States history in a private school's general education environment. A mixed-methods approach was used to acquire the data, combining quantitative and qualitative techniques. According to the report, formative assessment greatly improves student learning, with a 7%–16% improvement in summative scores, particularly for foreign, inclusion, and 504 children (Huisman, 2018), In order to establish a higher degree of confidence about the causal relationship between formative assessment and its observed impact on student outcomes current review by Klute et al in 2017 concluded their study provides a comprehensive analysis of the evidence surrounding the impact

of formative assessment techniques on the academic accomplishment of primary school students. The findings of their review suggest that these practices have a favorable influence on students' academic performance. The findings examined in the research indicate that the implementation of formative assessment procedures by instructors in primary school environments is associated with enhanced student learning outcomes. The aforementioned discovery highlights the significance of integrating formative assessment into the teaching methodologies employed by primary school teachers in order to improve student academic performance (Klute et al., 2017).

Therefore, nurse educator practices in the measurement of student achievement are valuable, so Birkhead conducted a study that examined the frequency and usage of multiple-choice questions (MCQs) as a means of gauging student performance in New York State's pre-licensure nursing programs. MCQs make up a sizable component of testing in these programs, according to a poll of 200 nurse educators, which found that 65% of participants believed that at least 80% of grades were based on testing and that MCQs made up around 81% of test questions. According to the study, in order to enhance their assessment procedures, nurse educators should have access to mentoring and professional development. It addresses the demand for greater faculty training in test development and interpretation and underlines the significance of written testing policies within nursing education programs to ensure excellent assessment processes. The study also emphasizes the possible repercussions of poorly designed tests, highlighting the significance of legitimate and reliable assessment techniques in nursing education (Birkhead & Jatulis,2016).

The University of Isfahan in Iran's study by Amir Mahshanian, Reihane Shoghi, and Mohammad Bahrami looks at the relationship between formative and summative evaluations and the final performance of English as a Foreign Language (EFL) students. The study investigates whether term-ending summative evaluations or ongoing formative assessments have different

effects on the overall academic performance of EFL learners. By demonstrating the varied effects of these assessment methodologies on student progress, the findings could guide EFL educational practices (Mahshanian et al., 2019), However, the study by Rebecca Morris, Thomas Perry, and Lindsey Wardle probably emphasizes how important formative evaluation and feedback are for improving learning outcomes in higher education. The summarization of several studies highlights the significance of thoughtfully planned formative assessment procedures and prompt, helpful feedback in fostering student engagement, motivation, and academic accomplishment. The analysis also underlines the necessity for educators to embrace evidence-based tactics for efficiently implementing formative evaluation and feedback in the context of higher education (D. H. Morris et al., 2021).

2.3.4 Self-Efficacy and Self-Regulation Enhancement via Formative Assessment

Formative feedback motivates students to take charge of their education and hone their self-control. They gain the ability to evaluate their performance, set objectives for growth, and take initiative to advance their knowledge and abilities; this is known as "self-regulation and is a crucial ability that not only helps students succeed academically but also equips them for lifelong learning and personal growth. Self-regulated learning allows students to take charge of their education by actively monitoring and modifying their learning tactics to meet their objectives (Panadero, 2017; Yan et al., 2022) Also, as students actively interact with feedback to enhance their performance, formative evaluations build self-regulation abilities. They get the ability to recognize their areas of weakness and put learning enhancement techniques into practice (Citation). Summative assessments may not offer students the same potential to build self-regulation abilities if they are not accompanied by opportunities for reflection and development. It’s critical to remember that the effects of tests might change depending on the educational

context, unique student features, and the precise way in which assessment procedures are used. Fostering a comprehensive and productive learning environment requires striking a balance between formative and summative assessments (Viana et al., 2022).

Academic self-efficacy is a significant determinant of academic achievement. Academic self-efficacy pertains to the cognitive perceptions and attitudes held by students regarding their aptitude to attain academic accomplishments, as well as their confidence in effectively executing academic assignments and acquiring knowledge presented in educational contexts. Academic self-efficacy refers to an individual's perception of their own competence and their confidence in their ability to overcome obstacles and achieve academic success (Zhao et al., 2021). A study conducted at the University of California explored the impact of formative assessments on student learning and showed that student-initiated formative assessments are most effective, highlighting the importance of active learning in successful assessment. And suggest that more proactive learning processes are needed, aligning with the shift from teacher-centered to student-centered instruction. It also suggests implementing effective formative assessment practices for targeted skill development (Na et al., 2021), Demonstrated rating scales are an effective instrument for assessing the overall performance of nursing students in clinical situations. These measures offer a systematic and uniform manner to evaluate different facets of student performance, including clinical abilities, professionalism, and communication, enabling a more objective and consistent assessment. According to the study, the use of rating scales improves the validity and reliability of summative evaluations in nursing education, thereby enhancing the quality of patient care and nursing student training (Gurková et al., 2018).

Furthermore, the act of engaging in self-assessment has been found to have a positive impact on the development of self-efficacy among teachers, leading to an increased sense of

confidence in their aptitude to proficiently instruct English as a second language. The significance of integrating self-assessment methodologies into teacher development programs to enhance the growth and efficacy of English as a Foreign Language (EFL) educators is emphasized by this research (Huang, 2022), The beneficial impacts of formative assessment on the development of self-regulation skills have the potential to transcend beyond the confines of academia, This is what he proved Beekman by A longitudinal study" indicates that the self-regulation skills cultivated among young adolescents through formative assessment exhibit a certain level of durability over an extended period. The research indicates that the acquisition of self-regulation abilities can have ongoing advantages for young adolescents as they advance in their academic pursuits. This underscores the possible enduring benefits of formative assessment on student learning and self-regulation (Beekman et al., 2021).

Also, the impact of formative frameworks on students' self-efficacy and self-regulation within the domain of mathematical assessments has been examined. The primary outcome of the study was to ascertain the effectiveness of formative assessment strategies in bolstering students' self-efficacy and fostering self-regulation during exams. It was further discovered that the implementation of formative assessment within a mathematics test scenario can exert a significantly beneficial influence on students' self-efficacy beliefs and self-regulation skills, thereby enhancing their overall learning capabilities (Grothérus et al., 2019).

Through the development and cultivation of self-regulation abilities, students are empowered to assume responsibility for their learning and engage actively in their educational endeavors. White and DiBenedetto assert that self-regulation holds significant importance as a fundamental element within the context of standards-based education. The importance of students' capacity to proficiently govern their learning processes, motivation, and conduct is

underscored in the context of attaining success within a standards-based educational framework. The chapter emphasizes the significance of incorporating self-regulation skills into instructional and educational procedures in order to assist students in surpassing academic benchmarks and developing as lifelong learners (DiBenedetto, 2017), The effects of educational methods and strategies designed to improve the academic achievement of students are significant. Fatima and others wrote about the relationship between students' perceptions of feedback and their academic self-efficacy and self-regulation in the context of higher education in Pakistan. and found evidence to suggest that students' beliefs about feedback significantly influence their confidence in their academic abilities (self-efficacy) and their ability to regulate their learning effectively (Fatima et al., 2021).

Pintrich and Zeidnezas are three of the important contributors to the development of self-regulation theory. Formative evaluation strategies for writing assignments have been found to significantly enhance students' self-regulation in all areas, except environmental structure (Miraki et al., 2016).

Self-regulation is the cognitive process by which individuals exert control over their behavior, emotions, and ideas to attain particular objectives in their learning process, making them more engaged, inventive, and inquisitive learners. The use of formative assessment has the potential to foster active engagement from first-year nursing students in their learning endeavors by facilitating the development of self-regulation abilities, including goal establishment, time allocation, and self-evaluation. Consequently, these skills can enhance academic achievement and mitigate test-related anxiety among these students (Ćwikła, 2021).

2.4 Theoretical Framework

The theoretical framework plays a crucial role in facilitating investigations and identifying the interactions among variables inside a study. Within this particular setting, it is possible to study the impact of using formative assessments on Palestinian nursing students in terms of academic test anxiety, academic performance, self-efficacy, and self-regulation by utilizing the Social Cognitive Theory (SCT). The Social Cognitive Theory (SCT), proposed by American psychologist Albert Bandura, suggests that learning is a dynamic method that occurs as a result of the interaction of external factors, psychological variables (Ilmiani et al., 2021).

Albert Bandura's Social Cognitive Theory (SCT) highlights that learning is a dynamic process influenced by external factors, psychological variables, and the active role of the mind in constructing knowledge. This viewpoint emphasizes the importance of observational learning, where people learn new behaviors by watching and copying others, demonstrating the interplay between cognitive, behavioral, and environmental elements. Bandura's concept of triadic reciprocal determinism further demonstrates this interaction, emphasizing how behavior, cognitive and other personal factors, and environmental influences all interplay with each other (Abdullah, 2019).

Furthermore, Bandura introduced the concept of self-efficacy within SCT, which is essential in the learning process. Self-efficacy is related to an individual's confidence in their ability to carry out behaviors required to achieve specific goals (Bandura, 1982-2012). Having confidence in one's abilities is essential for driving the behaviors required for learning and growth. It indicates that an individual's belief in their capability to complete a task impacts their motivation and learning results. The theory's practical use extends across different fields, such as educational environments, where it has been utilized to comprehend and improve learning

methods through techniques like modeling and observational learning. This helps create a learning-friendly atmosphere through social interaction and self-belief in one's abilities (Ilmiani et al., 2021).

The formative assessment strategy will have an impact on the first-year nursing students' self-efficacy, or their confidence in their ability to perform well on assessments, according to this framework. Test anxiety and academic performance are highly influenced by the student's belief in their ability to effectively manage assessments.

Social Cognitive Theory (SCT) posits that learning occurs in a social context and can be enhanced through experiences, observing others, and the perception of one's capabilities, which is known as self-efficacy. In the context of nursing education, formative assessment plays a significant role in shaping students' self-efficacy beliefs, which are crucial for their motivation and learning outcomes (Panigrahi et al., 2020). Thus, programs built upon social cognitive theory have proven to be highly effective in enhancing students' self-efficacy and consequently influencing their motivation and learning outcomes. For example, engaging in interprofessional nursing peer learning activities has been proven to improve students' self-confidence and have an effect on ensuring the delivery of high-quality nursing care (Kirkpatrick et al., 2018). Similarly, student self-efficacy at all phases of portfolio competency assessment is positively influenced by authenticity and feedback in formative assessment, highlighting the significance of reflective and evaluative processes in fostering competency and self-confidence (Dinther et al., 2015).

2.5 Conceptual Framework

This study will compare the effects of summative assessment and summative with formative assessment methods used in a nursing course at a university. The independent variable is summative vs formative assessment, while the dependent variables are test anxiety, academic

performance, self-efficacy, and self-regulation. The figure “1” below shows the conceptual framework proposed for the study.

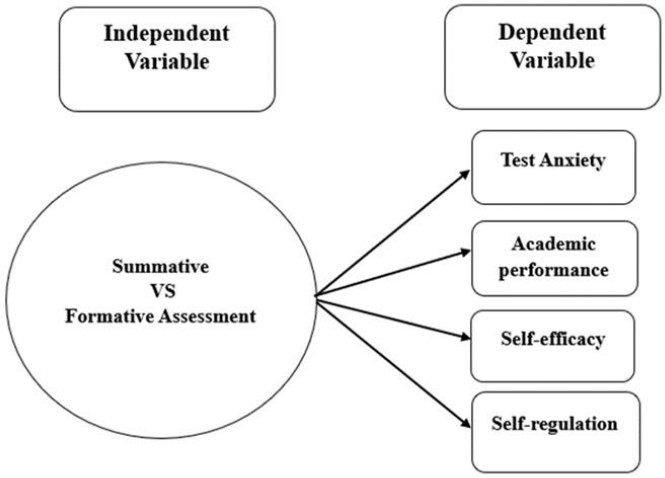

Figure 1: Conceptual Framework

2.6 Summary

This literature review highlighted that formative assessment has proven to be valuable in many areas of education. Formative assessment is known to enhance student learning outcomes by offering frequent feedback and enabling instructional adjustments. In addition, research has demonstrated its ability to enhance student engagement and motivation during the learning process. Likewise, formative assessment can provide valuable insights to teachers regarding areas where students may need additional support. This enables educators to implement focused interventions and tailor instruction to meet individual needs.

The nature of the feedback and the assessment environment are two variables that can have an impact on student anxiety. The chapter emphasizes the importance of regular formative

assessments in improving academic outcomes. These assessments enable students to identify their strengths and weaknesses and make necessary adjustments to their learning strategies. The review also explores the importance of formative assessments in improving self-efficacy, highlighting how positive feedback can enhance students' confidence in their abilities. At last, the chapter explores self-regulation, highlighting the importance of formative assessments in empowering students to actively engage in their learning journey. It emphasizes the significance of setting goals, utilizing strategic learning techniques, and reflecting on progress.

An extensive examination of the literature highlights a notable research gap, specifically the scarcity of studies that address the specified topic in the context of Palestine and the broader Middle East region. The lack of research specific to this region highlights the importance of our investigation. This study is driven by the belief that understanding the effects of formative assessment strategies on nursing students' educational experiences is crucial for enhancing educational methods and results. This research aims to fill a significant gap in the scholarly literature by providing valuable insights into improving nursing education in underrepresented contexts. The unique socio-cultural and educational landscape in Palestine makes this research particularly important. This study is a significant initiative that explores the intersection of education, psychology, and healthcare training in a previously overlooked region. It has the potential to enhance local educational policies and make a valuable contribution to the field of nursing education research.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the study design, setting, demographics, sampling, data collection procedure, study tools, intervention, and pilot study. Ethical considerations, data collection, and data analysis are also discussed.

3.2 Research Design

The researcher constructed a study design that utilizes both quantitative and qualitative methodologies to examine the impact of formative assessment on students' learning outcomes and experiences. The researcher used a pre-posttest nonequivalent group design in the second semester of 2022–2023.

The utilization of mixed methods in academic research is highly significant as it allows researchers to profit from the advantages offered by both quantitative and qualitative methodologies. The process of integration facilitates a more thorough and complex comprehension of multifaceted phenomena, enabling researchers to investigate multiple elements of a given study inquiry. The integration of numerical data derived from quantitative methodologies and in-depth contextual insights obtained through qualitative methodologies serves to improve the credibility and dependability of research findings (Reynolds et al., 2022; Wasti et al., 2022).

The quantitative facet of this study is to furnish empirical data about the effectiveness of formative assessment as an adjunctive approach. In order to accomplish this objective, the researcher will utilize pre and post-assessments as a means of quantifying the alterations in

student learning outcomes. The intervention group (receiving formative assessment and summative assessment) were subjected to the formative assessment intervention, whilst the control group (receiving summative assessment) did not receive the intervention. Through the application of statistical tests, this study aims to analyze and compare the performance of different groups, thereby shedding light on the potential influence of formative assessment on student academic outcomes (Levent & Ertok, 2020).

In addition to the quantitative evaluation, the qualitative aspect of the study will be crucial in understanding the intricacies that underlie the research topic. The researcher employs qualitative methodologies including interviews, to thoroughly investigate the multifaceted elements of students' encounters with and perspectives on the formative assessment intervention. This comprehensive methodology facilitates the examination of various elements, including motivation, engagement, and the learning environment, which may not be fully captured by quantitative data alone (Lo & Hew, 2020). By integrating both quantitative and qualitative elements, this research method provides a comprehensive understanding of the effects of formative assessment on both academic performance and student perceptions. The research issue is enhanced by adopting a multidimensional method, which surpasses the limitations of a single perspective and offers a whole picture of the topic (Peters et al., 2018). Qualitative content analysis was the method employed.

3.3 Setting

The research was conducted with great attention to detail within the prestigious premises of the Faculty of Nursing at Modern University College, located in the dynamic city of Ramallah, Palestine. Situated within the enchanting surroundings of the area, this educational establishment serves as a symbol of intellectual enlightenment and groundbreaking

advancements. The Faculty of Nursing, renowned for its dedication to the pursuit of quality in both education and research, offers an optimal environment for the study's endeavors. The university provides an exciting environment that is likely to facilitate insightful inquiries, thanks to its state-of-the-art amenities, technologically equipped classrooms, and quiet ambiance suitable to intellectual exploration. Ramallah, the city center in which this academic institution is situated, contributes a valuable and enriching aspect to the overall context of the research. Ramallah is renowned for its historical significance and contemporary liveliness, effectively juxtaposing traditional elements with progressive aspects. This distinctive combination of characteristics renders Ramallah an exceptional setting for scholarly study pursuits. The urban area's rich cultural heterogeneity, vibrant commercial centers, and proximity to diverse healthcare establishments also offer researchers valuable prospects for meaningful involvement and data acquisition. Ramallah, serving as the central hub of the Palestinian territories, embodies qualities of persistence and drive, hence emphasizing the significance of the study's objectives in the realm of healthcare and nursing. Considering the prevailing circumstances characterized by a notable emphasis on scholarly achievements and cultural importance, the research conducted at the Faculty of Nursing, Modern University College, located in Ramallah, Palestine, has the potential to bring about significant changes by seamlessly integrating the quest for knowledge with a profound comprehension of the specific regional circumstances. Modern University College grants bachelors and diploma degrees in sixteen majors. It was established in the city of Ramallah in the West Bank, of Palestine.

Founded in 1983, Modern University College follows an educational philosophy that combines both academic and practical aspects. This approach aligns with the needs of Palestinian society and the requirements of its job market, based on the belief that its graduates should play

an active role in the developmental process. At Modern University College, there are two main academic levels: the bachelor's degree program and the professional diploma program. The college has 2,000 students, including 400 bachelor's degree nursing students in 2023 (MUC, 2023).

3.4 Population and Sampling

The sample population comprises first-year undergraduate nursing students enrolled in the Modern University College of Nursing in Palestine. The selection of participants for this study was conducted via the convenience sampling technique. This methodology entails the selection of persons who are easily accessible and eager to engage in the research. The initial cohort of nursing students in their first year were contacted via a range of communication methods, including electronic invitations sent via email, verbal announcements made in the classroom, and physical notifications posted on bulletin boards. Detailed information regarding the study, including its objectives, procedures, and potential benefits, was offered to interested participants to ensure transparency and get informed consent.

Undergraduate students, particularly those enrolled in demanding programs such as nursing, can encounter a multitude of obstacles throughout their transition to undergraduate education. Students are in the process of adapting to novel academic requirements, social settings, and anticipated standards. This characteristic renders them a good demographic for investigating the impacts of treatments such as formative evaluation. As a result, its objective is to recognize issues early on and take preventative action to address them. These students can benefit from using formative assessment procedures in the classroom by acquiring more adaptive pedagogical practices, coping mechanisms, and academic skills. Furthermore, first-year students may have increased test anxiety because they are not yet accustomed to the academic

environment of a university. A better understanding of how formative assessment might reduce test anxiety and boost academic performance can be gained through research into this area.

Following the completion of the Anatomy I course, the participants were allocated into two distinct groups: an intervention group undergoing formative assessment and summative assessment, and a control group undergoing summative assessment.

The intervention groups consisted of participants who were subjected to both formative and summative assessments. Formative assessments are specifically designed to offer continuous feedback during the learning process, enabling students to recognize their areas of proficiency and areas for improvement. Consequently, these evaluations contribute to the development of students' self-regulation and self-efficacy. The students were engaged in an ongoing process of assessment, feedback, and learning adaption, which facilitated the development of a more profound comprehension of the subject matter. The control group included students who were subjected to summative assessments, which are evaluations administered after a designated learning session to measure overall performance. In contrast to formative assessment, the primary objective in this context is to allocate marks and ascertain the extent of mastery attained. The purpose of this group was to provide a comparative analysis to evaluate the possible advantages of formative assessment in contrast to the conventional summative approach. This control group aids in establishing a fundamental reference point for comparative analysis, enabling researchers to ascertain whether the utilization of formative assessment yields a quantifiable influence on test anxiety, academic achievement, self-efficacy, and self-regulation.

3.5 Sample Size

Choosing the right sample size is a very important part of planning a research study so that the results are statistically meaningful and reliable. In this case, G-power version 3 was used

to calculate the sample size (Faul et al., 2009), a statistics program that is often used for power and sample size analysis, to figure out the size of the sample.

The sample size calculation is based on several important factors, such as the effect size, which is a measure of the extent to which there is a difference between the two groups being studied. According to (Cohen, 1988), an effect size of 0.6 lies within the medium range of meaningful difference between groups. Study power, which is often stated as 1 - (beta), is the chance of rejecting a false null hypothesis properly. In this study, a power of 0.80 was used, which means that there is an 80% chance of finding a real effect if it exists. This study used an alpha level of 0.05, which means that there was a 5% chance of making a Type I error. Based on these factors, the total sample size was 90 students for both groups.

In order to address the possibility of non-response or dropout, the predicted sample size was increased by 10%. This modification aids in reducing the possible attrition of participants throughout the study, guaranteeing that the final sample size stays large enough for statistical analysis.

3.6 Inclusion and exclusion criteria

The study aimed to include first-year undergraduate nursing students who were currently enrolled in the Modern University College of Nursing in Palestine. Additionally, participants must have been in their first year of nursing studies and have enrolled in the Anatomy II course. Voluntary participation is mandatory, and participants must have expressed their willingness to take part in the study. Furthermore, participants must provide informed consent after receiving comprehensive information about the study's objectives, procedures, and potential benefits.

Finally, English proficiency is crucial, and participants must have had a sufficient understanding of the language used in the study materials.

In this study, exclusion criteria have been established to ensure that the sample is representative of the population and that the data collected are reliable and valid. First, nursing students who were repeating the year or upgrading were excluded, as the study focuses on the impact of formative assessment on first-year nursing students. Second, students who had not completed the Anatomy II course were excluded to ensure that participants had reached a certain academic point. Third, participants who did not provide informed consent or withdrew their consent during the study were excluded, as obtaining informed consent was crucial for ethical reasons. Fourth, participants with insufficient English proficiency to understand the study materials were excluded to ensure that all participants could comprehend the study materials. Fifth, participants who were planning to transfer to another institution or withdrew from the university during the study period were excluded to ensure their participation was complete. Sixth, participants who provided incomplete or invalid data that could not be used for analysis were excluded to ensure the data collected is reliable and valid. Lastly, students concurrently participating in other study programs or interventions related to formative assessment were excluded to avoid confounding effects.

The inclusion criteria for the qualitative sample were that a student should have completed the formative evaluation strategies experiment, and the summative evaluation assessment, and agreed to participate in the qualitative interviews. Excluded were students who were assessed only through summative evaluations and those who did not take the anatomy and physiology courses.

3.7 Research instruments

In this study, the following four data collection tools were employed: the "Test Anxiety Scale" to assess test anxiety, the "Academic Performance Scale" to gauge academic performance, the "Self-Efficacy for Learning and Performance Scale" to measure self-efficacy, and the "Self-Regulation Strategies Scale" to evaluate self-regulation.

The current study utilized a questionnaire adapted from various scales, comprising a total of 33 items. The questionnaire is designed to be given in class and takes approximately 20–30 minutes to administer. The questionnaire can be found in Appendix D.

3.7.1 Demographic Data

The current study utilized a questionnaire adapted from various scales, comprising a total of 33 items. The questionnaire is designed to be administered in class and takes approximately 20–30 minutes to complete. The full questionnaire can be found in Appendix D.

3.7.2 Test Anxiety Scale

The first scale was the test anxiety scale retrieved from the Manual of Motivated Strategies for Learning Questionnaire (MSLQ), developed by Paul Pintrich, Makeke, et al. (2004). It is known as the “test anxiety scale” within the MSLQ. No permission is necessary to utilize the MSLQ, as it is in the public domain and has free access (Pintrich et al., 1991). Paul Pintrich developed it as a self-report instrument (McKeachie et al., 2004). The test anxiety scale within the MSLQ consists of 5 items, and the items on the scale are typically scored on a 7-point Likert scale, with responses ranging from 1 (this is not at all true of me) to 5 (this is very true of me). Participants rate the extent to which each item applies to them.

To calculate the total score for this scale, responses to the five items are summed. The total score can range from a minimum of 5 (indicating low test anxiety) to a maximum of 35 (indicating high test anxiety). The higher the total score on the scale, the greater the level of test anxiety. Lower scores indicate lower levels of test anxiety.

Regarding the content validity of the test anxiety scale items, they were chosen based on theoretical and empirical considerations related to test anxiety. The scale was designed to assess the cognitive and affective aspects of test anxiety. In addition, the construct of test anxiety has been well established in the literature, and the Test Anxiety Scale has been shown to measure this construct effectively. The reliability of the test anxiety scale can also be assessed through measures such as internal consistency. A Cronbach's alpha reliability coefficient of 0.80 (Pintrich et al., 1991) was reported, implying that the scale measures the construct of test anxiety. The researchers often examined whether scores on a test anxiety scale correlate with other measures of test anxiety or related constructs. High correlations with well-established test anxiety measures provided evidence of criterion-related validity.

3.7.3 Academic Performance Scale

The second instrument was the Academic Performance Scale (APS), a tool developed by Carson Birchmeier, Emily Grattan, Sarah Hornbacher, and Christopher McGregory of Saginaw Valley State University (Odida et al., 2022). The APS consists of 8 items, and the items on the scale are typically scored on a 5-point Likert scale, with responses ranging from 1 (strongly agree) to 5 (strongly disagree). Participants rate the extent to which each item applies to them. The purpose of this scale is to evaluate several dimensions of academic performance among students. The cumulative score on the APS is determined by aggregating the individual ratings

across all eight items. A greater cumulative score on the APS is indicative of superior academic achievement.

The APS exhibits favorable attributes to its validity and reliability. The internal consistency, as indicated, demonstrates a substantial level of reliability with a coefficient of 0.89 (Odida et al., 2022). This indicates that the items comprising the scale consistently assess the same underlying construct, also implying that it is a reliable instrument for evaluating academic achievement.

3.7.4 Self-Efficacy Scale

The third instrument included in our study was the Self-Efficacy for Learning and Performance Instrument, which is based on the Motivated Strategies for Learning Questionnaire (MSLQ) Manual developed by Paul Pintrich and his colleagues (Pintrich & Others, 1991). The selection of this particular self-report instrument was based on its pertinence in assessing self-efficacy, a fundamental determinant of attaining success in many fields. Self-efficacy empowers individuals to define achievable goals, accurately assess their progress, and develop successful tactics for overcoming obstacles.

The Self-Efficacy for Learning and Performance Instrument consists of eight discrete items, with each item being assessed using a 7-point Likert scale. Participants are obligated to indicate their level of agreement with each statement using a numerical rating scale that spans from 1 (not at all true of me) to 7 (extremely true of me). The cumulative score is derived by summing the responses to all eight items, yielding an interval of points ranging from 8 to 56. A higher total score signifies a higher level of self-efficacy in both learning and performance.

The validity and reliability of this tool have undergone a thorough assessment. In order to ascertain its validity, the measure has undergone rigorous testing and analysis to confirm its

accuracy in assessing the intended construct of self-efficacy. Furthermore, the instrument exhibits a high level of internal consistency, as evidenced by a Cronbach's alpha coefficient of 0.93 (Pintrich & Others, 1991). The high coefficient indicates that the items within the instrument consistently evaluate the same underlying construct, hence enhancing the reliability of the tool for measuring self-efficacy.

3.7.5 Self-Regulatory Strategies Scale

The Self-Regulatory Strategies Scale (SRSS), which Paul Pintrich created (Pintrich & Others, 1991), is the last and fourth tool we used in our study. This scale serves as a crucial assessment tool in our study. This scale is designed to assess metacognitive self-regulatory behaviors, which involve three core processes: planning, monitoring, and regulating. There is a proposition that suggests that participating in activities aimed at regulation can potentially improve the performance of learners. This improvement is achieved by allowing learners to evaluate and make adjustments to their behavior while carrying out tasks. The Self-Regulation Strategy Scale (SRSS) is designed as a questionnaire employing a 7-point Likert scale format. It has a total of 12 items using a numerical rating scale that spans from 1 (not at all true of me) to 7 (extremely true of me).

Three general processes make up metacognitive self-regulatory activities: planning, monitoring, and regulating. It is thought that regulating activities will improve performance by helping learners check and change their behavior as they work on a task. The SRSS was a 7-point Likert instrument that consisted of 12 items. The results of Cronbach’s alpha formula showed that the reliability of the SRSS was 0.79 (Pintrich & Others, 1991). Taking into consideration the reverse questions in the instrument, No. 1 is extremely true of me, and No. 7 is not at all true of me".

The qualitative sample included 12 individual interviews with students who have completed the formative and summative evaluations. Four females and three males were interviewed to gain an in-depth understanding of their experiences.

3.8 Ethical considerations

The ethical considerations pertaining to dissertations in research hold noteworthy importance since they have a direct influence on the study's integrity and the welfare of the individuals involved (Singh & Dubey, 2021). The preservation of confidentiality is a fundamental principle of ethical research and was thoughtfully integrated into the design of this study. In order to safeguard the confidentiality and anonymity of the individuals involved, the materials utilized for the gathering of survey data were intentionally structured to omit any personal identifiers, such as names. Additionally, an important safeguard for those who want to engage in research is anonymity.

The study outlines a procedure that puts the autonomy of participants first when it comes to informed consent, a crucial ethical concept. By completing and sending back surveys, implied permission was acquired. Participants were explicitly informed that their participation in the research was entirely voluntary and that they had the choice to discontinue at any moment without penalty. People were allowed to decide whether or not to participate in the study because of the emphasis on voluntary involvement. It further emphasized the fact that the data will only be used for research purposes. To maintain the health and well-being of participants, this also involves a commitment to the ethical principle of compassion not to abuse or distribute data for any other objectives.

The significance of data security and confidentiality was acknowledged throughout the study process. Various precautions were taken to guard against any unauthorized access or exposure

when collecting, storing, and displaying data. These measures strengthened the confidence and integrity of the study while also protecting participants. Permission was granted by the Arab American University's Institutional Review Board (IRB) with the archived number 2023\A\98\N. The IRB approval letter, found in Appendix B, is provided in English. This approval enhanced the ethical grounds of the study, ensuring that the research adhered to accepted ethical standards and regulations, thereby further protecting the participants.

3.9 Informed consent

By obtaining informed consent, the preservation of human rights was guaranteed. To ensure that students were fully informed, it was essential to provide them with ample information regarding the research study. The students were given the assurance that their involvement was completely optional and that they had the freedom to withdraw from the program at any point without facing any negative consequences to ensure voluntariness. The informed consent was written clearly and concisely for the students to ensure clear understanding and expectations. The informed consent provided detailed information regarding the study's procedure, the rationale for participation, the potential advantages, and a clear explanation of the study's objective and potential risks involved. Before engaging in the research, the students had to provide informed consent. Each student signed and dated the consent form. Within Appendix (C), you will find the informed consent document in English.

3.10 Pilot Study

A pilot study was conducted, which included 10% of the initial sample size enrolled in their first year at MUC. The purpose of this study was to assess the feasibility of the research tool and recruiting process, as well as to determine the workability and acceptability of the data

collection method for the participants. The purpose of the pilot study was to evaluate the level of clarity and detect any issues that may arise during the implementation of the intervention among the participants as well as cross-cultural suitability.

Concerning the study`s tools of test anxiety and academic performance, self-regulation, and self-efficacy, the students who participated in the pilot research were asked to fill out both of the instruments of critical thinking and self-efficacy and evaluated the feasibility, clarity, application, relevance, readability, ease of understanding, question sequence, and completion time of the questionnaires. The results indicated positive feedback. Firstly, the students reported that the measure completion time was satisfactory, indicating that they were able to complete the questionnaires within a reasonable timeframe. This suggests that the length of the questionnaire was appropriate and did not cause any undue burden or inconvenience for the participants.

3.11.1 Study intervention

Formative evaluation interventions are of significant importance in augmenting the educational journey of nursing students. The purpose of these interventions is to offer continuous feedback, enabling students to assess their comprehension and advancement promptly. The implementation of formative assessment interventions in nursing education is a proactive and learner-centered strategy for enhancing skill and knowledge acquisition. The interventions indicated below are strategically integrated throughout the learning process in order to consistently assess and evaluate student's progress and comprehension. Through the integration of intervention strategies, nursing educators establish a conducive atmosphere that enables students to discern their competencies and areas requiring enhancement within a context that has minimal consequences. The provision of early feedback not only enables students to assume responsibility for their learning but also enables educators to customize their instructional

approaches in order to more effectively address the unique and collective requirements of their students. When formative assessment interventions are used in nursing education, they create a culture of continuous improvement. This makes sure that students are better prepared with the skills and knowledge they need for good clinical practice. The following examples represent the most prominent instances of formative interventions applied during the semester.

3.11.1.1 Bloom's Taxonomy

Bloom's Taxonomy categorizes cognitive learning into six levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating. Some interventions were considered when incorporating it into course syllabuses at each level:

In order to accommodate the wide range of learning styles and ability levels common among students, it is crucial to emphasize that an effective course curriculum should include a complete range of interventions that cover multiple levels of Bloom's Taxonomy (Persellin & Daniels, 2023). The Bloom’s Taxonomy and other formative evaluation strategies that were used are described in the following sections.

3.11.1.2 Remembering

Students concentrate on recalling and retaining information at this level, which is the fundamental component of learning. The foundation for more advanced cognitive abilities can be found at this level. "Remembering" in the context of an anatomy course for nurses refers to the capacity to locate and recognize critical knowledge, details, and ideas regarding the composition and operation of the human body. Students must memorize a variety of anatomical words, structures, and their associated functions for this course. This entails becoming familiar with the names of the bones, muscles, organs, and other elements of the body in addition to their

functions inside the body. Formative evaluation strategies such as feedback, peer reviews, and short assessments can enhance the recall of essential anatomical structures.

3.11.1.3 Understanding

Students start to understand the content more deeply as opposed to just remembering information. They are now expected to articulate their understanding of complex ideas and concepts and translate their knowledge into their language. This requires not only memorization of anatomical names and structures in a nursing anatomy course but also a thorough understanding of the relationships and purposes that support the complex structure of the human body. Students may participate in tasks in this setting that call for them to describe the connections between various body systems. For instance, they could explain how the respiratory and circulatory systems work together to ensure that blood is transported rich in oxygen throughout the body. Students show their understanding of the underlying ideas and systems that control how the body works by expressing these connections in their own words. Several formative assessment strategies deepened understanding beyong simple memorization of anatomical and functional structures.

3.11.1.4 Applying level

At this level, students move from knowing concepts to putting their information to use in fresh and practical contexts. In a nursing anatomy course, "Applying" refers to using the fundamental understanding of anatomical structures and functions to resolve issues and make wise judgments in diverse healthcare contexts. In order to effectively assess patient symptoms, students must connect their knowledge of anatomical structures, organ systems, and their functions. The applying principle was enforced through ongoing monitoring and evaluation formative strategies.

3.11.1.5 Analyzing

Students at this level learn to analyze complicated concepts and go beyond merely understanding information. At this level, complex concepts must be broken down into their component pieces, the relationships between these parts must be examined, and meaningful conclusions must be drawn from these studies. Students are pushed to look at the complex interactions between anatomical features, physiological processes, and diseases in the context of nursing anatomy.

3.11.1.6 Evaluation

During this stage, students learn to make meaningful decisions that are supported by standards and evidence. For nursing students learning about anatomy, this can entail considering the moral implications of medical practices or assessing the validity of studies regarding the body's structures.

3.11.1.7 Creating

The highest level of creation requires synthesizing knowledge to produce original concepts, layouts, or solutions. This can entail creating patient education resources that clearly explain difficult anatomical concepts in a nursing anatomy course.

In conclusion, it is critical to implement instructional techniques in order to facilitate the learning process, starting with tasks that involve lower-level cognitive skills and subsequently advancing to activities that require higher-order thinking by incorporating a variety of interventions. This approach not only caters to different learning styles but also encourages students to develop a diverse set of skills that can be applied across various academic disciplines

and real-world scenarios, which enhances a sense of competence and confidence in their abilities (Agarwal, 2019).

3.11.2 Discussion topics

The use of instructor-led discussion topics as a formative assessment strategy has the potential to dramatically improve student engagement, critical thinking skills, and fluency in every field of study (Moschella-Schuller, 2023). Also, by working together with their peers, students in these instructor-led discussions can improve their understanding and take an active role in the learning process. Students can explore various viewpoints, propose questions, and test their own beliefs by participating in stimulating conversations, which helps them better understand the complexities of ideas in anatomy (Bokosmaty et al., 2019). Below is a comprehensive analysis of the optimal approach for implementing this particular strategy with the utmost efficiency:

3.11.2.1 Creating the Scene

It is imperative to provide a precise and unambiguous delineation of the learning objectives or topics that will be the focus of instructor-led discussions. This facilitates students' understanding of the objectives of these dialogues and the anticipated results. It is imperative to effectively convey the proposed agenda and organizational framework of the forthcoming discussions promptly. This practice guarantees that students are sufficiently equipped and allotted ample time to engage in the activity (Goshtasbpour, 2019) .

To facilitate discussions, the researcher employed an interactive online platform such as Moodle discussion forums or Zoom video conferencing software, ensuring that all students had access to and were familiar with its use. The discussions were structured, respectful, and centered around the intended topics. Facilitation was offered as necessary, and students were

encouraged to actively engage with each other's contributions, fostering an environment conducive to meaningful exchange and learning.

3.11.2.2 Promotion of Participation

The researcher extended the invitation to all students so that even the most conservative students would have the opportunity to express their opinions. I also requested follow-up questions to encourage in-depth reflection. In order to guarantee that all students felt comfortable sharing their thoughts and opinions, I also established a secure and welcoming environment. I urged them to listen with an open mind and refrain from passing judgment or making any unfavorable remarks. In order to deepen the conversation and advance a deeper grasp of the subject, it is also vital to recognize and assess other points of view. They were able to promote dynamic and engaging discussion, inspire active learning, and foster collaboration among students by encouraging involvement and a courteous and inclusive environment.

3.11.2.3 Grading for Participation

Assessing the quality of contributions also fosters critical thinking abilities and encourages students to consider the topics under discussion thoroughly. As a result, debates may become deeper and more interesting, encouraging a collaborative learning environment (Alsaleh, 2020). A percentage of the students' grades was assigned to their participation in these discussions. This work has the potential to motivate students, encouraging them to actively participate and contribute their unique perspectives. Assessing students' understanding and application of content is achieved by evaluating the quality of their contributions and researching indicators of critical thinking, concept application, and relevant information integration. This process enables a deeper insight into students' abilities and comprehension.

3.11.2.4 Feedback and Reflection

Evaluating one’s Proficiency in Academic Writing which is a critique of the author's academic writing skills, drawing upon the feedback obtained. Students were given constructive criticism to identify their strengths and areas in need of improvement. The students were motivated to persist in their pursuit of excellence in those particular domains. Furthermore, the concept of discerning regions in need of enhancement enables students to concentrate their endeavors on cultivating those particular talents or information

additionally, the act of self-assessing one's participation and contributions has the potential to cultivate a heightened feeling of responsibility and accountability among students, as they develop a greater understanding of their impact on the overall classroom environment (Kazlauskienė et al., 2021).

3.11.2.5 Group Discussions

Students are encouraged to actively engage with the curriculum through group discussions. In order to improve their understanding of anatomical principles, they can debate, share ideas, and learn from one another. Students' understanding is reinforced when they talk about and clarify concepts with their peers (Holland & Pawlikowska, 2019).

Complex concepts in anatomy frequently call for analytical thought and evaluation. Students can debate one another's viewpoints, raise doubts about presumptions, and engage in critical thinking about various anatomical structures and their roles through group discussions. Mechanisms to support this are illustrated, including case studies and scenario-based inquiries. To solve difficulties, students must use their anatomical knowledge. The students were told to assume the role of "teachers" when elaborating on ideas with their fellow classmates during the discussion period following the lecture. This deepens their understanding and enables them to

locate knowledge gaps. During group discussions, I switched between groups to provide timely feedback and correct mistakes. These comments ultimately help the students clarify misconceptions, establish correct ones, and encourage them to participate in group discussions about complex anatomical topics.

3.11.2.6 Peer Teaching

Peer teaching not only enhances the learning of the students who are teaching but also gives the students who are learning a different perspective and encourages participation (D. Singh et al., 2019). In order to be able to teach a subject during a specifically designated period with a thorough understanding of the material, students were required to conduct a presentation on a specific topic or concept to their peers, organize it, and synthesize it. This process improves their learning and aids in their attainment of a higher level of mastery and active learning. In the subject matter, students must improve their communication abilities, which are important not only for academic success but also for their future professions. Presentations and instructions must incorporate clear communication and good presentation skills.

Topics are chosen that are aligned with the syllabus to ensure that essential subjects are covered, and clear instructions and expectations are provided for peer education sessions. Guidance and criticism are also offered on methods for instruction and presenting abilities.

3.11.3 Quick Quizzes or Knowledge Checks

The quizzes' layout and organization were clear and focused. Multiple-choice questions, true/false statements, matching exercises, and short-answer questions are just a few of the evaluation techniques that were used. It is emphasized that the questions relate directly to the

topic covered in the chapter. We use a wide variety of question types, including tasks like factual recall, relational analysis, and conceptual application, to assess different cognitive capacities.

3.10.4 Frequency and Timing

It has been decided how frequently tests will be given. Depending on pedagogical choices and the complexity of the subject matter, the distribution of ratings has also changed, happening either at the start or end of each instructive session. Since the course covers a wide range of anatomical topics, it was advantageous to include quizzes after each key section to encourage continued involvement and make progress tracking easier. After they completed the quizzes, we gave the students the notes. Giving feedback comprises a variety of elements, such as accurate answers, clarifications, and referrals to essential course materials. This quick response made it easier to spot faults made by students and correct them, while also enhancing their comprehension of correct ideas.

We used this information to inform pedagogical decisions, such as reviewing particular topics, changing the educational curriculum, and providing extra resources for subjects that students found difficult. based on the quizzes' outcomes. When students had trouble understanding a concept, I changed the way I taught that subject, giving it more time in subsequent courses and using more resources to illustrate it. In conclusion, a learning environment that encourages active learning, self-assessment, and continual reinforcement has been developed by introducing quick quizzes and knowledge assessments into the anatomy course curriculum. As a result, using this formative assessment intervention not only helps students learn more but also empowers them to take charge of their own academic development.

3.11.6 Think-Pair-Share

A is a well-known formative assessment technique that encourages peer interaction and active learning in the classroom (McConnell et al., 2017)**.** Students were encouraged to use their anatomical knowledge and assessment of the situation to solve a problem using a question or scenario chosen by the students. Additionally, the query was open and provocative enough to spark conversation. On the individual side, students were given a question and a scenario and were given a short period to consider their answers. This gave them time to absorb information and remember relevant ideas to help them come up with their ideas. To discuss their ideas with a partner, the students were then paired up. Partners were randomly selected based on the dynamics of a particular category. Students were encouraged to express their opinions, provide justifications, and pay close attention to what their partners were saying.

The strategies used included varying and structuring questions to suit different learning levels and learning styles, as well as giving clear directions for each stage (Think, Pair, Share) to avoid ambiguity and ensure a smooth flow of the activity. Sufficient time was allocated to each stage so that students did not feel rushed and had ample opportunity to think, talk, and participate. After the full class discussion, the main ideas were reviewed, misunderstandings were cleared up, and the importance of peer learning was emphasized.

The strategies that the researcher employed included offering specific instructions at each stage (Think, Pair, Share) to avoid ambiguity and ensure a seamless flow of the activity, as well as altering and structuring questions to suit various learning levels and learning styles. The researcher has given each stage enough time so that kids won't feel hurried and will have time to speak, ponder, and participate. After the entire class had a chance to speak, we went over the key points again, clarified any remaining issues, and emphasized the value of peer learning.

3.11.7 One-Minute Papers

A formative evaluation technique called "One-Minute Papers" encourages students to reflect on their learning by having them summarize the main ideas of a course in a condensed amount of time, usually one minute (Vera, 2022). The researcher began by describing to the students the goal of the one-minute papers. And it was a brief exercise to help them strengthen their comprehension of the lesson's fundamental ideas. Before beginning the assignment, I provided clear instructions regarding the subject, the researcher wanted them to summarize and advised them to concentrate on the major ideas, terminology, and linkages between concepts. The researcher allocated each student a certain period to write their summaries, and it was one minute. Because of time constraints, they are more likely to grasp the main points of the lesson quickly and avoid overanalyzing.

The researcher instructed the students to work on their abstracts alone. This stops students from thinking in groups and promotes autonomous thought. Students' written abstracts were gathered. Use the One Minute Sheets frequently with this in mind. If the students were hesitant to express their thoughts in public, the researcher enabled them to submit their abstracts anonymously because this might result in a franker exchange of ideas.

3.11.5 Concept Mapping

A concept map is a diagram that uses labeled nodes and connecting lines to show the relationships between concepts. Students can see the "overall picture" and the specifics at the same time since it visually displays the hierarchy and links between ideas.

There is a paradigm shift from behaviorism to constructivism that increases conceptual learning and the formation of attitudes toward science, according to Woldeamanuel et al., 2020,

who cited Yan & Pastore, 2022, also Choudhury & Freemont, 2017 conducted a study as an effective formative assessment, and they concluded that concept maps engage students and support their learning in a variety of ways. These are also useful in addressing students' misconceptions. Its use could be a beneficial addition to how science is conveyed and understood.

To implement concept mapping in the classroom, the researcher asked students to identify a specific topic or subtopic in the anatomy course that they wanted to explore and understand. Next, the researcher provided the students with relevant resources, such as an approved book, lecture notes, and online materials. Next, the researcher introduced the concept outline to the students by explaining the process, purpose, and criteria for creating an effective map. Then we asked the students to individually create their own concept maps, identifying key concepts and relationships. After completing the concept maps, the researcher asked them to review and revise them, making sure that the communications were accurate and logical. Encouraged by peer review, the students exchanged maps and critiqued each other on scientific grounds. Finally, class discussions were held where students presented maps and explained their concepts. Based on class observations and discussions, students should review and improve their concept maps and hand them over to me after a period of time. The process of assessment and grading encompasses the establishment of specific criteria for the evaluation of the idea of concept maps. These criteria encompass the correctness of linkages depicted in the maps, the depth of comprehension demonstrated, the clarity of presentation, and the level of originality exhibited. The primary focus of assessment is to facilitate learning and identify areas for development, making it primarily formative.

3.11.8 Conceptual Questions

Using conceptual questions as a formative assessment intervention can significantly improve students' comprehension and critical thinking abilities (Babinčáková et al., 2020).

The use of open-ended questions aimed to promote comprehension rather than mere memorization of facts. By focusing on the relationship between anatomical structure and function, we encouraged students to integrate their knowledge and think critically across multiple cognitive levels. Questions were intentionally varied in difficulty to accommodate diverse levels of comprehension, stimulating higher-order thinking skills such as analysis, evaluation, and synthesis. This approach fostered a deeper understanding of anatomical concepts and promoted critical thinking at an advanced level. The questions used real-world examples and clinical contexts to emphasize the relevance of anatomical ideas in everyday life.

Conceptual questions were utilized in conjunction with active learning strategies like case studies, group discussions, debates, and peer reviews. This encouraged group learning and enabled students to have conceptual discussions as part of active learning strategies**,** a brief analysis of the students' responses was given. As a result, misconceptions were cleared up and their understanding was guided in the proper path, after knowing this, the course started with simple questions and then moved to complex questions gradually as the students' knowledge expanded to gradually increase the individual's self-confidence and competence.

Conceptual questions for students are an excellent way to conduct formative assessments. They promote critical thinking, assist learners in better comprehending anatomical ideas, and give teachers insightful knowledge on how learners think. Conceptual questions can also encourage active participation in the learning process (Kulasegaram & Rangachari, 2018), In

addition, Conceptual questions Encourage students to think of the lesson or idea that they consider to be the most confusing. The areas that require more clarification or evaluation are revealed by this.

The researcher created open-ended questions that went beyond simple recall and required students to analyze, synthesize, and apply their knowledge. For example, instead of asking, "What is the name of this bone?" The researcher would ask, "How does the structure of this bone contribute to its function within the skeletal system?" The researcher always made sure that the conceptual questions aligned with the learning objectives of the course. This helps the students focus on the more interesting and important aspects of the subject.

The researcher started with questions targeting basic concepts before moving on to more complex ones. The questions have been formulated and based on real-life contexts to show practical applications of the students' anatomical knowledge. For example, you were asking, "How can understanding the muscular system influence the way physiotherapists treat a patient?"

On the other hand, the researcher was promoting class discussions where students could share their answers, discuss their points of view, and learn from each other's insights. Additionally, the researcher allowed students ample time to think and answer questions because complex conceptual questions might require more thinking. Questions were presented in various formats, such as written prompts, pictures, charts, or case studies, to suit different learning styles and encourage students to think from various perspectives. Feedback was consistently provided based on the students' answers, including recognizing their efforts at critical thinking, correcting misconceptions, and guiding them toward deeper insights. The emphasis was placed on the fact that these questions aim to assess understanding of concepts rather than memorization of facts. This encouraged students to explain their thinking and reasoning processes.

3.11.9 Muddiest Point Reflections

This is a type of classroom assessment technique (CAT) in which students can evaluate themselves. Students can take charge of their education by identifying their weak areas and using that information to ask clarifying questions or look for more resources. The activity asks students to quickly indicate the lecture, class, or assignment they think to be the "muddiest"—the most perplexing or unclear—part of. With the help of this activity, teachers can get fast feedback on how well their students understand (Krause & Hoyt, 2020).

The students were asked to write down the part of the lesson or concept they found most confusing or unclear to provide insight into areas that need further clarification or revision. More obscure point reflections were incorporated at appropriate intervals throughout the course of the lesson and at the end of each class session. The murkier reflection process was explained to the students, and they were assured that this activity was not about highlighting their shortcomings but rather a way to better tailor education to their needs.

The aim is to provide insight into how students communicate their ideas and write them down on paper. Students were asked to remain anonymous so that they could present their ideas anonymously.

The researcher incorporated more confusion point reflections at appropriate intervals throughout my course, clearly explaining the purpose and process of blind spot reflections to students and emphasizing to them that this activity is not about highlighting their flaws but rather a way through which you can better design your learning. To suit their needs, also, a quick question pattern was used to give students a prompt to guide their thoughts, such as “What is the most confusing concept in today’s lesson?” or "Which part of the lesson do you need more explanation for?" After gathering the ideas, common points of confusion were discussed in the

class. This helped me immediately clarify misunderstandings and create a supportive learning environment. Patterns were looked for in the most ambiguous places; e.g., if many students are struggling with the same concept, this indicates the need for additional instruction. Using a different educational approach, based on the ideas gathered, targeted revisions and additional explanations of concepts that many students found confusing were provided.

This encouraged them to make more honest responses and gave them incentives to direct their ideas. After collecting the ideas, some common points of confusion were discussed. In the classroom because this helps them immediately clarify misunderstandings and create a supportive learning environment. In addition, at the end of the course, Students were asked to think about the most ambiguous points they had encountered since the beginning of the semester, they were encouraged to reach out to me for clarifications outside of the musings of the most ambiguous points, knowing that I was available to answer questions and provide additional support. And I always remind them of that goal.

Muddiest Point Reflections not only improve their teaching but also empower them and address their areas of confusion, enabling them to create a more engaging and effective learning environment and shed light on the topics that require additional clarification or examination.

3.11.10 Interactive Online Tools

An excellent technique to engage students and improve their grasp of intricate anatomical structures and concepts in an anatomy course is to use interactive internet tools for evaluation. These resources give students the chance to actively engage in their education by enabling them to interact with virtual models, respond to questions, and get rapid feedback (Erolin, 2019) Teachers can develop a dynamic and interactive learning environment that encourages student

participation and increases their comprehension of anatomy by integrating interactive web resources into the curriculum**.**

An interactive online tool that suited the needs of the students and the course content was sought. Some popular options, such as Visible Body, were used to enhance the learning experience by providing detailed visualizations of anatomical structures. The chosen tool was ensured to be accessible to all students by checking its compatibility with screen readers and other assistive technologies.

The educational objectives for each interactive session that they would like to achieve using the tool were defined, and the objectives were consistent with the objectives of the curriculum. Students were encouraged to explore the 3D models effectively through guided exercises and tasks designed to deepen their understanding of anatomical relationships. Collaboration among students was enhanced by assigning group activities, allowing them to work together to explore and discuss anatomical structures using the tool. Constructive feedback was provided on the student's use of the interactive tool.

Ensuring students had access to technical support at University College for Visible Body tool issues was a priority. Clear instructions on how to use the tool and troubleshoot common problems were provided. The effectiveness of using the interactive tool was evaluated through periodic assessments. This dynamic and engaging learning experience for anatomy students helped them better visualize and understand complex anatomical structures and their relationships.

3.11.11 Case Studies

Provide actual or imagined clinical situations involving anatomical knowledge. To help them apply their knowledge to real-world circumstances by asking students to assess the scenario and find any pertinent anatomical variables (Kulasegaram & Rangachari, 2018).

The case study was shown to the students, providing all necessary information such as patient history, symptoms, diagnostic tests, and any relevant medical images (such as x-rays and MRIs), along with questions and prompts to guide their analysis. They were encouraged to work in groups by emphasizing the value of teamwork and urging them to discuss the case study with their peers, generate new ideas, and offer unique viewpoints. It was reminded that working together would aid in developing their critical thinking and problem-solving abilities, in addition to enhancing their comprehension of the subject matter. Furthermore, reassurance was provided that assistance with the case study or any queries they might have would be readily available.

Students were asked to identify and explain relevant anatomical factors related to the condition, including the affected organs, systems, and structures. They were encouraged to use anatomical terminology correctly in their analysis, cite sources, and apply evidence-based reasoning to support their conclusions. The students enthusiastically undertook the assignment, conducting thorough research on the anatomical aspects connected to the ailment. With impressive accuracy, they pinpointed the affected organs, systems, and structures, showcasing their deep understanding. Their ability to analyze the situation using precise anatomical language was notable. They also used reliable sources and evidence-based reasoning to substantiate their well-considered conclusions.

After analyzing the cases, a class discussion was conducted to share findings and ideas, encouraging peer criticism and constructive feedback to enhance learning. The student's case study responses were evaluated based on the accuracy of their anatomical analysis, critical thinking skills, and the ability to apply knowledge and provide timely, constructive feedback. A rubric was used to standardize classification criteria. Subsequently, the clinical implications of the condition, including treatment options, potential complications, and patient management strategies, were discussed to emphasize the importance of anatomical knowledge in clinical decision-making.

On the other hand, assigned follow-up activities to case-study homework included researching treatment options, studying related anatomical structures in more detail, and exploring recent advances in medical technology.

Through these exercises, students were able to gain a deeper comprehension of the case study as well as strengthen their research and analytical abilities. Students were allowed to examine various strategies and gauge their efficacy by investigating therapy choices. They gained a thorough understanding of the underlying anatomy and how it connects to the case by studying comparable anatomical components in more detail. Students were also able to keep up with the most recent developments in the field and comprehend how they might affect patient care by investigating new developments in medical technology. Overall, these extracurricular activities improved learning and inspired students to get more deeply involved in the material.

In Week 6, as the course progressed, more complex and challenging case studies were introduced to test the depth of students' understanding, including cases that required the integration of knowledge from different anatomical systems or the application of interdisciplinary approaches. The effectiveness of these case studies was regularly evaluated to achieve specific learning

outcomes. For an anatomy course, improving case study selection and implementation involved using student performance data and ensuring that students had access to necessary resources, such as textbooks, anatomy atlases, and online databases, to support their case study analysis.

3.11.12 Formative Quizzes

Regularly administer tests covering particular course topic parts. These tests enable students to monitor their development and pinpoint areas that need additional focus. These tests can be completed at any time during the semester and give students' rapid feedback, enabling them to pinpoint any areas that may require more study. Students can improve their learning results by focusing on their areas of weakness and modifying their study habits as a result of routinely analyzing their knowledge. Formative tests can also assist teachers in evaluating the success of their instructional strategies and identifying subjects that might need more explanation or review (Nadeem & Alfalig, 2020).

It had been decided that regular tests would be offered throughout the course, preferably after each section, to ensure students were constantly engaged with the material. Test formats were mixed to keep things interesting and cater to different learning styles.

Multiple choice questions, short answer questions, classification schemes, and even practical application questions (e.g., identifying structures on models) were used. The tests were prepared with a relatively short duration of 10 to 15 minutes to avoid tiring students out and maintaining their focus. Tests were placed at strategic points in the course to reinforce important concepts and motivate students to stay familiar with the material. Multiple-choice questions may appear on some tests to measure students' understanding of important ideas. This allowed students to demonstrate their analytical and critical thinking abilities. In addition, the tests were a process that required the students to apply the knowledge they gained in real-world situations. These

tests tested students' knowledge in a practical way to develop a dynamic learning environment that encourages active participation and retention of knowledge by providing a range of testing methods.

Immediate feedback was provided after each test, including correct answers and explanations. This helped students understand their mistakes and learn from them.

The evaluation of tests is based on completeness, not just correctness. This encouraged students to try all the questions and focus on their understanding rather than just getting a high score. Students were allowed to review their test results and use them as a basis for targeted study and revision. This fostered a growth mindset and encouraged students to learn from their mistakes.

Students were able to identify their weak points and work on strengthening them by allowing them to evaluate their test results and use them for focused study and review. Students learned that mistakes represent not only failure but also possibilities for progress as a result of this strategy, which reinforced an attitude of growth. Additionally, she inspired students to take charge of their education and tackle academics head-on. In general, this assessment method focused more on making improvements over time and learning from mistakes than on getting a high grade.

Data from formative tests was collected and analyzed to identify trends in student performance. This helped me adjust my teaching approach after each lesson and provide additional support when needed. Post-test review sessions were held to address common misconceptions and areas of difficulty that emerged from student performance data, and in order to maintain student motivation, small incentives for test participation were consistently provided. Thus, the students were more involved in the learning process and focused on increasing their understanding rather than just focusing on the class at the end. By analyzing student performance

data, I was able to adjust my teaching strategies to fit each student's unique needs and fill in any gaps in understanding. Students were able to clear up any misunderstandings they had and enhance their knowledge by making use of the post-test review sessions. The small rewards for taking the test served as a constant reminder of the value of their work and motivated them to take the test regularly.

3.11.13 Personalized Feedback

Because it helps students see their strengths and limitations, clear up misconceptions, and enhance their learning results, personal feedback is an essential part of resolving misunderstandings and leading students toward a deeper comprehension of the subject matter. Provide each student with personalized feedback on their assignments, tests, or discussions. Through assessment of the mistakes, they make and potential areas for growth, students are given feedback that ultimately encourages a growth mentality. In addition, receiving personal feedback from students and teachers fosters an encouraging and trustworthy relationship, fostering open dialogue and ongoing learning (Moss & Brookhart, 2019). Individual feedback is essential for fostering student achievement and accomplishing educational objectives since it addresses each student's requirements and makes particular recommendations.

After students submit assignments or tests and participate in discussions, feedback will be provided. Timely feedback allows students to connect it to their efforts and recent learning experiences. Comments are made clear, specific, and constructive. Highlighting what students did well and areas needing improvement, while deliberately avoiding vague comments that might confuse them. By avoiding ambiguous feedback, students are less likely to feel confused or unsure about how to address areas for improvement, allowing for more meaningful progress in their academic journey.

On the other hand, Common misconceptions in anatomy were identified and directly addressed in the comments. Explanations were provided on why the answers or a particular concept were incorrect, along with resources and references for further clarification. Rubrics were developed and shared with students, defining assessment criteria to help them understand expectations and provide a clear basis for feedback. Students were encouraged to reflect on their observations and respond to the comments by explaining their plans for improvement and the steps they would take to address their weaknesses. In terms of positive reinforcement that enhanced motivation and confidence, students' achievements and correct answers were celebrated. The Moodle platform was used to provide feedback, allowing peer feedback to be incorporated into the process, which helped students learn from each other and develop a deeper understanding of the topic. Records of the feedback students provided were kept, helping to track their progress over time and allowing for meaningful discussions during counseling and mentoring sessions while continually evaluating the effectiveness of the feedback. Input was sought from students on the quality and usefulness of the comments they received, and adjustments were made as needed. A supportive tone was maintained in improving student outcomes.

Evaluating the effects of interventions on participating groups comes after they have been put into practice and is an essential step in research procedures. Post-tests focusing on several important dimensions, such as anxiety levels, academic performance, self-efficacy, and self-regulation, were provided for both the control and intervention groups to comprehensively evaluate.

3.12 Qualitative Interview Questions

Interview questions were developed based on the research questions and study objectives. These questions were carefully designed to explore participants' experiences, perceptions, and attitudes related to the formative assessment intervention and summative assessment methods. Specific areas of research included participants' experiences with assessment methods, their perceptions of effectiveness, and the impact of these methods on various aspects of their academic experience, including test anxiety, academic performance, self-efficacy, and self-regulation. The following are the qualitative research questions:

1. Please describe your emotions while preparing for and during the exam?
2. In what ways do you view the relationship between formative assessment and their overall academic success?
3. Describe the ways in which formative assessment affects your beliefs about self-efficacy?
4. Describe the ways in which formative assessment affects your attitudes regarding self-regulation?
5. What recommendations can you make to promote the use of formative assessment to reduce test anxiety and improve self-efficacy and self-regulation?

Regarding the selection of interviewees, twelve participants were chosen from the intervention group. This selection continued until data saturation was achieved with six students. The interviews were conducted after the intervention period during the same semester of quantitative data collection. This timing was chosen to capture the participants' insights and

experiences following their engagement with the evaluation methods. Concerning the interview techniques employed: Throughout the interviews, the researcher utilized active listening to thoroughly comprehend the responses of the participants and motivate them to express their thoughts freely. Additionally, probing techniques were employed to further explore the participants' responses, encouraging them to offer more detailed and comprehensive information.

3.13 Data Collection Procedure

This evaluation scenario focuses on evaluating the effectiveness of a formative three-credit course delivered in a university setting. The evaluation took place during the second semester of the academic year. This period lasted 32 sessions, or 16 weeks (48 hours of lessons), in the second semester of the 2022–2023 academic year.

At the beginning of the semester, we identified two sessions of two classes: one served as the control group, receiving only summative assessments, while the other, the intervention group, received both summative and formative assessments. The decision to select Anatomy II for implementing formative assessment through quiz design was based on a strategic educational approach. This approach capitalizes on the course's complexity, the necessity for students to build upon foundational knowledge, and the opportunity to identify and correct misconceptions in real-time. Implementing formative quizzes provides immediate feedback, enhancing students' understanding and clarifying any doubts. These quizzes also evaluate the retention of essential concepts from previous courses, ensuring robust foundational knowledge. Additionally, this method boosts student engagement through interactive learning, enables personalized feedback tailored to each student's learning progress, and prepares students for future high-stakes examinations by simulating exam conditions. By promoting continuous learning and regular review of topics, formative assessments in Anatomy II encourage active and sustained

engagement with the material, leading to a comprehensive understanding and mastery of intricate anatomical concepts.

The Anatomy I course covered topics related to the basics of human anatomy, such as anatomical terminology and basic organ systems. Anatomy II delved deeper into the study of the complex physiological systems and structures of the human body. Many advanced anatomical and physiological systems, such as the musculoskeletal system, cardiovascular system, nervous system, and others, were covered in the course material. This comprehensive approach reflected the assumption that, during the Anatomy II course, students had a deeper understanding of the complex workings of the human body. The Anatomy II assessment aimed to evaluate the extent to which a particular intervention impacted student learning outcomes. In this intervention, assessment procedures for two separate groups of students were purposefully differentiated. Two sections were allocated to distinct semesters at the beginning of the academic year, each with its own unique set of evaluation criteria:

One class was chosen to serve as the control group. The majority of the assessments given to this set of students were summative. End-of-unit and end-of-course exams were frequently used as summative evaluations to gauge student comprehension and recall of the subject matter. The control group served as a standard against which to evaluate the intervention's efficacy. Their performance served as a good indicator of the course's utilization of conventional instruction and evaluation techniques. The summative evaluation results for the control group served as a standard for assessing the effects of the interventions on the intervention group. Any gains or changes might be attributed to the intervention by comparing the intervention group's scores to those of the control group. The outcomes of the control group likewise supported the validity and dependability of the evaluation tools utilized in the study.

Overall, the control group was extremely important in ensuring the precision and validity of the research results.

With the intervention group, a more complete assessment technique, including formative and summative interventions was implemented. Summative assessments demonstrate information regarding their broad understanding. On the other side, formative assessments raise the bar for assessment. Formative evaluations are meant to provide continuous feedback and identify areas for improvement throughout the learning process. This group benefits from a more participatory and engaging learning environment, which could lead to improved learning results.

As part of the research approach, pretests for the independent variable (test anxiety, academic performance, self-efficacy, and self-regulation) from the control and intervention groups were gathered to establish a baseline measure of the participants' beginning conditions and characteristics. These pre-evaluations were required to make sure that the intervention itself and not pre-existing differences between the two groups were responsible for any observed changes or effects coming from the intervention. By documenting any notable differences or improvements that emerged throughout the trial, a comparative examination of the data from the pretests allowed us to assess the success of the intervention. These pre-measurements were a crucial point of comparison when assessing how the intervention affected the outcomes of the different groups.

Post-test data collection was carried out systematically to ensure that all relevant data were collected appropriately. Participants were asked to complete assessments related to the four variables to monitor any changes resulting from the intervention. Anxiety-related assessments were administered to monitor any changes in their emotional health due to the interventions. To determine if there has been any improvement in their academic performance, indicators such as

test scores and grade point averages will also be examined. Students' self-efficacy, or their confidence in their ability to excel in academic assignments, was also evaluated. This evaluation is crucial for understanding how the intervention impacts students' motivation and self-confidence. Additionally, the assessment included students' ability to manage their learning processes effectively, such as time management, study routines, and goal planning. Tracking changes in self-regulation provides insights into how the interventions affect students' study habits and overall learning techniques. The data collected by collecting the questionnaires was carefully stored for further evaluation and statistical analysis. This step is crucial in ensuring the validity and reliability of our findings.

In addition to using quantitative data, the study recognizes the importance of qualitative insights. As a result, interviews were conducted and focus groups were organized with the students participating in the study. The qualitative methodologies used in this study aimed to explore and analyze students' personal experiences and perspectives regarding the assessment procedures used. The primary goal of the study was to enhance the understanding of the impact of intervention on participants' educational experiences, emotional well-being, and overall learning outcomes. This was achieved by facilitating open discussions and conducting in-depth interviews.

Data for qualitative analysis were obtained through individual interviews conducted with twelve students who were chosen from the intervention group using the greatest diversity sampling technique within intentional sampling methods. Gender and academic performance of students were considered in order to give the greatest amount of variety. The sample included six male and six female students.

The interviews were conducted in a private and comfortable place to ensure participants' comfort and openness during the discussions. They were moderated and audio-recorded to capture the participants' responses precisely. After the interviews, the audio recordings were transcribed verbatim to create a written record of the conversations. This transcription process involved capturing all nuances, expressions, and non-verbal cues for analysis.

Furthermore, a thorough examination of the transcriptions was conducted to ensure their precision, and any personal details that could potentially compromise the anonymity of the participants were duly eliminated. Subsequently, every transcript underwent coding and analysis in order to ascertain the prevalent themes and patterns that surfaced during the sessions. The meticulous examination facilitated a thorough comprehension of the viewpoints and encounters of the participants, yielding significant insights for future investigations and decision-making processes. In general, the rigorous transcription procedure ensured the preservation of all pertinent material and the faithful representation of the participants' perspectives.

3.14 Data Analysis

The initial phase in the data analysis process involved primary data collection, which was conducted strictly in accordance with the research objectives and study design. Data were collected through pre-intervention questionnaires for the control and intervention groups, and data were collected through post-intervention interviews conducted on the intervention group.

To guarantee data accuracy, data validation, and cleaning procedures were implemented to identify and correct any errors or discrepancies in data entry. This included checking data points for accuracy and completeness. Outliers and missing data were identified using appropriate statistical techniques and rechecked for accuracy.

Before embarking on statistical analyses, several assumptions were made to guide the analytical process. It was assumed that the collected data followed a normal distribution. This assumption is critical for many statistical tests, such as t-tests. Normality was then assessed by visual inspection (graphs) and Statistical analyses were performed with the use of IBM Corp. Released 2021. IBM SPSS Statistics for Windows version 28.0.0 software (*IBM SPSS Statistics*,2024).

The SPSS is a powerful software package widely used in social science research for data processing and statistical analysis, and the selection of specific analytical techniques used in this study was made based on the research questions. The researcher used parametric and non-parametric based on the assumption each variable, is based on the normality test results, the analytical approach for assessing scale domains was tailored according to the distribution of the data. For the Anxiety, Self-Efficacy, and Regulation domains, the Shapiro-Wilk test indicated a non-significant deviation from normality ($p > 0.05$), which justified the use of parametric tests. Consequently, independent sample t-tests were utilized to compare group differences pre- and post-intervention, and paired t-tests were used to analyze within-group changes over time. In contrast, the Performance domain displayed significant deviation from normality ($p < 0.05$), prompting the adoption of non-parametric tests for this domain. The independent samples Mann-Whitney U test was employed to compare between groups, while the Wilcoxon Rank-Sum test was used for within-group comparisons. This approach ensured the statistical integrity of the analysis, aligning each domain's data characteristics with the most appropriate inferential test.

Descriptive statistics such as means, standard deviations, medians, and percentages were calculated to summarize and describe the main variables of the data. Inferential statistical tests,

such as independent t-tests, were used to test hypotheses and draw conclusions about population parameters.

A paired t-test was used because we have two sets of measurements for the same set of observations (before and after the intervention). It evaluates whether the means of paired data differ significantly from each other. This is particularly useful for testing the effect of the intervention. The results obtained from the statistical analyses were interpreted in the context of the research questions and objectives. Statistically significant results were discussed, and their implications were considered.

As for the qualitative data analysis process, the written interviews were subjected to content analysis. After each interview, the transcript was analyzed independently by three researchers and a consultant. The team members then shared their themes and discussed discordances and concordances. This multiple-coding strategy ensured the validity of the results. The team members also put forth recommendations for the next interview/interviews based on the results and experience gained from the previous interview/interviews. Data collection continued until theme saturation was achieved when themes were repeated and no new themes were emerging.

This analytical approach involved systematically identifying and coding meaningful themes, patterns, and segments within the data. To ensure that the research's focus remained consistent throughout the coding process, pre-defined research questions and objectives served as the analysis's guides. The coding strategies followed the following order:

1. Open coding: data is broken down analytically. Line-by-line sentences and paragraphs were given descriptive codes. The codes were then organized under major codes or themes by grouping conceptually similar categories.

2. Axial coding: the themes and codes were related to each other in terms of what theme caused, preceded, or resulted from other themes.

To enhance the credibility and trustworthiness of the findings, the coding was presented to two other coders who analyzed a portion of the transcripts to discuss and resolve any coding discrepancies. The main themes were also presented to the participants to confirm the accuracy of the findings.

Qualitative findings were integrated with the quantitative data collected in the study. This integration provided a comprehensive and multidimensional understanding of the research question, allowing for a more robust interpretation of the findings.

3.15 Summary

The current study used a mixed-methods, quasi-experimental design to evaluate the impact of formative assessment on first-year nursing students' anxiety, performance, self-efficacy, and self-regulation in Palestine. Convenience sampling was used to select the study sample. The classes were assigned randomly to the intervention or control group. Both groups filled out the demographic part and were evaluated through self-administered questionnaires.

The researcher used both control and intervention groups when implementing the study. The intervention group received intervention over sixteen weeks. Upon the conclusion of the research, participants were provided with self-administered questionnaires to assess their critical thinking abilities, anxiety levels, academic performance, and self-efficacy. To check the study hypothesis and look at mean differences between the control and intervention groups, SBSS version 27 analyzed the data. Independent t-tests to examine mean differences between the control and intervention groups and to test the study hypothesis, a paired t-test compares the means of the pretest and posttest for each group of control and intervention groups.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the results of two sections, quantitative and qualitative. As for the quantitative part, outline the descriptive and inferential statistics conducted for the current study. Ninety students were recruited to evaluate the impact of formative assessment on first-year nursing students' anxiety, performance, self-efficacy, and self-regulation in Palestine, utilizing the interventions for the intervention group. For each group using the paired samples t-tests or their nonparametric equivalents in case the assumptions were violated. The average pretest scores are compared between the intervention and control groups using independent sample t-tests or their nonparametric equivalents in case the assumptions were violated.

4.2 Demographics

A total of 90 students participated in this study: 44 in the control group and 46 in the intervention group. Table 1 shows that there are no significant differences between the control and intervention groups by demographic variables. Almost half of the sample were males and half were females, and the Chi2 statistics showed no significant differences in the distribution of gender ($P = 0.97$). Similarly, no significant differences between the groups were found by GPA, $P = 0.075$. The average number of credit hours also did not differ between the two groups; $t(88) = 0.128$, $P = 0.893$.

Table 1: Demographic variables by group, N = 90 (Control =44, Intervention=46)

	Group			
Variable	Control N = 44	Intervention N = 46	P value	Chi^2
Gender				
Male	48.6	51.4	0.97	0.001
Female	49.1	50.9		
GPA				
<69%	34.6	65.4	0.075	5.186
70 - 79%	47.5	52.5		
>80%	66.7	33.3		
# credit hours	15.8	15.8	0.893	t = 0.128

Table 2 presents the results of independent samples t-tests and Levene's test for equality of variances between the control (N = 44) and intervention (N = 46) groups at the pre-intervention stage. Based on Levene's test, the p-values showed that the variances for test anxiety (p=<0.001), self-efficacy (p=0.030), and performance (p=0.030) were unequal, but the variances for self-regulation (p=0.244) were equal. Because the assumption of equal variances was not assumed for anxiety, performance, and self-efficacy, the Welch t-test was used to test the differences in means. Because the assumption of equal variances was upheld for self-regulation, the regular t-test was used. The independent samples Welch t-test p-values showed a statistically significant difference in test anxiety mean scores between the control group (M = 21.9) and the intervention group (M = 17.17) (t=3.90, P < 0.001). The pre-intervention mean differences in self-efficacy between the intervention (M = 28.3) and control (M = 32.2) groups, was a statistically significant (t=2.078, P = 0.041). There was a significant difference in self-regulation (t=4.173, P < 0.001) between the intervention (M = 43.5) and control (M = 53.5) groups. The means of the performance variable in the intervention (M = 29.456) and control (M = 29.681) groups did not differ significantly from one another (t=0.258, P = 0.797).

Table 2. Differences between study variables in control and intervention groups at pre-intervention

Variable	Levene's test		Groups		Independent sample t-test	
	F	P	Control (N = 44) Mean	Intervention (N =46) Mean	P	t
Test-anxiety	22.496	0.000	21.9	17.17	<0.001	3.90
Performance	4.852	0.030	29.681	29.456	0.797	0.258
Self-efficacy	4.851	0.030	32.2	28.3	0.041	2.078
Self-regulation	1.47	0.287	53.5	43.5	<0.001	4.173

4.3 Quantitative Part

4.3.1 Anxiety

Figure 2 compares the pretest and posttest average test anxiety scores by group (intervention vs. control). The figure clearly shows that test anxiety decreased after the intervention while test anxiety remained the same in the control group. The independent samples t-tests in Table 3 for the pretest showed that the intervention group had a significantly lower anxiety score than the control group (17.2 vs. 21.9, respectively), $t(66.6) = 3.9$, $P < 0.001$). At the posttest, the intervention group had a statistically significantly lower average anxiety score compared to the control group: 10.4 vs. 23.2, $t(79.2)$, $P < .001$.

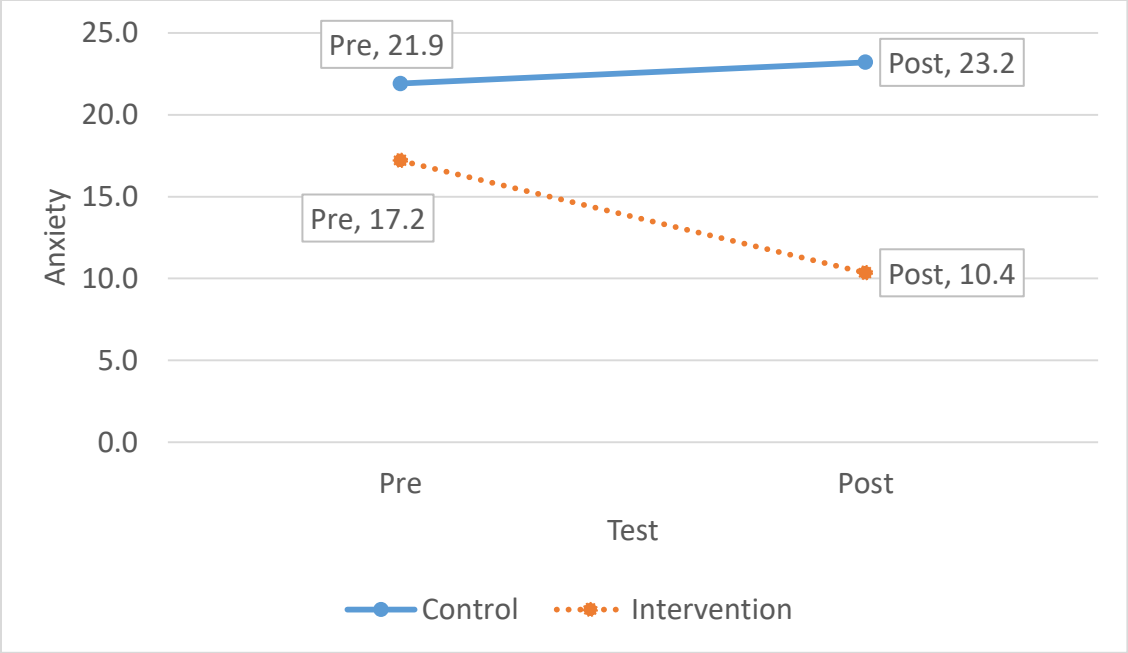

Figure 2: Pretests and posttests average anxiety scores, by group

Table 3: Independent samples t tests comparing test anxiety in the intervention versus control for pre and posttests

		Mean	SD	t	df	p-value	Mean Difference
Anxiety Pre	Control	21.9	3.64	3.90	88	<0.001	4.73
	Intervention	17.7	7.34				
Anxiety Post	Control	23.18	3.94	17.59	88	<0.001	12.83
	Intervention	10.34	2.92				

Figure 2 shows that test anxiety decreased to a significantly greater degree among the intervention group compared to the control group. The paired samples t-tests in Table 4 confirm this trend by statistically showing that the decrease in anxiety among the intervention group from an average of 17.2 at pretest to 10.4 at posttest is highly statistically significant, t (43) = 5.84, $P < 0.0001$. Among the control group, the minor change in test anxiety from 21.9 to 23.2 is not statistically significant, t (43) = -1.92, $P = 0.062$.

Table 4: Paired samples t test of the difference in test anxiety between pre and posttests, by group

Group	Mean Pre-test (SD)	Mean post- test (SD)	Mean difference	t	df	P-value
Control	21.9 (3.64)	23.2(3.94)	1.3	1.916	43	.062
Intervention	17.2(7.34)	10.4(2.92)	6.8	-5.841	45	.000

4.3.2 Performance

Independent-sample t tests were performed to compare the pretests and posttests between intervention and control groups, Table 0. The lower performance scores in the intervention group at pretests (29.456 vs. 29.681). On the other hand, at posttests, the intervention group score improved significantly and became statistically significantly higher than the control group (32.000vs 28.522, respectively), p = 0.001.

Table 5: Independent samples t-tests comparing performance in the intervention versus control for pre and posttests

		Mean	SD	t	df	p-value	Mean Difference
performance Pre	**Control**	29.681	2.907	0.258	71.946	0.797	0.225
	Intervention	29.456	5.115				
performance Post	**Control**	28.522	5.367	-3.459	79.871	0.001	3.477
	Intervention	32.000	4.044				

Figure 3 shows that performance decreased in the control group and increased in the intervention group. The paired samples t-tests showed that the increase in average performance scores among the intervention group from an average of 29.456 to 32.000, is statistically significant, P = 0.020. Among the control group, the change in average performance scores from 29.681 at pretest 28.522 at posttest, P = 0.171

Table 6: Paired samples t-test of the difference in performance between pre and posttests, by group

Group	Mean Pre-test (SD)	Mean post-test (SD)	Mean difference	t	df	P-value
Control	29.681 (2.907)	28.522 (5.367)	1.159	-1.393	43	0.171
Intervention	29.456 (5.115)	32.000 (4.044)	2.544	2.419	45	0.020

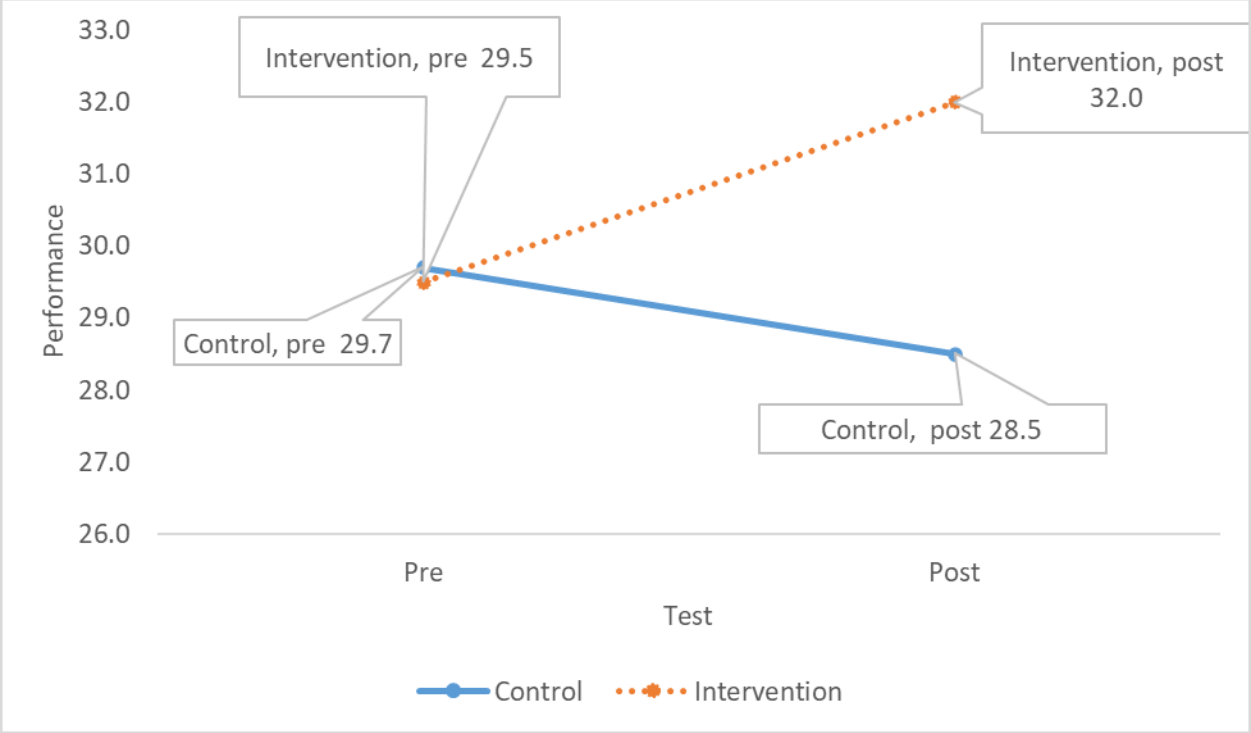

Figure 3: Pretests and posttests average performance scores by group

4.3.3 Self-efficacy

Figure 4 compares the pretest and posttest average self-efficacy scores by group (intervention vs. control). The figure shows no change in the control group from the pretest to the posttest average scores but an increase in self-efficacy in the intervention group.

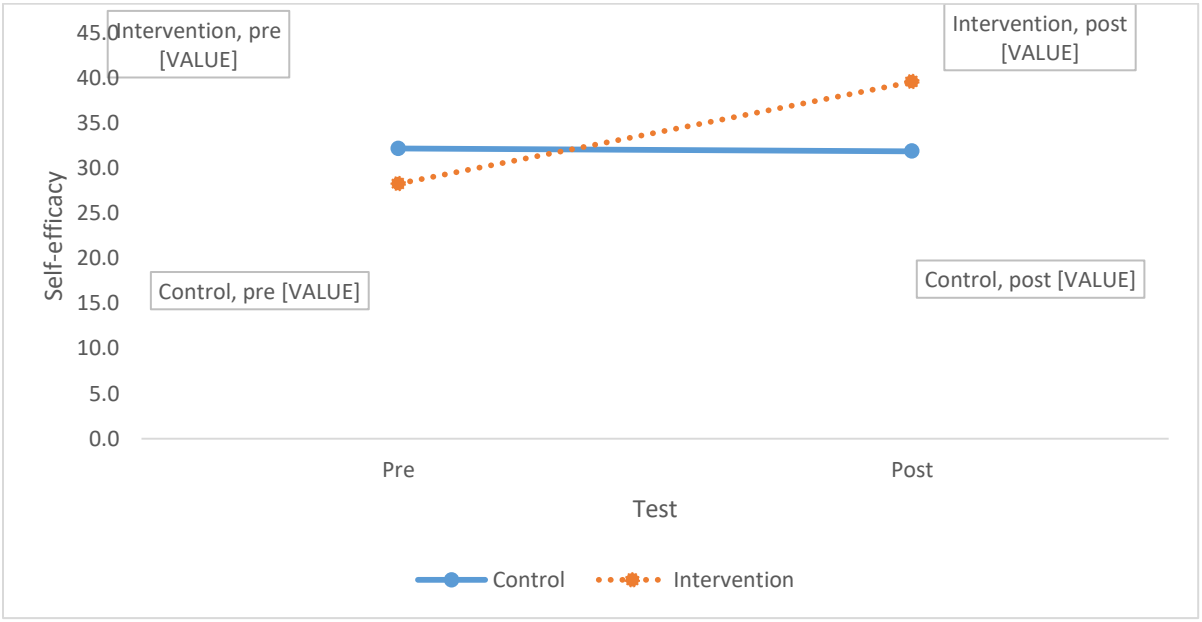

Figure 4: Pretests and posttests average self-efficacy scores by group

Independent-sample t-tests were performed to compare the pretests and posttests between groups. The slightly lower self-efficacy score at the pretest in the intervention group compared to the control group (28.3 vs. 32.2), Figure 4 were statistically significant, t (84) = 2.08, (P < 0.041), Table 6. At posttests, the intervention group had a statistically significantly higher average self-efficacy score compared to the control group (39.6 vs 31.9, respectively), t (88) = -3.78, P < 0.0001.

Table 7: Independent samples t tests comparing self-efficacy in the intervention versus control for pre and post tests

		Mean	SD	t	df	p-value	Mean Difference
Self-Efficacy Pre	Control	32.2	7.76	2.078	88	0.041	3.95
	Intervention	28.3	10.1				
Self-Efficacy Post	Control	31.9	10.2	-3.779	88	<0.001	-7.74
	Intervention	39.6	9.21				

The paired samples t tests showed significant increases in the self-efficacy among the intervention group but not among the control group, Table 7. The paired samples t-tests in Table 7 show that the increase in self-efficacy among the intervention group from an average of 28.3 to 39.6, is statistically significant, t (43) = -6.24, $P < 0.001$. Among the control group, the self-efficacy changes from 21.9 to 23.2 is not statistically significant, t (43) = 0.57, $P = 0.573$.

Table 8: Paired samples t test of the difference in self-efficacy between pre and posttests, by group

Group	Mean Pre-test (SD)	Mean POST test (SD)	Mean difference	t	df	P-value
Control	32.2(7.76)	31.9(10.2)	0.3	-.568	43	0.573
Intervention	28.3(10.1)	39.6(9.2)	11.3	6.23	45	.000

4.3.4 Self-Regulation

Figure 5 compares the pretest and posttest average regulation scores by group (intervention vs. control). The figure shows no change in the control group from the pretest to the posttest average scores but an increase in regulation in the intervention group. The figure also shows that the intervention group started with a lower average regulation score at the pretest but improved greatly to surpass the control group at the posttest.

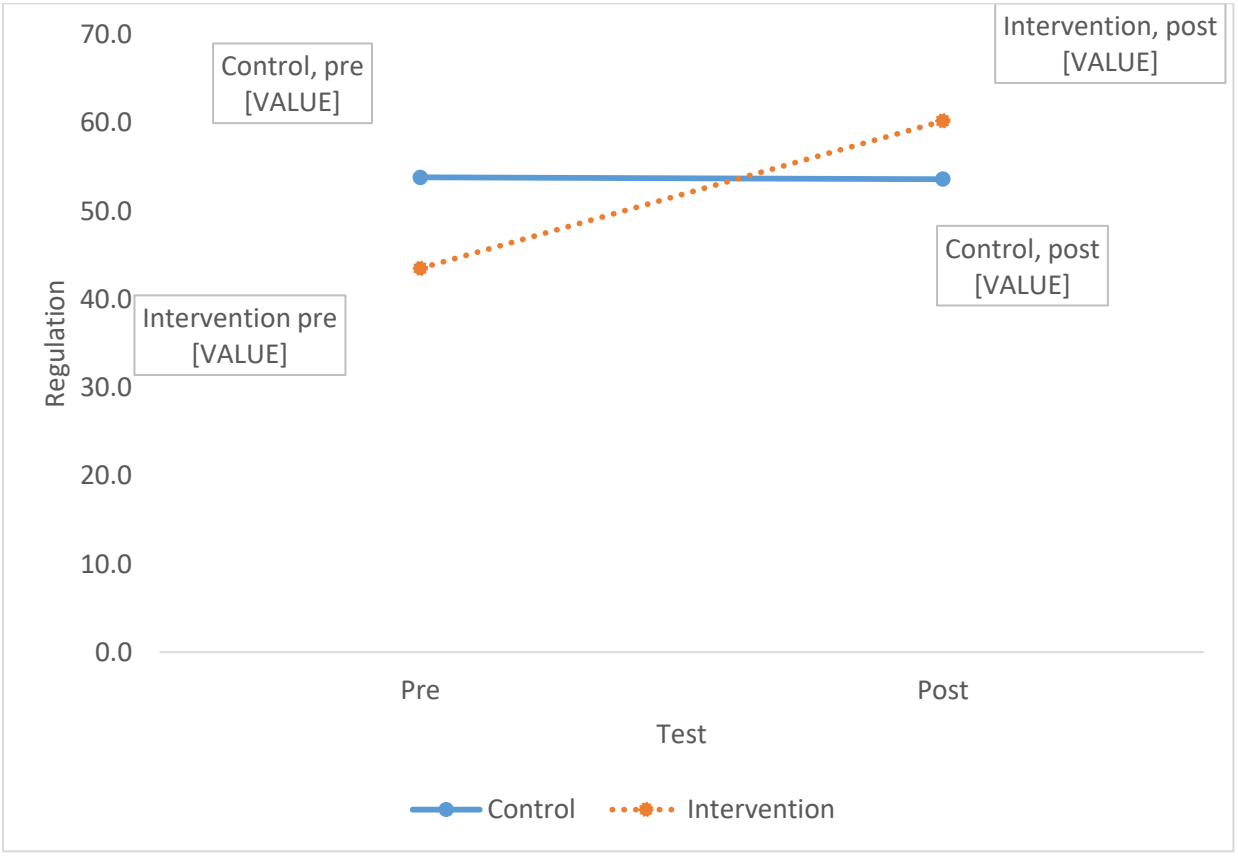

Figure 5: Pretests and posttests average regulation scores by group

Independent-sample t tests were performed to compare the pretests and posttests between intervention and control groups, Table 8. The lower regulation scores in the intervention group at pretests (43.5 vs. 53.8), Figure 5 were statistically significant, t (88) = 4.17, ($P < 0.001$), Table 8.

At posttests, the intervention group score improved significantly and became statistically significantly higher than the control group (39.6 vs 31.9, respectively), t (88) = -3.42, p < 0.001.

Table 9: Independent samples t tests comparing regulation in the intervention versus control for pre and post tests

		Mean	SD	t	df	p-value	Mean Difference
Self-Regulation Pre	Control	53.8	10.8	4.19	88	<0.001	10.34
	Intervention	43.5	12.5				
Self-Regulation Post	Control	53.5	9.35	-3.42	88	<0.001	-6.63
	Intervention	60.1	9.02				

The paired samples t tests showed significant increases in the regulation domain among the intervention group but not among the control group, Table 9. The paired samples t-tests shows that the increase in average regulation scores among the intervention group from an average of 43.5 to 60.2, is statistically significant, t (45) = -6.91, $P < 0.001$. Among the control group, the change in average regulation scores from 53.8 at pretest to 53.6 at posttest, Figure 4 was not statistically significant, t (43) = 0.41, $P = 0.681$, Table 9.

Table 10: Paired samples t test of the difference in regulation between pre and posttests, by group

Group	Mean Pre-test (SD)	Mean POST test (SD)	Mean difference	t	df	P-value
Control	53.8(10.83)	53.5 (9.35)	0.3	-.414	43	.681
Intervention	43.5(12.5)	60.1(9.02)	16.6	6.91	45	.000

4.4 Qualitative part

The qualitative analysis included seven students who were interviewed individually. The analysis continued until no new themes emerged (i.e., saturation was achieved). The qualitative content analysis of the interviews revealed the main themes and subthemes derived from the qualitative interviews. Table 11 illustrates the four main themes: 1) Formative Evaluation Strategies, 2) Improved Academic Performance, 3) Enhanced Self-Efficacy, and 4) Improved Self-Regulation. The table also shows the subthemes included in each of the main themes. The formative evaluation strategies included four subthemes: Peer Reviews, Feedback, Open Questions Strategy, and Short Tasks and Assignments. Improved academic performance included seven subthemes: Improving Understanding, Addressing Weaknesses, Active Learning, Motivating, Stimulating Critical and Analytical Thinking, Preparing for Summative Evaluation, and Reducing Anxiety. Enhanced self-efficacy included four subthemes: Building Confidence, Self-Reflection, Tracking Growth, and Reduced Anxiety. Improved self-regulation included seven subthemes: Motivation, Discipline, Organization, Goal Setting, Ability to Prioritize Tasks, Managing Time, and Reducing Anxiety.

Table 11. The main and sub-themes derived from the qualitative interviews

MAIN THEMES	FORMATIVE EVALUATION STRATEGIES	IMPROVES ACADEMIC PERFORMANCE BY	ENHANCES SELF-EFFICACY BY	BUILDS SELF-REGULATION BY IMPROVING
SUB THEMES	Peer Reviews	Improving understanding	Building confidence	Motivation
	Feedback	Addressing weaknesses	Self-reflection	Discipline
	Open questions strategy	Active learning	Tracking growth	Organization
	Short tasks and assignments	Motivating	Reduced anxiety	Goal setting
		Stimulating critical		Ability to prioritize

	and analytical thinking	tasks
	Preparing for summative evaluation	Managing time
	Reduced anxiety	Reduced anxiety

4.4.1 Emotions Associated with Exams

As is clear from Table 10 and Figure 5, the emotion of anxiety is related to all the other themes in the framework. Students described mixed emotions of fear, anxiety, and tension while at the same time, they experienced excitement and determination when completing milestones in their study progression. These emotions are heightened by uncertainty about time allocation, the inability to finish the exam within the allotted time, and fear of incomplete subject coverage.

Participant 1 said "*I was having mixed feelings of anxiety and tension because of not having enough time, and excitement when I finished and progressed to another stage, while cooperation with my classmates provided me with emotional support and helped me. You understand difficult concepts.*" Participant 2 added "W*hen I prepare for an exam, I usually feel a mixture of excitement, tension, and determination. But during the exam, I try to maintain my focus and calm because I have gone through short exams that have made me feel psychologically calm.*"

Factors that contribute to reducing anxiety and tension include cooperation with classmates and comprehensive course materials that provide direction and organization, enabling students to prioritize contents and work efficiently. As Participant 3 told us *"I always feel afraid and nervous before every exam, and when the exam comes, I am trembling and frightened, but the curriculum was explained in detail, and these course assessment methods were clear enough to make me less nervous.*"

The professor’s personality and teaching styles can reduce or increase anxiety among students. This is attributable to the lecturer's skill in fostering a supportive and upbeat learning atmosphere. Students are more likely to approach tests with confidence and less worry when they sense that their lecturer is enthusiastic about them and believes in their talents.

Participant 4 expressed this by saying: "*Exam preparations can be really difficult, with a huge amount of material to cover in a limited time. It is normal to feel pressure to perform well, which can increase stress levels. However, the guidance and encouragement from my teacher provided me with the inspiration and determination needed to prepare diligently for the exam, allowing me to stay focused on achieving my ultimate goal."*

Overcoming fear and finding motivation in test anxiety can be a challenging journey for many students. However, with the right strategies and support, it is possible to conquer test anxiety and find the motivation to succeed. In addition, seeking support from teachers, friends, or even a therapist can also provide valuable guidance and encouragement to overcome fear and achieve academic success. Another participant (Participant 5) confirmed:" *There was a fear inside me that I would not finish the subject and that the subject required time to study it, but engaging in the subject through preparation and there was a special atmosphere within the class that made us involved in the subject, which gave us the motivation when studying the subject through love of study and attachment to the subjec*t".

Participant 6 shared, *“During my exam preparations, I'm filled with a sense of possibility, believing that I can excel in the test and receive a grade that reflects the hard work I've put into my studies. When actually taking the exam, there is anxiety, but I make an effort to transform anxiety to motivation by reminding myself of the dedication and effort I've invested.”*

4.4.2 Formative Assessment Improves Academic Success

According to students, formative academic assessments are crucial tools in the quest for academic success. This is achieved through feedback on performance, identifying weaknesses, and clarifying objectives. Formative assessments significantly prepare students for summative evaluation. Participant 2 said, *"I believe that formative assessment plays a critical role in overall academic success. These assessments allowed me to receive timely feedback on my understanding of the material, enabling me to identify any areas of weakness and address them before summative assessments and educational objectives were clear for each unit".*

The above quote contains three themes: 1) the formative assessment method of feedback and its impact on 2) understanding of the material and how those two themes are related 3) identifying areas of weakness.

4.4.3 Peer Evaluation and feedback encourage critical and analytical thinking

The peer evaluation which is a catalyst for academic excellence and motivation students share their perspectives on the transformative power of peer evaluation in academia, and the profound impact of peer evaluation on academic excellence and motivation. Peer evaluation and feedback from students and teachers motivate students to improve their performance and enhance their critical and analytical thinking skills. Participant 1 confirmed when she said:" *It motivates me to improve my performance from the middle of the semester to the final stage by encouraging students to evaluate and provide feedback to their peers because, in my view, peer evaluation not only diversifies the sources of feedback but also enhances critical thinking and analytical skills in physiology. It also encourages me to work harder additionally, seeing my peers succeed through their hard work and dedication serves as a great source of inspiration and motivates me".*

The above comment also includes three themes and explains how they are related to each other. 1) The formative evaluation strategy of peer feedback enhances 2) Academic performance by improving 3) motivation, critical, and analytical thinking.

4.4.4 The open-question strategy enhances active learning and engagement

An important formative evaluation method is to require students to read and summarize lecture notes and class readings and then post questions for teachers and peers about concepts they did not understand. Students felt that this strategy enhanced their participation with teachers and peers and created a more active learning environment.

According to Participant 3, "*The lecturer's strategy of stimulating questions is excellent as it encourages students to actively engage with the material by prompting them to think about a question. Additionally, the strategy of asking students to read the lectures and ask questions about what is unclear consolidates our understanding of the key concepts discussed. Moreover, the open-question strategy is particularly valuable as it creates an inclusive and active learning environment where students feel comfortable asking questions and seeking clarification.*"

The above statement describes two themes 1) the formative evaluation strategy of open-question or encouraging students to ask open-ended questions. Students found this strategy to be helpful in 2) engaging students in the class and clarifying concepts.

4.4.5 Short tasks and assignments lead to a deeper understanding

These strategies confirm that fostering a collaborative and active learning atmosphere in the classroom empowers students to take charge of their education. When used properly, formative evaluation gives students immediate insight and growth opportunities, enabling them to recognize their strengths and abilities, Participant 5 responded: *"The relationship between academic performance and formative assessment is strong from my point of view because in the*

classroom the evaluation criteria were clear before starting the class, the teaching environment was comfortable and free of any disturbance, and the short tasks and assignments had a clear assessment, and from my point of view I see that these assessments work to enhance active learning and participation in the classroom, leading to a deeper understanding of the topic."

The above quote emphasizes two themes: 1) the formative evaluation strategy of short tasks and assignments work to 2) to enhance active learning and participation. Those in turn lead to improved understanding and academic performance.

4.4.6 Formative assessment enhances self-efficacy

Formative assessment enhances self-efficacy by building confidence through self-reflection, tracking one's growth, constructive feedback, and encouragement, and by allowing a student to identify strengths and weaknesses throughout the course, Participant 5 responded: *"Honestly, formative assessment is like magic in the world of education! It allows you to see yourself in the mirror of reality, to know how much you have done and where you can improve further. The most wonderful thing is that you have a boost of enthusiasm and confidence when you see your progress. Also, getting positive feedback and practical advice enhances your readiness to challenge yourself and overcome obstacles. Indeed, it is the path to self-development and creativity in learning".*

4.4.7 Building confidence through self-reflection

Formative assessment involves a continuous and constructive evaluation of one's progress, and its effects on self-efficacy are significant. When giving feedback that highlights areas for improvement, it reassures students of their dedication and effort and that they can progress. The increase in confidence is based on tangible evidence of growth and development. It fuels the belief that achieving personal goals and excellence is attainable through a commitment

to continuous learning and hard work. Participant 2 said: *"Formative assessment boosts my self-efficacy by showing me that I can improve and achieve my goals through continuous learning and effort. It helps me build confidence in my abilities and motivates me to strive for excellence*".

4.4.8 Enhancing self-efficacy through continuous feedback and tracking progress

Through a deeper understanding of the students' strengths and shortcomings, we may help students adjust their learning methodologies. Students who engage in self-reflection are encouraged to consider their learning experiences critically, noting what went well and what needs improvement. In addition to pointing out areas that require work, feedback should recognize and praise students' accomplishments. Students who receive timely feedback can observe a clear link between their efforts and the results they obtain. This encourages them to keep up the good job and fosters a growth attitude in them. Participant 4 confirmed: *"The formative assessment allowed me to track my growth over time and identify any patterns or trends in my performance and self-efficacy. By receiving feedback regularly, I can develop a better understanding of my strengths and weaknesses, which ultimately strengthens my confidence in taking on new challenges*".

Giving students timely and constructive feedback on their work regularly will make them aware of their strengths and weaknesses. It helps them in setting goals and paves for them the path to achieve their goals. Participant 6 said: "*By increasing awareness and identifying my strengths and weaknesses, I can develop my perceptions of progress and be more accurate about my abilities and confidence. By setting my goals, it can help me make them achievable by breaking down complex tasks into smaller steps".*

Self-efficacy beliefs influence student motivation to approach conceptual questions. When students have high self-efficacy in a particular topic or skill area, they are more likely to

be motivated to learn and tackle difficult questions because they believe they can succeed in a course.

According to Participant 1: "*Motivation, this might prompt me to work harder to prove my self-competence and search for additional resources and study materials to deepen my understanding of the subject. This had an impact on class discussions and asking questions because it instilled in me confidence in the ability to understand complex anatomical concepts".*

Acknowledging and honoring students' accomplishments, not only boosts their self-esteem and confidence but also reinforces their intrinsic motivation to excel academically and in other aspects of life. This recognition provides a sense of validation for their hard work and dedication, creating a positive and nurturing learning environment that encourages students to continue striving for their personal best. Students are inspired to realize their greatest potential in a supportive learning environment created by this positive reinforcement.

Participant 5 explained: *'The mutual respect and appreciation of our efforts as students by the teacher had an impact on our souls. At the end of each chapter, the professor would highlight the student who showed noticeable improvement or mastery in a particular subject. This not only encourages healthy competition among us students but creates a positive and supportive classroom environment".*

4.4.9 Formative Assessment Boosts Self-regulation

Formative assessment boosts self-regulation through increasing motivation, discipline, organization, goal-setting skills, and abilities to prioritize tasks and manage time Participant 2 said: *"Formative assessment is a golden opportunity for any student who wants to develop himself and reach his goals in an organized and thoughtful way. It teaches us how to be motivated and manage our time better, and also how to arrange our priorities so that we can*

deal with pressures and challenges with great efficiency. Honestly, thanks to this type of assessment, I became more focused and organized in my studies and daily life. It helps me see the big picture and plan my future more consciously and confidently".

4.4.10 Self-regulation through discipline and organization

Formative assessment is not just a passive or routine part of education but an active and dynamic tool that helps shape students' own learning experiences in many meaningful ways. Formative assessment has a transformative impact on self-regulation, instilling essential qualities and skills that are fundamental to academic success and personal development such as holding oneself accountable, identifying strengths and weaknesses, and adjusting learning strategies. Formative assessments serve as a powerful incentive for self-organization among nursing students. Self-organization then leads to self-regulation. Participant 2 said*:" Formative assessment helped me develop my accountability, allowed me to know my strengths and weaknesses, identify areas for improvement, and make the necessary adjustments in my learning strategies. It also helped me stay motivated and engaged in my studies and made me disciplined, organized, and proactive in managing my studies".*

4.4.11 Self-regulation through goal-setting

Formative assessment serves as a guide for setting clear and logical goals. When students receive regular feedback and evaluation, it provides them with insights into their current performance and areas that require improvement. With this information, students can establish well-defined objectives for their academic progress. This goal-setting process is informed by a deep understanding of their strengths and weaknesses, making the goals more realistic and achievable.

Participant 3 clarified: *"Formative assessment helped me in setting clear and logical goals and ways to reach the goals through direct evaluation was an incentive to increase my self-organization towards reaching the goal, so I increased my efforts and tried harder to achieve engagement in the subject".*

4.4.12 Self-regulation through task prioritization

Formative assessment empowers students by facilitating effective prioritization of their learning efforts. This statement by Participant 4 underscores the vital role of formative assessment in guiding efficient and focused learning. Formative assessment empowers students to make informed decisions about where to invest their time and resources. By allocating their resources to the most important topics, students can learn more efficiently. They are not bogged down by irrelevant or less critical information.

This quote from Participant 4 underscores the vital role of formative assessment in guiding efficient and focused learning. *"Formative assessment helped me to prioritize my learning effectively. I was allocating time and resources to the most important topics that were identified as needing improvement through self-assessment. This method helped me feel responsible for mastering the educational materials*".

4.5 Recommendations

To improve formative evaluation, students recommended incorporating the following strategies:

4.5.1 The evaluations should be comprehensive

Feedback suggests that evaluations should cover every relevant material, not just one aspect of the subject. This can include tasks, projects, tests, quizzes, and other forms of assessment, and the setting for the assessment should be created with the needs of the individual in mind. Comprehensive feedback encompassing all sections of the subject, ensures that students receive guidance on their performance in all aspects of the course, which is crucial for holistic learning.

Participant 2 said: *"Feedback must include all sections of the subject, including quizzes, and provide clear guidance on areas for improvement. The environment must be comfortable and appropriate for learning, and tests must take into account individual differences among students".*

4.5.2 The evaluation methods should be clear

The scoring rubrics used to assess assignments and projects should explicitly define the criteria and expectations for each task. The rubrics should outline in detail what aspects of the assignment will be evaluated and how they will be assessed. By doing so, students have a clear understanding of what the instructor is looking for and what is expected in their work. This transparency helps reduce ambiguity and subjectivity in grading. Clear rubrics ensure that expectations and progress are reviewed throughout the course by facilitating communication between instructors and students and reducing subjectivity and ambiguity in grading. In general, rubrics are a useful teaching aid for anatomy classes.

Participant 1 said *"The rubric should clearly state the criteria and expectations for each assignment, providing students with a clear understanding of what is required. Furthermore, incorporating continuous feedback and assessment throughout the course can help students*

identify areas for improvement and make necessary adjustments to enhance their learning experience".

4.5.3 The evaluation methods should be varied and diverse

Applying a range of assessment techniques highlights students' abilities and helps them adjust to different teaching styles. Assessment techniques can include discussions, projects, writing assignments, and presentations. By allowing students to demonstrate their textual expression, creativity, problem-solving ability, oral communication, and public speaking abilities, these techniques make sure that each student's unique learning preferences and capabilities are acknowledged. A variety of assessment methods allows each student to shine in their unique way and reduces the risk of bias or unfairness associated with a singular assessment method.

Participant 3 said: "*It is recommended to use a variety of types of assessment in the course, such as written tasks, presentations, projects, and discussions. This makes us feel distinct, creative, and different from the school system or the traditional system, in which I feel unequal and unbiased under any circumstances".*

4.5.4 Provide quick and constructive feedback

Quick and constructive feedback reduces anxiety, fosters continuous improvement, and boosts confidence but also sustains motivation and engagement, ultimately creating a supportive and effective learning environment. Quick feedback also conveys a sense of support and appreciation. It shows students that their instructor is attentive and invested in their learning, which can enhance the teacher-student relationship. Feeling valued and supported by the instructor can create a positive learning atmosphere, where students are more likely to actively participate and seek assistance when needed.

Participant 5 said:*" One thing that was clearly different from other courses was that there was quick and constructive feedback after every test, assignment, and presentation, which gave me the opportunity to reduce anxiety. I was constantly improving and refining my work, which ultimately strengthened my confidence in my abilities. Additionally, quick feedback helped me stay motivated and engaged throughout the course, knowing that my efforts were appreciated and supported".*

4.5.5 Engage students with classroom discussions and surveys

Formative assessment that engages students in classroom discussions and surveys enhances the overall quality of instruction. It not only empowers students to actively participate in their learning but also promotes a student-centered approach that considers their individual needs and preferences. Moreover, students' feedback collected through surveys is invaluable for instructors and institutions to make data-informed decisions. It allows them to identify areas for improvement, understand what is working well, and adapt their teaching methods to better meet student needs.

Participant 6 recommends *"Using classroom discussions in every lecture to focus on strengths and weaknesses, focusing on the importance of the part to be taught, using surveys to obtain the views of a group of students about their educational experiences and preferences, and promoting constructive critical thinking without embarrassing any student"*.

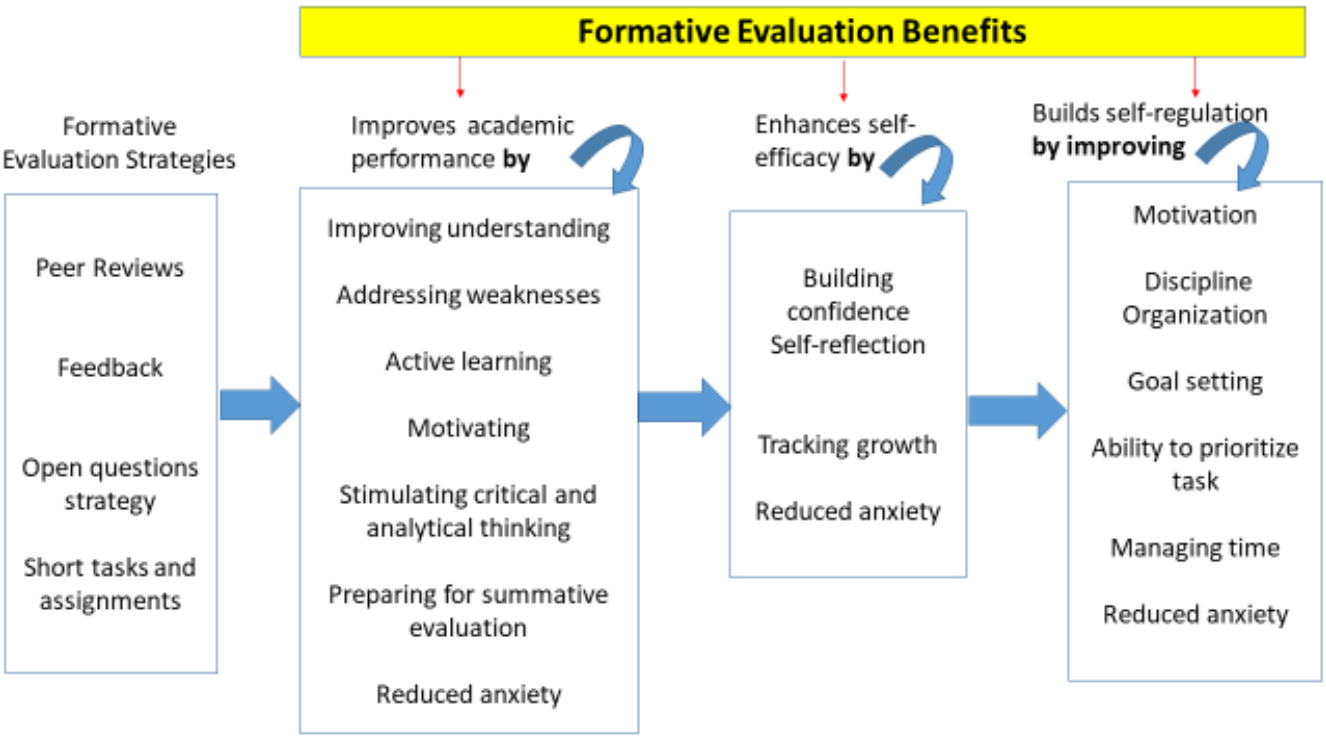

Figure 4: Theoretical framework of the main formative evaluation themes

Figure 5 illustrates the main themes derived from this study and shows how the qualitative interviews enriched and explained the quantitative results. The figure shows the main formative methods which were lauded by the students included open-ended strategies, giving feedback, and peer reviews. These strategies were found to improve academic performance in the quantitative analysis. The qualitative interviews explained how those strategies improved academic performance. The qualitative explorations showed that formative evaluation strategies improve academic performance through enhancing 7 subthemes: 1) understanding, 2) addressing weaknesses, 3) active learning, 4) motivating students, 5) stimulating critical and analytical thinking, 6) preparation for summative evaluation, , and 6) reducing anxiety.

That qualitative interviews also revealed that improved academic performance leads to enhanced self-efficacy through 4 subthemes: 1) the ability to track one's growth, 2) building confidence, 3) self-reflection, , and 6) reducing anxiety as illustrated in Figure 5. As a result,

self-regulation will also be improved through 6 subthemes 1) motivation, 2) discipline, and increased organization 3) increased skills in goal setting, 4) the ability to prioritize tasks, 5) managing time effectively, and 6) reducing anxiety. As is clear from Figure 5, reducing anxiety is a core subtheme that underpinned all of the major themes and categories.

4.6 Summary

This chapter presents the results of two sections, quantitative and qualitative. As for the quantitative part, outline the descriptive and inferential statistics conducted for the current study. Ninety students were recruited to evaluate the impact of formative assessment on first-year nursing students' anxiety, performance, self-efficacy, and self-regulation in Palestine, utilizing the intervention for the intervention group.

The sample characteristics of the control and intervention groups tested by chi-square revealed that there were no significant differences between the two groups by demographic variables.

At the post-test, the independent t-test revealed a significant difference between the control and intervention groups in the mean scores of anxiety, self-efficacy, and self-regulation. On the other hand, the Mann-Whitney U test showed that the academic performance intervention group had a significantly higher mean rank score than the control groups.

Paired sample t-tests showed that the anxiety of the intervention groups decreased statistically significantly from the pretest to the posttest. Additionally, tests showed significant increases in the efficacy and regulation domains among the intervention group. On the other hand, the Wilcoxon rank-sum test showed that the increase in the intervention group was statistically significant in academic performance.

Thus, the findings indicate that the intervention had a positive impact on participants, leading to a decrease in anxiety levels and an enhancement in their self-efficacy and self-regulation. In addition, the notable enhancement in academic performance underscores the favorable influence of the intervention on students' overall success in their studies.

In the qualitative part, students praised formative methods like open-ended strategies, feedback, and peer reviews for improving academic performance. These strategies stimulate critical thinking, motivate active learning, and prepare students for summative evaluation. Improved academic performance enhances self-efficacy, self-regulation, goal setting, and time management.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

A study using a quasi-experimental design was carried out to evaluate the impact of using formative assessments on Palestinian nursing students in terms of academic test anxiety, academic performance, self-efficacy, and self-regulation at a Modern College University in Palestine.

This section provides a discussion of the quantitative and qualitative results of the study begins with an introduction to the subject and goes on to discuss research methods, data analysis, and relevant literature before providing a thorough summary of the study's conclusions. The aim and hypothesis of the study are taken into consideration when analyzing and interpreting the data. The conceptual framework of the study provides context for the current findings. Based on the research, a full discussion is given of the implications for nursing practice, education, and administration, as well as the study's strengths and limitations. The study's conclusions recommend future lines of inquiry. Furthermore, this chapter concludes with some recommendations.

5.2 Study Findings in the Context of the Conceptual Framework

The proposed conceptual framework suggests a good test method that could help us understand the link between these important factors (academic test anxiety, academic performance, self-efficacy, and self-regulation) and formative assessment. New research shows that this method works well in nursing education. It gives policymakers and teachers useful information to help them set up support systems and give students the tools they need to overcome test anxiety and improve their studies.

In addition, educators can help students develop a sense of ownership and accountability for their academic performance by enabling them to take responsibility for their learning journey through self-regulation.

5.3 Results and Social Cognitive Theory (SCT)

The results of the study are consistent with SCT which was developed by Albert Bandura in 1977. One study revealed that a cognitive-behavioral intervention effectively reduced exam anxiety scores among nursing students, highlighting the importance of cognitive strategies in conjunction with SCT for anxiety management (Parrish, 2022). As social support strategies can help nursing students avoid feeling anxious during exams, they can be included in formative evaluations or anxiety-reduction activities (Ortega-Donaire et al., 2023).

Among nursing students, there is a negative link between social anxiety and problem-solving skills, indicating that educational intervention programs can assist in correcting cognitive distortions and enhancing interpersonal interactions (Ahmady & Shahbazi, 2020). This is consistent with SCT that interventions could concentrate on developing students' talents and tactics (behavioral), increasing their self-assurance (personal), and establishing a positive learning environment (environmental) (Cha et al., 2014). In addition, social anxiety among nursing students is influenced by cognitive emotion regulation and social support. The complex interaction between anxiety and cognitive regulation highlights SCT's focus on cognitive processes (Cho & Kim, 2018).

As for academic performance and social cognitive theory, a study of Spanish nursing students found that the social cognitive model explained a lot of the compatibility and collaboration in both of them (Arribas-Marín et al., 2021). This is similar to our study, which aims to improve the education of nursing professionals.

Formative assessment significantly enhances first-year nursing students' academic performance and course-learning outcomes (Elaraby & Hassan, 2021) .The implementation of effective teaching methods develops a positive educational culture and encourages a sense of responsibility and ownership among students. Formative assessment practices significantly increased academic achievement and performance levels (Ozan & Kincal, 2018).

Engaging students in the process of developing assessment criteria promotes accountability, comprehension of performance goals, and active engagement. Better results are eventually achieved through this cooperative method, which enhances both personal development and academic performance (Hivner et al., 2019). The findings of the current study were consistent with Pesce and Díaz's (2020) finding that employing a rubric for formative assessment improves nursing students' performance and ability to self-regulate, encouraging self-control and dedication to their studies (Pesce & Díaz, 2020).

Similarly, this strategy improves self-regulatory behaviors and enhances student confidence (Irvine et al., 2019). Thus, the study was organized based on the presumptions of the conceptual framework for the study. Referring to the SCT and its underlying assumptions, the SCT presupposes that individuals acquire knowledge through the process of observing others. When it comes to assessments, students demonstrated the opportunity to gain valuable insights from the final results and ongoing feedback provided by their peers. This helped them understand effective strategies and methods that can ultimately lead to success.

In this framework, through the integration of different assessment methods, educators can create a well-rounded and engaging learning environment. This approach not only evaluates learning outcomes but also fosters continuous improvement by providing feedback, setting goals, and developing important skills like self-efficacy and self-regulation. As an immediate impact of

this, within the context of enhanced learning and skill development in nursing education, formative assessments provided ongoing feedback and opportunities for reflection, which helped students internalize key concepts and skills (Xiao & Yang, 2019).

In addition, this approach increased self-efficacy as students gained confidence by seeing progress in their abilities, which is crucial in a high-stakes field like nursing. It also worked on improving critical thinking and decision-making skills through real-world scenarios. Furthermore, formative assessments provided rapid identification of learning gaps for timely intervention, preventing minor misunderstandings from becoming major problems. The SCT highlights the dynamic relationship between personal factors, behavior, and environment in nursing education, profoundly impacting students' beliefs, attitudes, and behaviors. It creates a vibrant, encouraging, and efficient learning atmosphere for aspiring nurses (Manjarres-Posada et al., 2020)

5.4 Impact of Formative Study on Nursing Students' Anxiety

According to the study's findings, the intervention group's increased test scores showed a significant improvement in test anxiety; indicating that the strategies used effectively reduced anxiety related to test-taking. The findings of the current study were consistent with Bayat et al., (2017) study, which found that the implementation of formative assessment has the potential to greatly augment the acquisition of knowledge and mitigate levels of anxiety experienced by learners (Bayat, 2017). Similarly, another study aligns with the findings of the present study conducted by Yusefzadeh and colleagues found that students who actively engage in these strategies demonstrate a significant reduction in test anxiety, which subsequently contributes to enhanced performance on assessments (Yusefzadeh et al., 2019). Further, this result coincides with the results of studies at Maastricht University by Molin and associates who concluded that

formative assessments have a significant impact on reducing anxiety and improving academic performance in physics when compared to traditional teaching methods. This suggests that a simple and effective method of formative assessment can help students feel more comfortable, leading to improved educational performance (Molin et al., 2021).

Several studies showed that formative evaluation strategies assist students in nursing programs to better control their anxiety, such as (Cardozo et al., 2023; (Mastagli et al., 2020); Mohammedi et al., 2017; Piroozmanesh & Imanipour, 2018; Sudakova et al., 2022). These studies demonstrated that formative strategies may reduce students' test anxiety. In addition, formative exams offer students a chance to receive feedback and gain insights from their errors, enabling them to cultivate a growth mindset and a more optimistic outlook on assessments. Adopting a more focused approach can ease the stress and apprehension that often come with important exams leading to decreased test anxiety and improved academic results. Thus, integrating regular formative assessments into the curriculum can serve as an effective strategy for reducing test anxiety among students.

In contrast to the findings of the current study, a prior study conducted by Reza Jafaei Deloie et al. (2015) revealed that there was no statistically significant difference in test anxiety in students of basic medical sciences between the intervention group and the control group. It appears that focusing only on changes in teaching and evaluation methods may not effectively reduce test anxiety. Therefore, it is recommended to consider additional interventions alongside educational approaches like stress management techniques, resources, and workshops or counseling sessions where students can acquire relaxation exercises and strategies for effectively managing their stress levels to assist them in managing test anxiety. In addition, establishing a nurturing and encouraging learning atmosphere where students feel at ease reaching out to their

peers and instructors for assistance and guidance could also prove advantageous in alleviating test anxiety.

Even with the use of precise methodologies, different studies can yield contradictory results, which presents challenges for researchers. Nunez and colleagues (2015) found that formative assessment systems, which give students feedback on assignment errors, did not correlate significantly with math anxiety scores. The researchers propose that additional factors such as variations in how students interpret and react to feedback might be involved. In addition, the size and composition of the study's sample may have impacted the findings. Furthermore, it is crucial to take into account the cultural and contextual factors that can influence how students interpret and respond to feedback. These factors may also play a role in the conflicting findings found in the literature, underscoring the importance of conducting more research in this field.

The qualitative insights reveal that quick feedback reduces anxiety, improves confidence, and sustains motivation in a supportive learning environment based on various perspectives and lives. It conveys support and appreciation, enhances the teacher-student relationship, and encourages active participation and assistance. These results are consistent with those of Wadi and colleagues (2022) who showed that when given helpful criticism during a test, the learning abilities of students were improved and they performed better in a practice test or exam subsequently.

Also, the study highlights that the professor’s personality and teaching styles can reduce or increase anxiety among students. This is attributable to the lecturer's skill in fostering a supportive and upbeat learning atmosphere. Students are more likely to approach tests with confidence and less worry when they sense that their lecturer is enthusiastic about them and believes in their talents. These results are consistent with Blondeel et al. (2023) findings, which

concluded that formative assessments have a positive impact on students' psychological well-being and academic performance. They help boost self-confidence and decrease test anxiety when compared to the control group (Blondeel et al., 2023). On the other hand, numerous factors may contribute to students' mental anxiety, but knowledgeable instructors with strong communication skills will still be better able to manage students' anxiety and lessen the stress that comes with getting students involved in the formative assessment process (Al-Wassia et al., 2015).

From the perspective of formative assessment practices, overcoming fear and finding motivation in test anxiety can be a challenging journey for many students. The results showed that with the right strategies and support, it is possible to conquer test anxiety and find the motivation to succeed. In addition, seeking support from teachers, friends, or even a therapist can also provide valuable guidance and encouragement to overcome fear and achieve academic success. This coincides with the results of studies on anxiety in honors public speaking courses by Westwick et al. (2019) who concluded that formative assessment intervention in an honors public speaking course had a significant impact on reducing public speaking anxiety and boosting students' confidence in their communication abilities. This approach to formative assessment has been proven to be highly effective in improving students' public speaking skills and increasing their self-assurance (Westwick et al., 2019).

One of the live experiences on the use of formative assessments is from the students' experience perspective “When I prepare for an exam, I usually feel a mixture of excitement, tension, and determination. But during the exam, I try to maintain my focus and calm because I have gone through short exams that have made me feel psychologically calm.” In sum, formative

evaluations enable students to identify areas in which they might be having difficulty and look for extra assistance or resources to enhance their comprehension.

5.5 Impact of Formative Study on Nursing Students' Performance

The findings of this study revealed a significant difference between the intervention and control groups regarding the mean academic performance, concluding that the intervention had a positive impact on student academic outcomes. These findings are consistent with Lipnevich & Smith (2018) study, which found that formative assessment provides valuable feedback for students, helping them improve their learning process. Formative assessment is valuable for educators and learners to gain insights into their progress, pinpoint areas for improvement, and cultivate a growth-oriented mindset. It enables educators to personalize instructional approaches, leading to enhanced performance and academic achievement by addressing the unique needs of each student (Lipnevich & Smith, 2018).

Similar to the current study's findings, Yan et al. (2022) concluded that creating efficient support systems to help medical students manage and reduce test anxiety ultimately improves their overall well-being and academic performance. The researchers highlighted the significance of offering prompt and detailed feedback to students, enabling them to grasp their strengths and areas for growth (Yan et al., 2022). Also, Ozan et al. (2018) emphasized that implementing effective formative evaluation techniques helps students get quick and early feedback on their development and make the required corrections and advancements in their learning. Lecturers can customize their instruction to meet the needs of each student by using formative evaluation to assist in discovering individuals' strengths and weaknesses. Additionally, it fosters a sense of ownership and responsibility for each student's learning journey by actively integrating them into the evaluation process. Students gain greater drive, interest, and commitment to their academic

endeavors as a result. With the help of these strategies, there are significant positive impacts on students' academic performance (Ozan & Kincal, 2018).

Several studies showed the impact of combining and integrating formative and summative assessment in education, such as (Arribas-Marín et al., 2021; Huisman,2018; Mackintosh-Franklin, 2021; Permana & Permatawati, 2020).The results of these studies suggest that these methods have a positive effect on students' academic performance. They discovered a link between formative assessment techniques used by elementary school teachers and improved student learning outcomes. The results also showed that giving effective formative feedback to undergraduate student nurses had a big and positive effect on their academic performance. In addition, utilizing a well-rounded integration of formative and summative evaluations in a healthcare course can enhance various aspects of student engagement.

A significant amount of research has shown that combining elements of formative and summative evaluations can improve educational results and provide more comprehensive knowledge for students (Buchholtz et al., 2018; Faber et al., 2017; Morris et al., 2021; Phan & Nguyen, 2019; Wadi et al., 2022). These studies emphasize that lecturers can continuously assess students' knowledge and modify their education by integrating the assessment into the teaching and learning process. This allows them to better adapt their teaching strategies to each student's needs while also assisting students in identifying their areas of strength and growth. In sum, this integrated strategy improves educational outcomes for all students by fostering a more dynamic and engaging learning environment.

Regarding the conflicting results presented with our result, Solamo and Fritz Stephen Dadula (2022) conclude that the impact of formative assessments was not more statistically significant than that of standard quiz techniques. This implies that not all formative assessments

are superior in terms of their ability to influence learning outcomes. This is likely because the efficacy of the particular formative assessment utilized in the study might have been weaker due to different methods. Hence, it is necessary to emphasize the importance of taking into account the design and quality of formative assessment rather than excluding it based on individual comparison (Solamo, 2022).

Also, Burgess and colleagues (2013) express concerns about accurate feedback, suggesting that students may not feel confident or prepared enough to give their peers accurate feedback, which may reduce the effectiveness of peer-based formative assessments and, eventually, impeding the process of learning. This lack of readiness can result in biased or insufficient assessments, which reduces the effectiveness of peer-based evaluations as an objective tool for assessing students' progress. Therefore, for peer-based formative evaluations to be effective, teachers must ensure that students receive appropriate guidance and education on how to provide accurate and positive feedback (Burgess et al., 2013).

One perspective argues that distinguishing between learning and performance is crucial when considering the purpose of formative assessment. The goal is to enhance learning processes and achieve better outcomes (Harry Fletcher, 2017). This viewpoint stresses that lecturers should plan for long-term retention of knowledge rather than just immediate performance, as actual learning may not always be adequately measured in the moment of a class. This understanding does not undermine the value of formative assessment but rather calls for a nuanced approach in its application, ensuring that it genuinely contributes to lasting learning rather than merely assessing short-term performance.

In this thesis, there was a congruence between the statistical results and the narrative evidence from the deep qualitative exploration. This reveals the dynamics and underlying

components that characterize formative academic assessments, which are crucial tools in the quest for academic success. This knowledge was gained through feedback on performance, identifying weaknesses, and clarifying objectives. The findings of this study are consistent with (Naseer Ud Din et al., 2018), which showed that in higher education, formative evaluation and feedback are essential for improving instruction and student learning. Effective formative feedback that students initiate and connect to peers and self-assessment are crucial components of modifying instruction to improve academic achievement.

The quantitative findings echoed the qualitative narratives with peer evaluation and feedback to encourage critical and analytical thinking. Students felt that this strategy enhanced their participation with teachers and peers and created a more active learning environment. They referred to this approach as “stimulating questions." In addition, peer evaluation and feedback encourage active engagement and participation in the learning process, as students are motivated to contribute their insights and suggestions for improvement. This agrees with a study conducted by Fernández-Ferrer & Cano (2016), which revealed that an experience in university teaching innovation demonstrated significant benefits in terms of student engagement, enthusiasm, and perception of learning, although it may not have directly resulted in improved performance (Fernández-Ferrer & Cano, 2016).

5.6 Impact of Formative Study on Nursing Students’ Self-Efficacy

In the study, the self-efficacy of the students in the intervention group where the formative assessment practices were applied was significantly higher than the ones in the control group. This finding is consistent with the findings of a study conducted in Hebei, China, which suggest that improving teenage academic engagement requires addressing teenage self-esteem, academic self-efficacy, and perceived social support as a whole. As a result, parents and

educators in schools ought to be actively involved in helping teenagers develop their sense of self-worth and academic self-efficacy (Zhao et al., 2021).

Another study of formative scaffolding in the teaching cycle by Grothérus et al. (2019) showed that the students' confidence and abilities improved after taking part in the testing cycle. The study concluded that it would be advantageous to implement the Formative Scaffolding Program on a larger scale, considering the advantages of utilizing this technique. Likewise, the study showed how formative scaffolding can help close the achievement gap between students with varying skill levels, which makes it a viable strategy for educational institutions looking to offer fair learning opportunities. Given these encouraging results, it is clear that expanding the use of the Formative Scaffolding Program among students could have a significant positive impact on their academic progress (Grothérus et al., 2019).

Similarly, a study conducted by Fatima in Pakistan aimed to investigate the influence of students' conceptions of feedback (ScoF) dimensions on academic self-efficacy (SE) and self-regulation (SRG). The results show that higher education students' perceptions of feedback significantly impact their academic self-efficacy and self-regulation, suggesting that educational methods can significantly enhance student achievement and encouragement through the provision of useful feedback. Moreover Encouraging an empowering feedback culture may improve students' confidence and ability to regulate themselves, resulting in more effective academic performance and educational outcomes (Fatima et al., 2021).

Several studies agree that the formative assessment intervention helps students evaluate their competence more positively, such as (Chung et al., 2021; Lerdpornkulrat et al., 2019; Lishinski & Yadav, 2021; Rakoczy et al., 2019). In these studies, participants under the formative assessment condition viewed feedback as more helpful, which positively enhanced their self-

efficacy, improved their outcomes, and made them feel more motivated. Besides, in addition to raising self-efficacy, formative assessment creates a more encouraging and effective learning environment. These results of emphasize the importance of formative assessment techniques in learning environments to contribute to students' development and success.

Nieminen et al. (2021) disagreed with our study's findings, stating that summative self-assessment might improve self-efficacy, which highlights the possibility that people who summatively analyze their learning after a process will feel more competent and accomplished. This can be the case because summative evaluations frequently offer an exact standard or result (such as an exam result or grade), which may strengthen a person's confidence in their abilities. It's also essential to remember that the influence of such assessments on self-efficacy may vary depending on several variables, such as the subject matter, the method of learning of the individual, the construction of the assessment, the level of quality of the feedback it provides, and the learning environment. It implies that, while formative evaluation is essential for education and development, it's equally critical to include summative assessments in a way that encourages students to believe in their skills (Nieminen et al., 2021).

Further, a quasi-experimental study at a university in South Korea for 110 participants was contradictory to our study and concluded that negative feedback in formative assessments increased self-assessment but also caused negative emotional reactions and decreased self-efficacy (Kim & Lee, 2019). This implies that how feedback is given in educational settings is vital, with balanced feedback to support their emotional health as well as their academic goals. There is a harmony between the quantitative results and the qualitative insights regarding the formative assessment, which enhances self-efficacy by building confidence through self-reflection, tracking one’s growth through constructive feedback and encouragement, and

allowing a student to identify strengths and weaknesses throughout the course. This is in agreement with the study of what Ole and Gallos (2023) found. The implementation of the Feedback Loop Model (FLM) in physics classes resulted in significant improvements in teachers' attitudes, self-efficacy, and classroom practices related to formative assessment. As a result, teachers developed more positive attitudes towards utilizing assessment and gained increased self-confidence in applying formative assessment techniques in their classes (Ole & Gallos, 2023).

This convergence between quantitative data and qualitative observations strengthens the idea that continuous feedback and tracking progress can enhance self-efficacy in students by helping them adjust their learning methodologies, identify strengths and shortcomings, and recognize and praise their accomplishments. This encourages critical thinking, fosters a growth attitude, and establishes a clear link between efforts and results. This parallels a study demonstrating the significance of formative assessment in advancing learning and growth. The study delves into the utilization of formative assessment, particularly focusing on delivering feedback to enrich students' learning and cultivate their proficiency in learning effectively. The material highlights the significance of making learning visible to students by focusing on aspects like learning goals, assessing learning progress, and fostering self-efficacy (Voinea, 2018).

5.7 Impact of Formative Assessment on Nursing Students' Self-Regulation

In the current study, the self-regulation of the students in the intervention group where the formative assessment practices were applied was significantly higher than the ones in the control group. The findings of the study were consistent with Huang's study, which revealed a significant connection between teacher self-assessment and self-regulation. Additionally, it was highlighted that self-regulation and self-evaluation play pivotal roles in formative assessment, enabling

teachers to reflect on their teaching effectiveness. which leads to the positive influence of self-assessment on learner awareness and self-efficacy by improving mastery experiences (Huang, 2022). Also, a study conducted in 2020 indicates that the acquisition of self-regulation abilities can have ongoing advantages for young adolescents as they advance in their academic activities. This underscores the possible enduring benefits of formative assessment on student learning self-regulation (Beekman et al., 2021).

However, the findings done by Xiao & Yang (2019) suggest that the participants actively embraced formative evaluation and appeared to be developing into self-regulated learners with the help of their teachers. The students perceived the formative assessment tasks carried out in the classroom, along with the accompanying comments, as valuable tools for enhancing their deep understanding and fostering self-regulation skills in the process of learning the English language (Xiao & Yang, 2019). Moreover, a study on the same line provided a closer look at the teacher's formative assessment strategy and revealed a practice that integrates several formative assessment components, such as identifying the gap, feedback, and learning progressions. This study showed how formative assessment works and how it affects Self-regulated learning (SRL) (Granberg et al., 2021). Formative assessment identifies the gaps, provides timely feedback, and utilizes learning progressions. This is consistent with my result, supporting student learning and ensuring academic success.

Self-regulated learning, or SRL, is becoming more and more important in a variety of educational contexts, although most studies have been conducted in the context of higher education (Mahlberg, 2015; Meusen-Beekman et al., 2016).There is a growing recognition of its significance across diverse educational levels. As our understanding of SRL continues to evolve, researchers are increasingly exploring its application and impact in various educational settings,

from primary and secondary schools to vocational and adult education, highlighting the broad relevance of self-regulated learning across the educational spectrum.

Additionally, a previous study by Ozan and Kensal (2018) found that there was no statistically significant difference between formative assessment and SRL, in contrast to the findings of the current study. It is possible that the researcher could not find a significant relationship because of the small sample size of only 30 participants (Ozan & Kincal, 2018). Further, a study conducted with accounting undergraduates by Mountain et al. (2020) showed that formative assessment and feedback activities resulted in notable enhancements in confidence and satisfaction with assessments. However, the evidence for improvement in self-regulation was minimal, indicating that additional interventions or methods could be done to improve self-regulation skills in this population. Subsequent investigations may delve into inventive approaches, such as integrating technology-driven resources or cooperative education exercises, to cultivate students' self-control abilities. Nevertheless, future studies must explore the enduring impact of formative evaluation and feedback on self-regulation to ascertain whether the enhancements persist for a long time (Mountain et al., 2023).

Quantitative outcomes mirror the trends observed in qualitative data that formative assessment enhances self-regulation by increasing motivation, discipline, organization, goal-setting skills, and time management abilities. It is an active tool in education, shaping students' learning experiences and instilling essential skills for academic success and personal development, particularly in nursing students. Fujita and colleagues (2019) investigated how people regulate their motivational beliefs in activities, emphasizing how they distinguish between high-level and low-level constructs and make strategic decisions to improve

performance, supports. This might have an impact on student behavior research (Fujita et al., 2019).

Similarly, formative assessment helps students set clear goals through regular feedback, identify areas for improvement, and set realistic objectives for academic progress based on their strengths and weaknesses, which is confirmed by (Mountain et al., 2023). Participating in formative evaluation and feedback practices with students can help them develop self-regulation. also,(Rivero et al., 2021) assured When feedback is task-focused, comprehensible, and has interactive peer feedback, students develop a favorable perception of it that supports SRL.

5.8 Implications for Nursing Education, Practice, and Administration

The current study evaluated the Impact of Formative Assessment on First-Year Nursing Students' Anxiety, Performance, Self-Efficacy, and Self-Regulation in Palestine. This study's findings suggested several implications for nursing education, nursing practice, and nursing administration.

5.8.1 Nursing Education

The outcomes of this study hold crucial implications for nursing education. Integrating formative assessment methodologies into the curriculum for first-year nursing students shows promise to mitigate anxiety and optimize overall academic performance. Recognizing formative assessment as a useful complementary strategy suggests that educators should systematically incorporate such practices. This approach can contribute to advancing a supportive learning environment.

Building self-efficacy and promoting self-regulation among novice nursing students. By recognizing the nuances of the impact of formative assessment on various dimensions, nursing

educators can adapt methodologies to address specific concerns, fostering a positive and effective learning experience for first-year nursing students.

Having a deep understanding of students' needs is crucial for nursing educators to establish significantly effective learning environments. Adjusting these circumstances encourages nursing students to progress in their studies. In nursing education, formative assessments are essential for providing consistent feedback to students and educators, helping them progress toward their academic objectives. These assessments help nursing students recognize and close the distance between their current understanding and their learning targets. The use of formative assessments in nursing education provides a clear indication of students' current progress, enabling them to actively participate in self-monitoring and adapt their learning strategies accordingly. This method not only helps students keep track of their academic progress but also closely aligns with their educational goals in the nursing field.

5.8.2 Nursing Practice

Within the domain of nursing practice, the study indicates that healthcare institutions and clinical educators should acknowledge the potential advantages of formative assessment in strengthening the skills and confidence of newly enrolled nursing professionals. The incorporation of formative assessment strategies in nursing education can have a favorable ripple impact on the readiness and adaptability of graduates entering the workforce. Implementing formative assessment as a learning strategy in classrooms for nursing students enhances their understanding and readiness for nursing practice. This approach offers a dynamic and interactive learning experience, going beyond the constraints of traditional lectures and textbook knowledge. Through the use of formative assessments, students have the opportunity to

experience the challenges in a controlled manner. This enables them to cultivate their critical thinking abilities and make well-informed choices even in high-pressure situations.

In addition, formative assessments encourage a well-rounded approach to learning, allowing students to explore various aspects of patient-centered care. Aspiring nurses gain the expertise to evaluate not only the physical aspects of patient care, but also take into account the mental, emotional, and social aspects. This comprehensive approach reflects the realities of nursing practice, where care goes beyond medical treatments to address the overall well-being of patients and their families. Likewise, the implementation of formative assessment strategies can help foster improved communication and teamwork skills among nursing students. These strategies promote efficient collaboration within interdisciplinary teams, which is crucial for delivering comprehensive healthcare services. The emphasis on teamwork and communication reflects the current trends in healthcare, highlighting the significance of collaboration and effective communication for the provision of safe and efficient patient care.

Insights into the relationship between formative assessment and self-efficacy suggest that healthcare practitioners who have undergone such assessments during their education may exhibit enhanced self-regulation and a stronger strategy to meet the dynamic challenges of the nursing profession. Consequently, nursing practice stands to profit from a workforce that has undergone formative assessment experiences, contributing to elevated performance, reduced anxiety, and heightened self-efficacy among emerging nursing professionals.

5.8.3 Nursing Administration and Policymakers

The current findings hold significant implications for nursing administration. Recognizing the affirmative influence of formative assessment on the educational outcomes and experiences of nursing students, nursing administrators are urged to consider the formulation and

implementation of strategic policies. These policies are required to promote the systematic integration of formative assessment practices into educational programs, requiring collaborative efforts with educators to assure seamless adoption within the curriculum. Moreover, nursing administrators can play an essential role in cultivating an institutional culture that supports ongoing development through formative assessment, fostering a dynamic learning environment. Embracing these insights can contribute to the general progress of nursing education, positively impacting the readiness and efficacy of nursing professionals as they enter the workforce.

Administrators in the nursing field can utilize data and insights from formative assessments to identify student areas that could benefit from improvements in the curriculum, teaching methods, and assessment approaches. The emphasis on evidence-based practice ensures that the nursing program remains relevant, responsive, and aligned with the changing demands of the nursing field. By conducting impact evaluations, nursing educators can make well-informed decisions regarding the integration of these strategies into the curriculum. This ensures that the education provided remains current and effective in equipping students for the practical aspects of nursing. These implications underscore the imperative of not just acknowledging the potential efficacy of formative assessment in nursing education but also proactively incorporating these practices into the development of prospective nursing professionals.

5.9 Future research

One of the main recommendations for future research is to use alternative sample populations, such as nursing students from various academic backgrounds, to enable the generalization of the findings to the baccalaureate nursing student community. Further investigation on the effects of different interventions or educational initiatives on nursing students' stress levels and coping strategies may be helpful.

Given that the effectiveness of formative evaluation strategies has been demonstrated in this pre post non-equivalent groups design, future studies should employ the more rigorous Randomized Controlled Trials to confirm the results of this study. State-of-the-art technologies such as simulations and virtual realities should also be investigated as new formative evaluation strategies.

5.10 Recommendations

From what this study has revealed, numerous recommendations are presented. The study's insights and conclusions support these recommendations. To fill in the gaps and overcome the obstacles found, they offer insightful advice for upcoming actions and choices.

1. Encourage a balanced approach to assessment that integrates both formative and summative assessment methods. This includes regular formative assessments throughout the learning process to provide timely feedback, coupled with well-designed summative assessments to gauge overall student achievement.

2. Provide specialized training for nursing faculty on effective formative assessment techniques and prepare teachers with the skills to design and implement formative assessments that align with learning objectives, stimulate critical thinking, and promote active student engagement.

3. Ensure that nursing courses possess precisely defined learning objectives, and align both formative and summative assessments with these objectives. This alignment ensures that assessments measure what they are intended to measure and contribute to meaningful learning outcomes.

4. Promote self-assessment practices among nursing students. Integrate tools and activities that permit students to consider their learning, identify improvement areas, and set personal goals. This can enhance self-regulation and contribute to a more proactive approach to learning.

Explore the integration of technology tools to enable formative assessments. Online platforms, quizzes, and interactive modules can provide real-time feedback, offering students immediate insights into their performance and promoting a continuous improvement mindset.

5. Ensure that formative assessments align with the professional competencies and standards anticipated by recent nursing graduates. This alignment ensures that the assessment methods used reflect the skills and knowledge required to successfully enter the nursing profession.

6. Establish a continuous monitoring system for formative assessments. Implement a feedback loop that includes periodic evaluation data to identify trends and areas for improvement. This iterative process allows for timely adjustments to teaching strategies and assessment methods.

6. Integrate peer review components into formative assessments. This collaborative approach not only provides students with diverse perspectives but also creates an encouraging atmosphere for learners. Peer assessments can contribute to the development of critical thinking and self-efficacy.

7. Conduct longitudinal analyses of both formative and summative assessment data. Track student performance over time to identify patterns, assess the impact of interventions, and make data-driven decisions to increase the efficacy of the assessment process.

8. Implement benchmarking practices by contrasting the performance of nursing students against established standards and benchmarks. This comparative analysis can provide valuable insights into the effectiveness of both formative and summative assessments in preparing students for their nursing careers.

9. Expand the study to include other colleges and specializations to assess the transferability of the formative assessment intervention. Collect and compare data on anxiety, academic performance, self-efficacy, and self-regulation across institutions and specialties.

10. Document contextual variations, institutional policies, and teaching methodologies to provide comprehensive insights into the effectiveness of formative assessment approaches in varied academic settings. This cross-institutional approach not only enriches the learning process but also contributes valuable information for the improvement of nursing education practices across a broader spectrum. Disseminate the findings to foster knowledge exchange and collaborative initiatives among nursing education institutions.

By focusing on these recommendations, educational institutions can cultivate a comprehensive assessment strategy that blends the advantages of formative and summative assessments, ultimately improving the overall quality of nursing education.

5.11 Conclusion

The findings indicate that students who actively engage in these strategies demonstrate a significant reduction in test anxiety, which subsequently contributes to enhanced performance on assessments.

This mixed-methods study aimed to evaluate the impact of formal assessment on first-year nursing students' anxiety, performance, self-efficacy, and self-regulation in Palestine. The integration of both quantitative and qualitative approaches provided a comprehensive exploration of the nursing student.

The quantitative analysis revealed that the study compared a control group and an intervention group, finding no significant differences in demographic variables. Notably, post-test results revealed that the intervention group showed significantly lower anxiety levels and higher scores in self-efficacy, self-regulation, and academic performance compared to the control group. The intervention had a positive impact, leading to decreased anxiety and improved self-efficacy, self-regulation, and academic performance in participants. These numerical outcomes contribute

valuable insights into evaluating the difference between the pretest and posttest of test anxiety, academic performance, self-efficacy, and self-regulation among interventional groups at a Modern College University.

The qualitative part of the study delved into assessing the insight and perceptions of the study receiving summative and formative assessments at a Modern College University. The integration of qualitative findings enhances the depth of our understanding, and students appreciate formative methods like open-ended strategies, feedback, and peer reviews, citing their positive impact on academic performance. These approaches stimulate critical thinking, encourage active learning, and prepare students for summative evaluations. The resulting improvement in academic performance contributes to the development of key skills such as self-efficacy, self-regulation, goal setting, and time management.

In sum, this mixed-methods study offers a comprehensive understanding of the impact of conjunctional formative assessment on first-year nursing students. The integration of quantitative and qualitative approaches strengthens the robustness of the findings. As we move forward, these insights can guide future research in formative and summative assessment.

5.12 Strengths and Limitations of the Study

The thorough methodology used, the depth of the data gathered, and the creative analytic approaches are only a few of the study's many strong points. These elements give important insights into nursing and considerably enhance the validity and dependability of our findings. It is also imperative to recognize certain constraints.

5.12.1 Strengths

A significant strength of this study lies in its comprehensive mixed-methods approach. By combining both quantitative and qualitative methodologies, the research achieves a more

detailed and holistic comprehension of how formative assessment impacts Palestine's first-year nursing students. This study represents the first interventional study conducted in Palestine and aims to assess the impact of utilizing formative assessment on students' anxiety, performance, self-efficacy, and self-regulation. Considering the positive implications of the study's findings, it seems that the study could be useful for other nursing universities in the Palestinian context. Moreover, using pre- and post-assessments in supplementary interviews and open-ended questionnaires, the study explores multiple perspectives. Including academic performance, motivation, and the learning environment. This methodological diversity enhances the reliability and validity of the findings and offers a strong basis for concluding that formative assessment is efficient. The integration of numerical data and contextual insights appears to be especially helpful in unraveling the intricate interplay of factors influencing students' experiences and outcomes.

The study analyzing the effects of formative assessment on first-year nursing students in Palestine is comprehensive. The extended duration of 14 weeks allowed for a substantial amount of time to observe and analyze the effects of formative assessment interventions. During this extended period, a thorough understanding was developed regarding the immediate and long-term effects on student anxiety, performance, self-efficacy, and self-regulation. In addition, the study's approach to implementing structured formative assessment interventions was highly methodical and carefully thought out. The systematic approach used in this study helped to maintain the consistent application of interventions, which in turn improved the reliability of the findings. The incorporation of realist evaluation methods in these interventions enhanced the study by bringing a sense of practicality and relevance to the research. Through a strong emphasis on practical applications and tangible results, the study has generated valuable insights

that can be directly applied in educational settings. This enhances the study's credibility and relevance for educators and policymakers.

5.12.2 Limitations

The study was conducted in a specific educational setting, which could limit the applicability of its findings. This limitation is crucial because educational settings can differ greatly in terms of their resources, methods of instruction, contexts of culture, and population of students. The specific characteristics of the selected setting might have impacted the results of the study in a manner that does not accurately reflect other educational contexts. Thus, the observed effects of formative assessment in this study may be specific to this context and may not be applicable in other settings with distinct characteristics.

In addition, the study's focus on a single institution restricts its ability to consider the wide variety of nursing students in the general population. The diverse backgrounds, previous educational experiences, and individual learning styles of students can have a significant influence on their response to formative assessment, which may result in varying outcomes in different environments. One potential limitation of this study could be the exclusive utilization of a single educational setting, which may potentially constrain the extent to which the findings can be generalized to broader populations. Otherwise, the scope of this study was limited to examining a single material, Anatomy II, and the potential for conducting the study for other materials in a more robust approach to data collection, analysis, and interpretation.

Additionally, the extensive preparation needed, which requires instructors to put in a substantial amount of effort. They have to conduct research, create suitable materials, and seek input from experts to ensure that the study objectives and course content are met.

On the flip side, it is important to note that the quasi-experimental design does have a limitation when it comes to random assignment. While the study employs a quasi-interventional static-group comparison design, selection bias could be introduced when randomization is not used. Participants are assigned to groups based on either their preferences or the researcher's decision, impacting the composition of the groups and the internal validity of the study. Without random assignment, it becomes difficult to assign the noted variations between the intervention and control groups solely to the formative assessment intervention. This limitation generates concerns in interpreting the study results, highlighting the necessity of giving serious consideration to making assertions about the direct impact of formative assessment on the measured outcomes.

References

Abbas, F., Hammad, H. M., Ishaq, W., Farooque, A. A., Bakhat, H. F., Zia, Z., Fahad, S., Farhad, W., & Cerdà, A. (2020). A review of soil carbon dynamics resulting from agricultural practices. *Journal of Environmental Management*, *268*, 110319. https://doi.org/10.1016/j.jenvman.2020.110319

Abdullah, S. M. (2019). Social Cognitive Theory: A Bandura Thought Review published in 1982-2012. *Psikodimensia: Kajian Ilmiah Psikologi*, *18*(1), Article 1. https://doi.org/10.24167/psidim.v18i1.1708

Agarwal, P. K. (2019). Retrieval practice & Bloom's taxonomy: Do students need fact knowledge before higher order learning? *Journal of Educational Psychology*, *111*(2), 189–209. https://doi.org/10.1037/edu0000282

Ahmady, S., & Shahbazi, S. (2020). Impact of social problem-solving training on critical thinking and decision making of nursing students. *BMC Nursing*, *19*(1), 94. https://doi.org/10.1186/s12912-020-00487-x

Ahmed, F., Ali, S., & Shah, R. A. (2019). Exploring Variation in Summative Assessment: Language Teachers' Knowledge of Students' Formative Assessment and Its Effect on Their Summative Assessment. *Bulletin of Education and Research*, *41*(2), 109–119.

Alahmadi, N., Alrahaili, M., & Alshraideh, D. (2019). *The Impact of the Formative Assessment in Speaking Test on Saudi Students' Performance* (SSRN Scholarly Paper 3367580). https://doi.org/10.2139/ssrn.3367580

Al-Wassia, R., Hamed, O., Al-Wassia, H., Alafari, R., & Jamjoom, R. (2015). Cultural challenges to implementation of formative assessment in Saudi Arabia: An exploratory study. *Medical Teacher*, *37*(sup1), S9–S19. https://doi.org/10.3109/0142159X.2015.1006601

Andrade, H. L., & Brookhart, S. M. (2020). Classroom assessment as the co-regulation of learning. *Assessment in Education: Principles, Policy & Practice*, *27*(4), 350–372. https://doi.org/10.1080/0969594X.2019.1571992

Archer, E. (2017). The Assessment Purpose Triangle: Balancing the Purposes of Educational Assessment. *Frontiers in Education*, *2*.
https://www.frontiersin.org/articles/10.3389/feduc.2017.00041

Arribas-Marín, J., Hernández-Franco, V., Plumed-Moreno, C., & Blanco-Blanco, Á. (2021). Applying the social cognitive model of well-being in the nursing clinical practicum: A structural equation modeling analysis with a Spanish student's sample. *Nurse Education in Practice*, *52*, 103028. https://doi.org/10.1016/j.nepr.2021.103028

Ashdale, M. (2020). *The Effect of Formative Assessment on Achievement and Motivation*. http://hdl.handle.net/11603/18489

Babinčáková, M., Ganajová, M., Sotáková, I., & Bernard, P. (2020). INFLUENCE OF FORMATIVE ASSESSMENT CLASSROOM TECHNIQUES (FACTs) ON STUDENT'S OUTCOMES IN CHEMISTRY AT SECONDARY SCHOOL. *Journal of Baltic Science Education*, *19*(1), 36–49. https://doi.org/10.33225/jbse/20.19.36

Bacquet, J. N. (2020). Implications of Summative and Formative Assessment in Japan – A Review of the Current Literature. *International Journal of Education and Literacy Studies*, *8*(2), 28–35. https://doi.org/10.7575/aiac.ijels.v.8n.2p.28

Bayat, A., Jamshidipour, A., & Hashemi, M. (2017). The Beneficial Impacts of Applying Formative Assessment on Iranian University Students' Anxiety Reduction and Listening Efficacy. In *Online Submission* (Vol. 5, Issue 2, pp. 1–11). https://eric.ed.gov/?id=ED574963

Beach, P. (2017). Self-directed online learning: A theoretical model for understanding elementary teachers' online learning experiences. *Teaching and Teacher Education*, *61*, 60–72. https://doi.org/10.1016/j.tate.2016.10.007

Beekman, K., Joosten-Ten Brinke, D., & Boshuizen, E. (2021). Sustainability of Developed Self-Regulation by Means of Formative Assessment Among Young Adolescents: A Longitudinal Study. *Frontiers in Education*, *6*. https://www.frontiersin.org/articles/10.3389/feduc.2021.746819

Beer, P., & Mulder, R. H. (2020). The Effects of Technological Developments on Work and Their Implications for Continuous Vocational Education and Training: A Systematic Review. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.00918

Bembenutty, H. (2009). Test anxiety and academic delay of gratification. *College Student Journal*, *43*(1), 10–21.

Black, P., & Wiliam, D. (2018). Classroom assessment and pedagogy. *Assessment in Education: Principles, Policy & Practice*, *25*(6), 551–575. https://doi.org/10.1080/0969594X.2018.1441807

Blondeel, E., Everaert, P., & Opdecam, E. (2023). Does practice make perfect? The effect of online formative assessments on students' self-efficacy and test anxiety. *The British Accounting Review*, 101189. https://doi.org/10.1016/j.bar.2023.101189

Bokosmaty, R., Bridgeman, A., & Muir, M. (2019). Using a Partially Flipped Learning Model To Teach First Year Undergraduate Chemistry. *Journal of Chemical Education*, *96*(4), 629–639. https://doi.org/10.1021/acs.jchemed.8b00414

Brandmo, C., Panadero, E., & Hopfenbeck, T. N. (2020). Bridging classroom assessment and self-regulated learning. *Assessment in Education: Principles, Policy & Practice*, *27*(4), 319–331. https://doi.org/10.1080/0969594X.2020.1803589

Buchholtz, N., Krosanke, N., Orschulik, A., & Vorhölter, K. (2018). Combining and integrating formative and summative assessment in mathematics teacher education. *ZDM*, *50*. https://doi.org/10.1007/s11858-018-0948-y

Buck, E., Braga, P., & Ortiz, C. (2023). Effective Assessment in a Block Pedagogy. *Journal of Block and Intensive Learning and Teaching*, *1*, 6–16. https://doi.org/10.15209/jbilt.1280

Burner, T. (2016). Formative assessment of writing in English as a foreign language. *Scandinavian Journal of Educational Research*, *60*(6), 626–648. https://doi.org/10.1080/00313831.2015.1066430.

Burgess, A. W., Roberts, C., Black, K. I., & Mellis, C. (2013). Senior medical student perceived ability and experience in giving peer feedback in formative long case examinations. BMC Medical Education, 13(1), 79. https://doi.org/10.1186/1472-6920-13-79

Can Daşkın, N., & Hatipoğlu, Ç. (2019). Reference to a past learning event as a practice of informal formative assessment in L2 classroom interaction. *Language Testing*, *36*(4), 527–551. https://doi.org/10.1177/0265532219857066

Cardozo, L. T., de Lima, P. O., Carvalho, M. S. M., Casale, K. R., Bettioli, A. L., de Azevedo, M. A. R., & Marcondes, F. K. (2023). Active learning methodology, associated to formative assessment, improved cardiac physiology knowledge and decreased pre-test stress and anxiety. *Frontiers in Physiology*, *14*, 1261199.
https://doi.org/10.3389/fphys.2023.1261199

Carrillo-de-la-Peña, M. T., Baillès, E., Caseras, X., Martínez, À., Ortet, G., & Pérez, J. (2009). Formative assessment and academic achievement in pre-graduate students of health sciences. *Advances in Health Sciences Education*, *14*(1), 61–67. https://doi.org/10.1007/s10459-007-9086-y

Cha, K.-S., Jun, W., & Hong, S. (2014). Problem Solving Ability and Social Anxiety in Nursing Students. *The Journal of the Korea Contents Association*, *14*, 324–333. https://doi.org/10.5392/JKCA.2014.14.07.324

Chan, K. T. (2021). Embedding Formative Assessment in Blended Learning Environment: The Case of Secondary Chinese Language Teaching in Singapore. *Education Sciences*, *11*(7), Article 7. https://doi.org/10.3390/educsci11070360

Chikazinga, W. W. N. (2018). Perceptions of lectures towards student evaluation of their teaching at the University of Malawi, Kamuzu College of nursing. *International Education Journal: Comparative Perspectives*, *17*(4), 36–48.

Cho, O., & Kim, Y.-H. (2018). Influences of Cognitive Emotion Regulation and Social Support on Social Anxiety amongNursing Students. *THE KOREAN JOURNAL OF STRESS RESEARCH*, *26*, 25–31. https://doi.org/10.17547/KJSR.2018.26.1.25

Choudhury, B., & Freemont, A. (2017). Assessment of anatomical knowledge: Approaches taken by higher education institutions. *Clinical Anatomy*, *30*(3), 290–299. https://doi.org/10.1002/ca.22835

Chung, H. Q., Chen, V., & Olson, C. B. (2021). The impact of self-assessment, planning and goal setting, and reflection before and after revision on student self-efficacy and writing performance. *Reading and Writing*, *34*(7), 1885–1913. https://doi.org/10.1007/s11145-021-10186-x

Ćwikła, E. (2021). Formative assessment as one of the ways to support the child in the learning process. *Issues in Childhood Care and Education*, *604*(9), 15–26. https://doi.org/10.5604/01.3001.0015.5788

Delfino, A. P. (2019). Student Engagement and Academic Performance of Students of Partido State University. *Asian Journal of University Education*, *15*(1). https://eric.ed.gov/?id=EJ1222588

DiBenedetto, M. C. W., Maria K. (2017). Self-Regulation: An Integral Part of Standards-Based Education. In *Handbook of Self-Regulation of Learning and Performance* (2nd ed.). Routledge.

Dinther, M. V., Dochy, F., & Segers, M. (2015). The contribution of assessment experiences to student teachers' self-efficacy in competence-based education. *Teaching and Teacher Education*, *49*, 45–55. https://doi.org/10.1016/J.TATE.2015.02.013

Duers, L. E., & Brown, N. (2009). An exploration of student nurses' experiences of formative assessment. *Nurse Education Today*, *29*(6), 654–659. https://doi.org/10.1016/j.nedt.2009.02.007

Elaraby, S., & Hassan, M. (2021). Examining the Relationship Between Monitoring Learner Progress and Course Learning Outcomes Achievement. *Journal of Ecophysiology and Occupational Health*. https://doi.org/10.18311/JEOH/2021/28339

Erolin, C. (2019). Interactive 3D Digital Models for Anatomy and Medical Education. In P. M. Rea (Ed.), *Biomedical Visualisation: Volume 2* (pp. 1–16). Springer International Publishing. https://doi.org/10.1007/978-3-030-14227-8_1

Ewell, S. N., Josefson, C. C., & Ballen, C. J. (2022). Why Did Students Report Lower Test Anxiety during the COVID-19 Pandemic? *Journal of Microbiology & Biology Education*, *23*(1), e00282-21. https://doi.org/10.1128/jmbe.00282-21

Faber, J. M., Luyten, H., & Visscher, A. J. (2017). The effects of a digital formative assessment tool on mathematics achievement and student motivation: Results of a randomized experiment. *Computers & Education*, *106*, 83–96. https://doi.org/10.1016/j.compedu.2016.12.001

Fatima, S., Ali, M., & Saad, M. I. (2021). The effect of students' conceptions of feedback on academic self-efficacy and self-regulation: Evidence from higher education in Pakistan. *Journal of Applied Research in Higher Education*, *14*(1), 180–199. https://doi.org/10.1108/JARHE-07-2020-0209

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Fauth, B., Decristan, J., Decker, A.-T., Büttner, G., Hardy, I., Klieme, E., & Kunter, M. (2019). The effects of teacher competence on student outcomes in elementary science education: The mediating role of teaching quality. *Teaching and Teacher Education*, *86*, 102882. https://doi.org/10.1016/j.tate.2019.102882

Fernández-Ferrer, M., & Cano, E. (2016). The influence of the internet for pedagogical innovation: Using twitter to promote online collaborative learning. *International Journal of Educational Technology in Higher Education*, *13*(1), 22. https://doi.org/10.1186/s41239-016-0021-2

Frey, B. B. (2018). *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*. SAGE Publications, Inc. https://doi.org/10.4135/9781506326139

Fujita, K., Scholer, A. A., Miele, D. B., & Nguyen, T. (2019). On Metamotivation: Consumers' Knowledge about the Role of Construal Level in Enhancing Task Performance. *Journal of the Association for Consumer Research*, *4*(1), 57–64. https://doi.org/10.1086/700839

Gikandi, J. W., & Gikandi, J. W. (2015). *Towards a Theory of Formative Assessment in Online Higher Education* (towards-a-theory-of-formative-assessment-in-online-higher-education) [Chapter]. Https://Services.Igi-

Global.Com/Resolvedoi/Resolve.Aspx?Doi=10.4018/978-1-4666-8363-1.Ch014; IGI Global. https://www.igi-global.com/gateway/chapter/www.igi-global.com/gateway/chapter/128051

Granberg, C., Palm, T., & Palmberg, B. (2021). A case study of a formative assessment practice and the effects on students' self-regulated learning. *Studies in Educational Evaluation*, *68*, 100955. https://doi.org/10.1016/j.stueduc.2020.100955

Grothérus, A., Jeppsson, F., & Samuelsson, J. (2019). Formative Scaffolding: How to alter the level and strength of self-efficacy and foster self-regulation in a mathematics test situation. *Educational Action Research*, *27*(5), 667–690.

https://doi.org/10.1080/09650792.2018.1538893

Gurková, E., Žiaková, K., Zanovitová, M., Cibríková, S., & Hudáková, A. (2018). ASSESSMENT OF NURSING STUDENT PERFORMANCE IN CLINICAL SETTINGS - USEFULNESS OF RATING SCALES FOR SUMMATIVE EVALUATION. *Central European Journal of Nursing and Midwifery*, *9*(1), 791–798. https://doi.org/10.15452/CEJNM.2018.09.0006

Hadi, H. A., Carr, C. S., & Al Suwaidi, J. (2005). Endothelial Dysfunction: Cardiovascular Risk Factors, Therapy, and Outcome. *Vascular Health and Risk Management*, *1*(3), 183–198.

Harry Fletcher-, W. (2017, March 26). Is formative assessment fatally flawed? Confusing learning & performance. *Improving Teaching*.

https://improvingteaching.co.uk/2017/03/26/formative-assessment-flawed-confusing-learning-performance/

Hattie, J. (2015). The applicability of Visible Learning to higher education. *Scholarship of Teaching and Learning in Psychology*, *1*(1), 79–91. https://doi.org/10.1037/stl0000021

Hessels, R. S., Holleman, G. A., Kingstone, A., Hooge, I. T. C., & Kemner, C. (2019). Gaze allocation in face-to-face communication is affected primarily by task structure and social context, not stimulus-driven factors. *Cognition*, *184*, 28–43. https://doi.org/10.1016/j.cognition.2018.12.005

Hivner, E. A., Hoke, A. M., Francis, E. B., Lehman, E. B., Hwang, G. W., & Kraschnewski, J. L. (2019). Training teachers to implement physical activity: Applying social cognitive theory. *Health Education Journal*, *78*(4), 464–475. https://doi.org/10.1177/0017896918820558

Holland, J. C., & Pawlikowska, T. (2019). Undergraduate Medical Students' Usage and Perceptions of Anatomical Case-Based Learning: Comparison of Facilitated Small Group Discussions and eLearning Resources. *Anatomical Sciences Education*, *12*(3), 245–256. https://doi.org/10.1002/ase.1824

Huang, Q. (2022). Influence of EFL Teachers' Self-Assessment on Their Self-Regulation and Self-Efficacy. *Frontiers in Psychology*, *13*. https://www.frontiersin.org/articles/10.3389/fpsyg.2022.891839

Huisman, M. (2018). Formative Assessment and the Impact on Student Learning. *Master's Theses & Capstone Projects*. https://nwcommons.nwciowa.edu/education_masters/86

IBM SPSS Statistics. (n.d.). Retrieved January 18, 2024, from https://www.ibm.com/products/spss-statistics

Ilmiani, A., Wahdah, N., & Mubarak, M. (2021). The application of Albert Bandura's Social Cognitive Theory: A Process in Learning Speaking Skill. *Ta'lim al-'Arabiyyah: Jurnal Pendidikan Bahasa Arab & Kebahasaaraban*, *5*. https://doi.org/10.15575/jpba.v5i2.12945

Immonen, K., Oikarainen, A., Tomietto, M., Kääriäinen, M., Tuomikoski, A.-M., Kaučič, B. M., Filej, B., Riklikiene, O., Flores Vizcaya-Moreno, M., Perez-Cañaveras, R. M., De Raeve, P., & Mikkonen, K. (2019). Assessment of nursing students' competence in clinical practice: A systematic review of reviews. *International Journal of Nursing Studies*, *100*, 103414. https://doi.org/10.1016/j.ijnurstu.2019.103414

Irvine, S., Williams, B., Özmen, M., & McKenna, L. (2019). Exploration of self-regulatory behaviours of undergraduate nursing students learning to teach: A social cognitive perspective. *Nurse Education in Practice*, *41*, 102633. https://doi.org/10.1016/j.nepr.2019.102633

Ismail, S. M., Rahul, D. R., Patra, I., & Rezvani, E. (2022). Formative vs. summative assessment: Impacts on academic motivation, attitude toward learning, test anxiety, and self-regulation skill. *Language Testing in Asia*, *12*(1), 40. https://doi.org/10.1186/s40468-022-00191-4

Kazlauskienė, A., Gaučaitė, R., Cañabate, D., Colomer, J., & Bubnys, R. (2021). Sustainable Development of Students' Assumed Responsibility for Their Own Learning during Participatory Action Research. *Sustainability*, *13*(18), Article 18. https://doi.org/10.3390/su131810183

Khaled, S., & El Khatib, S. (2020, June 8). *Summative Assessment in Higher Education: A Feedback for Better Learning Outcomes*.

Kim, E. J., & Lee, K. R. (2019). Effects of an examiner's positive and negative feedback on self-assessment of skill performance, emotional response, and self-efficacy in Korea: A quasi-experimental study. *BMC Medical Education*, *19*(1), 142. https://doi.org/10.1186/s12909-019-1595-x

Kirkpatrick, A. J., Ball, S., Connelly, S., Hercinger, M., Hanks, J., Potthoff, M., Banzhaf, S., & McCafferty, K. (2018). Intraprofessional Simulation's Impact on Advanced Practice and

Baccalaureate Student Self-Efficacy. *Clinical Simulation in Nursing*, *16*, 33–39. https://doi.org/10.1016/J.ECNS.2017.11.005

Klute, M., Apthorp, H., Harlacher, J., & Reale, M. (2017). Formative Assessment and Elementary School Student Academic Achievement: A Review of the Evidence. REL 2017-259. In *Regional Educational Laboratory Central*. Regional Educational Laboratory Central. https://eric.ed.gov/?id=ED572929

Krause, S. J., & Hoyt, S. (2020, June 22). *Enhancing Instruction by Uncovering Instructor Blind Spots from Muddiest Point Reflections in Introductory Materials Classes*. 2020 ASEE Virtual Annual Conference Content Access. https://peer.asee.org/enhancing-instruction-by-uncovering-instructor-blind-spots-from-muddiest-point-reflections-in-introductory-materials-classes

Kulasegaram, K., & Rangachari, P. K. (2018). Beyond "formative": Assessments to enrich student learning. *Advances in Physiology Education*, *42*(1), 5–14. https://doi.org/10.1152/advan.00122.2017

Lajane, H., Gouifrane, R., Qaisar, R., Noudmi, F., Lotfi, S., Chemsi, G., & Radid, M. (2020). Formative e-Assessment for Moroccan Polyvalent Nurses Training: Effects and

Challenges. *International Journal of Emerging Technologies in Learning (iJET)*, *15*(14), 236–251.

Lean, S. N. M. (2022). *Analysis of probable substitution of Summative Assessment methods with Formative Assessments in Higher Education*.

Lerdpornkulrat, T., Poondej, C., Koul, R., Khiawrod, G., & Prasertsirikul, P. (2019). The Positive Effect of Intrinsic Feedback on Motivational Engagement and Self-Efficacy in Information Literacy. *Journal of Psychoeducational Assessment*, *37*(4), 421–434. https://doi.org/10.1177/0734282917747423

Lipnevich, A. A., & Smith, J. K. (2018). *The Cambridge Handbook of Instructional Feedback*. Cambridge University Press.

Lishinski, A., & Yadav, A. (2021). Self-evaluation Interventions: Impact on Self-efficacy and Performance in Introductory Programming. *ACM Transactions on Computing Education*, *21*(3), 23:1-23:28. https://doi.org/10.1145/3447378

Luckin, R. (2017). Towards artificial intelligence-based assessment systems. *Nature Human Behaviour*, *1*(3), Article 3. https://doi.org/10.1038/s41562-016-0028

Mackintosh-Franklin, D. C. (2021). An evaluation of formative feedback and its impact on undergraduate student nurse academic achievement. *Nurse Education in Practice*, *50*, 102930. https://doi.org/10.1016/j.nepr.2020.102930

Mahlberg, J. (2015). Formative Self-Assessment College Classes Improves Self-Regulation and Retention in First/Second Year Community College Students. *Community College Journal of Research and Practice*, *39*(8), 772–783. https://doi.org/10.1080/10668926.2014.922134

Mahshanian, A., Shoghi, R., & Bahrami, M. (2019). Investigating the Differential Effects of Formative and Summative Assessment on EFL Learners' End-of-term Achievement. *Journal of Language Teaching and Research*, *10*(5), 1055. https://doi.org/10.17507/jltr.1005.19

Malespina, A., & Singh, C. (2022). Gender differences in test anxiety and self-efficacy: Why instructors should emphasize low-stakes formative assessments in physics courses. *European Journal of Physics*, *43*(3), 035701. https://doi.org/10.1088/1361-6404/ac51b1

Manjarres-Posada, N. I., Onofre-Rodríguez, D. J., & Benavides-Torres, R. A. (2020). Social Cognitive Theory and Health Care: Analysis and Evaluation. *International Journal of Social Science Studies*, *8*(4), Article 4. https://doi.org/10.11114/ijsss.v8i4.4870

Mastagli, M., Malini, D., Hainaut, J.-P., Van Hoye, A., & Bolmont, B. (2020). Summative assessment versus formative assessment: An ecological study of physical education by analyzing state-anxiety and shot-put performance among French high school students. *Journal of Physical Education and Sport*, *20*, 2220–2229.
https://doi.org/10.7752/jpes.2020.s3298

Mastour, H., Eslami Hasan Abadi, S., Nili, M. R., Delavar, A., & Zarei, E. (2018). Real Time Electronic Formative Assessment in Medical Education and Its Impact on Motivational Beliefs and Self-regulation Strategies. *Future of Medical Education Journal*, *8*(1), 42–46. https://doi.org/10.22038/fmej.2018.32080.1204

McCallum, S., & Milner, M. M. (2021). The effectiveness of formative assessment: Student views and staff reflections. *Assessment & Evaluation in Higher Education*, *46*(1), 1–16. https://doi.org/10.1080/02602938.2020.1754761

McConnell, D. A., Chapman, L., Czajka, C. D., Jones, J. P., Ryker, K. D., & Wiggen, J. (2017). Instructional Utility and Learning Efficacy of Common Active Learning Strategies. *Journal of Geoscience Education*, *65*(4), 604–625. https://doi.org/10.5408/17-249.1

McKeachie, W. J., Lin, Y.-G., & Middleton, M. J. (2004, September 1). *Two Types of Low Test-Anxious (Low-Worry) Students. | Counseling & Clinical Psychology Journal | EBSCOhost*. https://openurl.ebsco.com/contentitem/gcd:14742138?sid=ebsco:plink:crawler&id=ebsco:gcd:14742138

McLaughlin, S. A., Hobgood, C., Binder, L., & Manthey, D. E. (2005). Impact of the Liaison Committee on Medical Education Requirements for Emergency Medicine Education at U.S. Schools of Medicine. *Academic Emergency Medicine*, *12*(10), 1003–1009. https://doi.org/10.1197/j.aem.2005.05.029

Meusen-Beekman, K. D., Joosten-ten Brinke, D., & Boshuizen, H. P. A. (2016). Effects of formative assessments to develop self-regulation among sixth grade students: Results from a randomized controlled intervention. *Studies in Educational Evaluation*, *51*, 126–136. https://doi.org/10.1016/j.stueduc.2016.10.008

Miraki, P., Masoomi, M., & Amjadiparvar, A. (2016). *The Impact of Formative Assessment on Self-Regulation of EFL Learners in Academic Writing*. *2016*.

Mogboh, V. E., & Okoye, A. C. (2019). FORMATIVE AND SUMMATIVE ASSESSMENT: TRENDS AND PRACTICES IN BASIC EDUCATION. *Journal of Education and Practice*, *10*(27), Article 27. http://eprints.gouni.edu.ng/2278/

Molin, F., Cabus, S., Haelermans, C., & Groot, W. (2021). Toward Reducing Anxiety and Increasing Performance in Physics Education: Evidence from a Randomized Experiment. *Research in Science Education*, *51*(1), 233–249. https://doi.org/10.1007/s11165-019-9845-9

Morris, D. H., Rossine, F. W., Plotkin, J. B., & Levin, S. A. (2021). Optimal, near-optimal, and robust epidemic control. *Communications Physics*, *4*(1), 1–8. https://doi.org/10.1038/s42005-021-00570-y

Morris, R., Perry, T., & Wardle, L. (2021). Formative assessment and feedback for learning in higher education: A systematic review. *Review of Education*, *9*. https://doi.org/10.1002/rev3.3292

Moss, C. M., & Brookhart, S. M. (2019). *Advancing Formative Assessment in Every Classroom: A Guide for Instructional Leaders*. ASCD.

Mountain, K., Teviotdale, W., Duxbury, J., & Oldroyd, J. (2023). Are they taking action? Accounting undergraduates' engagement with assessment criteria and self-regulation development. *Accounting Education*, *32*(1), 34–60.
https://doi.org/10.1080/09639284.2022.2030240

Na, S.-J., Ji, Y. G., & Lee, D. H. (2021). Application of Bloom's taxonomy to formative assessment in real-time online classes in Korea. *Korean Journal of Medical Education*, *33*(3), 191. https://doi.org/10.3946/kjme.2021.199

Nadeem, N., & Alfalig, H. (2020). Kahoot! Quizzes: A Formative Assessment Tool to Promote Students' Self-Regulated Learning Skills. *Journal of Applied Linguistics and Language Research*, *7*, 1–20.

Naseer Ud Din, M., Faizi, W. U. N., & Khan, A. M. (2018). Impact of Formative Assessment and Feedback on Higher Education. *Global Social Sciences Review*, *III*(IV), 498–514. https://doi.org/10.31703/gssr.2018(III-IV).34

Nieminen, J. H., Asikainen, H., & Rämö, J. (2021). Promoting deep approach to learning and self-efficacy by changing the purpose of self-assessment: A comparison of summative and formative models. *Studies in Higher Education*, *46*(7), 1296–1311. https://doi.org/10.1080/03075079.2019.1688282

Nortvedt, G. A., & Buchholtz, N. (2018). Assessment in mathematics education: Responding to issues regarding methodology, policy, and equity. *ZDM*, *50*(4), 555–570. https://doi.org/10.1007/s11858-018-0963-z

Odida, M., Odida, M., Ayebazibwe, P., Mbabazi, J., & Amoding, B. (2022). *Stress, Substance Use and Academic Performance among students in makerere University Kampala, Uganda* [Thesis, Makerere University]. http://dissertations.mak.ac.ug/handle/20.500.12281/13613

Ole, F. C. B., & Gallos, M. R. (2023). Effects of Feedback Loop Model on Teachers' Attitudes, Self-Efficacy and Classroom Practices towards Formative Assessment. *International Journal of Research in Education and Science*, *9*(1), Article 1. https://doi.org/10.46328/ijres.3006

Ortega-Donaire, L., Álvarez-García, C., Lopez-Franco, M., & Sanz-Martos, S. (2023). Effectiveness of Guided Breathing and Social Support for the Reduction of Pre-Exam

Anxiety in University Students: A Factorial Study. *Healthcare*, *11*. https://doi.org/10.3390/healthcare11040574

Ozan, C., & Kincal, R. (2018). The Effects of Formative Assessment on Academic Achievement, Attitudes toward the Lesson, and Self-Regulation Skills. *EDUCATIONAL SCIENCES-THEORY & PRACTICE*, *18*. https://doi.org/10.12738/estp.2018.1.0216

Panadero, E., Andrade, H., & Brookhart, S. (2018). Fusing self-regulated learning and formative assessment: A roadmap of where we are, how we got here, and where we are going. *The Australian Educational Researcher*, *45*(1), 13–31. https://doi.org/10.1007/s13384-018-0258-y

Panigrahi, R., Srivastava, P. R., & Panigrahi, P. K. (2020). Effectiveness of e-learning: The mediating role of student engagement on perceived learning effectiveness. *Information Technology & People*, *34*(7), 1840–1862. https://doi.org/10.1108/ITP-07-2019-0380

Parrish, A. R. (2022). The Impact of a Cognitive Behavioral Intervention on Test Anxiety in a BSN Program. *Nursing Education Perspectives*, *43*, 97–99. https://doi.org/10.1097/01.NEP.0000000000000989

Permana, P., & Permatawati, I. (2020). *Using Quizizz as a Formative Assessment Tool in German Classrooms*. 155–159. https://doi.org/10.2991/assehr.k.200325.073

Pesce, M., & Díaz, P. (2020). Cocreating Assessment Criteria With Nursing Students. *Nurse Educator*. https://doi.org/10.1097/NNE.0000000000000917

Phan, D. D., & Nguyen, Y. T. H. (2019). Utilizing summative test for improving the quality of teaching and learning—A direction of applying formative assessment in high school. *Vietnam Journal of Education*, 52–56. https://doi.org/10.52296/vje.2019.43

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. https://doi.org/10.1037/0022-0663.82.1.33

Pintrich, P. R., & Others, A. (1991). *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. https://eric.ed.gov/?id=ED338122

Piroozmanesh, A., & Imanipour, M. (2018). The Effect of Formative Assessment on Test Anxiety of Nursing Students. *Journal of Medical Education Development*, *10*, 18–26. https://doi.org/10.29252/edcj.10.28.18

Rakoczy, K., Pinger, P., Hochweber, J., Klieme, E., Schütze, B., & Besser, M. (2019). Formative assessment in mathematics: Mediated by feedback's perceived usefulness and students' self-efficacy. *Learning and Instruction*, *60*, 154–165. https://doi.org/10.1016/j.learninstruc.2018.01.004

Reynolds, C. J., Pade, C., Gibbons, J. M., Otter, A. D., Lin, K.-M., Muñoz Sandoval, D., Pieper, F. P., Butler, D. K., Liu, S., Joy, G., Forooghi, N., Treibel, T. A., Manisty, C., Moon, J. C., COVIDsortium Investigators, COVIDsortium Immune Correlates Network, Semper, A., Brooks, T., McKnight, Á., … Boyton, R. J. (2022). Immune boosting by B.1.1.529 (Omicron) depends on previous SARS-CoV-2 exposure. *Science*, *377*(6603), eabq1841. https://doi.org/10.1126/science.abq1841

Reza Jafaei Deloie, R., Karimi Monaghi, H., Haghir, H., & Alizadeh, S. (2015). Effects of Pop quiz on Test Anxiety in Students of Basic Medical Sciences. *Iranian Journal of Medical Education*, *15*(0), 286–292. http://ijme.mui.ac.ir/article-1-3455-en.html

Rivero, V. M. H., Bonilla, P. J. S., & Alonso, J. J. S. (2021). Feedback y autorregulación del aprendizaje en educación superior. *Revista de Investigación Educativa*, *39*(1), Article 1. https://doi.org/10.6018/rie.423341

Rolfe, I., & McPherson, J. (1995). Formative assessment: How am I doing? *The Lancet*, *345*(8953), 837–839. https://doi.org/10.1016/S0140-6736(95)92968-1

Salas Vicente, F., Escuder, Á. V., Pérez Puig, M. Á., & Segovia López, F. (2021). Effect on Procrastination and Learning of Mistakes in the Design of the Formative and Summative Assessments: A Case Study. *Education Sciences*, *11*(8), Article 8. https://doi.org/10.3390/educsci11080428

Self-Efficacy Beliefs in Academic Settings—Frank Pajares, 1996. (n.d.). Retrieved March 31, 2024, from https://journals.sagepub.com/doi/10.3102/00346543066004543

Shepard, L. A. (2019). Classroom Assessment to Support Teaching and Learning. *The ANNALS of the American Academy of Political and Social Science*, *683*(1), 183–200. https://doi.org/10.1177/0002716219843818

Singh, D., Agusti, A., Anzueto, A., Barnes, P. J., Bourbeau, J., Celli, B. R., Criner, G. J., Frith, P., Halpin, D. M. G., Han, M., Varela, M. V. L., Martinez, F., Oca, M. M. de, Papi, A., Pavord, I. D., Roche, N., Sin, D. D., Stockley, R., Vestbo, J., … Vogelmeier, C. (2019). Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease: The GOLD science committee report 2019. *European Respiratory Journal*, *53*(5). https://doi.org/10.1183/13993003.00164-2019

Singh, D. Y. K., & Dubey, B. (2021). *Introduction of Research Methods and Publication Ethics*. Friends Publications (India).

Solamo, F. S. D. (2022). One-Minute Paper (OMP) as a Formative Assessment. *Indonesian Journal Of Educational Research and Review*, *5*(2), Article 2. https://doi.org/10.23887/ijerr.v5i2.48248

Sood, R., & Singh, T. (2012). Assessment in medical education: Evolving perspectives and contemporary trends. *The National Medical Journal of India*, *25*(6), 357–364.

Taras, M. (2008). Summative and formative assessment: Perceptions and realities. *Active Learning in Higher Education*, *9*(2), 172–192. https://doi.org/10.1177/1469787408091655

Teachers' formative assessment abilities and their relationship to student learning: Findings from a four-year intervention study | Instructional Science. (n.d.). Retrieved July 10, 2024, from https://link.springer.com/article/10.1007/s11251-016-9371-3

Uzun, L., & Ertok, Ş. (2020). Student Opinions on Task-Based Approach as Formative Evaluation versus Exam-Based Approach as Summative Evaluation in Education. *Sakarya University Journal of Education*, *10*(2), Article 2. https://doi.org/10.19126/suje.598048

Vera, F. (2022). Promoting teachers' innovation by using the One-Minute Paper. *Transformar*, *3*(1), Article 1.

Viana, R., Moyo, S., Amoako, D. G., Tegally, H., Scheepers, C., Althaus, C. L., Anyaneji, U. J., Bester, P. A., Boni, M. F., Chand, M., Choga, W. T., Colquhoun, R., Davids, M., Deforche, K., Doolabh, D., du Plessis, L., Engelbrecht, S., Everatt, J., Giandhari, J., … de Oliveira, T. (2022). Rapid epidemic expansion of the SARS-CoV-2 Omicron variant in southern Africa. *Nature*, *603*(7902), Article 7902. https://doi.org/10.1038/s41586-022-04411-y

Voinea, L. (2018). FORMATIVE ASSESSMENT AS ASSESSMENT FOR LEARNING DEVELOPMENT. *Revista de Pedagogie - Journal of Pedagogy*, *LXVI*(1), 7–23. https://doi.org/10.26755/RevPed/2018.1/7

Wadi, M., Yusoff, M. S. B., Abdul Rahim, A. F., & Lah, N. A. Z. N. (2022a). Factors affecting test anxiety: A qualitative analysis of medical students' views. *BMC Psychology*, *10*(1), 8. https://doi.org/10.1186/s40359-021-00715-2

Wadi, M., Yusoff, M. S. B., Abdul Rahim, A. F., & Lah, N. A. Z. N. (2022b). Factors affecting test anxiety: A qualitative analysis of medical students' views. *BMC Psychology*, *10*(1), 8. https://doi.org/10.1186/s40359-021-00715-2

Wang, Y., OuYang, Y., & Levkiv, M. (2023). Academic Performance Prediction Model Based on Educational Similarity. *2023 17th International Conference on the Experience of Designing and Application of CAD Systems (CADSM)*, *1*, 1–4. https://doi.org/10.1109/CADSM58174.2023.10076516

Wasti, S. P., Simkhada, P., van Teijlingen, E. R., Sathian, B., & Banerjee, I. (2022). The Growing Importance of Mixed-Methods Research in Health. *Nepal Journal of Epidemiology*, *12*(1), 1175–1178. https://doi.org/10.3126/nje.v12i1.43633

Wei, W. (2015). Using summative and formative assessments to evaluate EFL teachers' teaching performance. *Assessment & Evaluation in Higher Education*, *40*(4), 611–623. https://doi.org/10.1080/02602938.2014.939609

Westwick, J., Hunter, K., & Kleinjan, B. (2019). Anxiety and Communication Competence in the Honors Basic Public Speaking Course: An Intervention and Formative Assessment. *Basic Communication Course Annual*, *31*(1). https://ecommons.udayton.edu/bcca/vol31/iss1/9

Wing, T. (2018). The Effects of Formative and Summative Assessment on Student's Connectedness, Satisfaction, Learning and Academic Performance within an Online Healthcare Course. *Boise State University Theses and Dissertations*. https://doi.org/10.18122/td/1450/boisestate

Woldeamanuel, Y. W., Abate, N. T., & Berhane, D. E. (2020). Effectiveness of Concept Mapping Based Teaching Methods on Grade Eight Students' Conceptual Understanding of Photosynthesis at Ewket Fana Primary School, Bahir Dar, Ethiopia. *EURASIA Journal of Mathematics, Science and Technology Education*, *16*(12).
https://eric.ed.gov/?id=EJ1284595

Xiao, Y., & Yang, M. (2019a). Formative assessment and self-regulated learning: How formative assessment supports students' self-regulation in English language learning. *System*. https://doi.org/10.1016/J.SYSTEM.2019.01.004

Xiao, Y., & Yang, M. (2019b). Formative assessment and self-regulated learning: How formative assessment supports students' self-regulation in English language learning. *System*, *81*, 39–49. https://doi.org/10.1016/j.system.2019.01.004

Yan, Z., Lao, H., Panadero, E., Fernández-Castilla, B., Yang, L., & Yang, M. (2022). Effects of self-assessment and peer-assessment interventions on academic performance: A meta-analysis. *Educational Research Review*, *37*, 100484.
https://doi.org/10.1016/j.edurev.2022.100484

Yan, Z., & Pastore, S. (2022). Assessing Teachers' Strategies in Formative Assessment: The Teacher Formative Assessment Practice Scale. *Journal of Psychoeducational Assessment*, *40*(5), 592–604. https://doi.org/10.1177/07342829221075121

Yusefzadeh, H., Amirzadeh Iranagh, J., & Nabilou, B. (2019). The effect of study preparation on test anxiety and performance: A quasi-experimental study. *Advances in Medical Education and Practice*, *10*, 245–251. https://doi.org/10.2147/AMEP.S192053

Zhao, Y., Zheng, Z., Pan, C., & Zhou, L. (2021a). Self-Esteem and Academic Engagement Among Adolescents: A Moderated Mediation Model. *Frontiers in Psychology*, *12*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.690828

Zhao, Y., Zheng, Z., Pan, C., & Zhou, L. (2021b). Self-Esteem and Academic Engagement Among Adolescents: A Moderated Mediation Model. *Frontiers in Psychology*, *12*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.690828

Appendices

APPENDIX A
Appendix 1: Institutional Review Board (IRB)

APPENDIX B: Permission letter of the faculty Nursing Dean

Arab American University- Palestine
Deanship of Scientific Research
IRB committee
Tel: 04-241-8888, ext 1196
E-mail: irb.aaup@aaup.edu

الجامعة العربية الامريكية- فلسطين
عمادة البحث العلمي
لجنة أخلاقيات البحث العلمي
تلفون: 1196 ext 04-241-8888
البريد الالكتروني: irb.aaup@aaup.edu

IRB Approval Letter

Study Title: The Impact of Formative Assessment on Test Anxiety, Academic Performance, Self-Efficacy, and Self-Regulation among First-Year Nursing Students at the Modern University College of Nursing in Palestine: A Mixed-Methods study

Submitted by: Adam Mohammad Ahmed Marawa'a

Date received: 2nd May 2023

Date reviewed: 4th June 2023

Date approved: 13th June 2023

Your Study titled "**The Impact of Formative Assessment on Test Anxiety, Academic Performance, Self-Efficacy, and Self-Regulation among First-Year Nursing Students at the Modern University College of Nursing in Palestine: A Mixed-Methods study**" With archived number 2023/A/98/N was reviewed by the Arab American University IRB committee and was approved on 13th June 2023

Reham Khalaf-Nazzal, MD, PhD
IRB committee chairman
Arab American University of Palestine

General Conditions:
1. Valid for 4 months from date of approval.
2. It is important to inform the committee with any modification of the approved study protocol.
3. The committee appreciates a copy of the research when accomplished.

APPENDIX C: Informed consent (English version)

Arab American University
Scientific Research Deanship
Ethical Review Committee

الجامعـــة العربيـــة الأمريكيـــة
عمادة البحث العلمي
لجنة اخلاقيات البحث العلمي

INFORMED CONSENT

AAUP-IRB Code No.: 2023/A/98/N
AAUP-IRB Date: 13TH JUNE 2023

I, ……..... *(Name of Participant / optional)* hereby agree to take part in the clinical research (clinical study/questionnaire study/drug trial) specified below:

Title of Study: The Impact of Formative Assessment on Test Anxiety, Academic Performance, Self-Efficacy, and Self-Regulation among First-Year Nursing Students at the Modern University College of Nursing in Palestine: A Mixed-Methods Study

Fulfillment of ……PhD ……..…..…… degree, in ……Philosophy of Nursing……..…., in AAUP.
(Name of program)

The nature and purpose of which has been explained to me by Adam Marawa`a , and interpreted by Adam Marawa`a to the best of his/her ability in English.

I have been told about the nature of the research in terms of methodology, possible adverse effects and complications (as per Participant Information Sheet).
After knowing and understanding all the possible advantages and disadvantages of this research, I voluntarily consent of my own free will to participate in the clinical research specified above.
I understand that I can withdraw from this research at any time without assigning any reason whatsoever.

Date: ……..……..….. **Signature:** ……
(Participant)

IN THE PRESENCE OF:

Name: Adam Mohammad Marawa'a

Designation: The Researcher , Adam **Signature:** Adam M.Marawa'a

(Witness for Signature of Participant)

I confirm that I have explained to the patient the nature and purpose of the above-mentioned research.

Date: …… **Signature:** ……

(Attending investigator

APPENDIX D: Data Collection Instrument

Introduction

Impact of Formative Assessment on First-Year Nursing Students' Anxiety, Performance, Self-Efficacy, and Self-Regulation in Palestine: A Mixed-Methods Study

Dear Participant,

This research study aims to gather information on The Impact of Formative Assessment on Test Anxiety, Academic Performance, Self-Efficacy, and Self-Regulation among First-Year Nursing Students at the Modern University College of Nursing in Palestine: A Mixed-Methods. The questionnaire is divided into 5 parts, each focusing on different aspects of classroom Assessment. Answers will be kept confidential and anonymous, and the information gathered will be used solely for research purposes. It will take 15-20 minutes to complete the questionnaire.

Sincerely,

Adam Marawa'a
a.marawaa1@student.aaup.edu
00972599816258

A Questionnaire

Part one: Demographic data

1. Gender
   A. ☐ Male B. ☐ Female
2. Age: ……
3. Current Grade Point Average (GPA)…… ….
4. Number of credit hours registered in the current semester……
5. Are you a special-needs student……

Part Two: Test Anxiety Scale

Please rate the following items based on your behavior in this class

Items	**1 Not at all true of me**	**2 Slightly true of me**	**3 Somewhat true of me**	**4 Moderately true of me**	**5 Mostly true of me**	**6 Very true of me**	**7 Extremely true of me**
1.When I take a test I think about how poorly I am doing compared with other students.							
2.When I take a test I think about items on other parts of the test I can't answer.							
3.When I take tests I think of the consequences of failing.							
4.I have an uneasy, upset feeling when I take an exam.							
5.I feel my heart beating fast when I take an exam.							

Part Three: Academic Performance Scale

Instructions: Please answer each question using the 5-point scale to answer each question so that it accurately reflects what you do or have done as a student. Be as honest as possible because the information can be utilized to discover areas of strength.

Scale:
SA - STRONGLY AGREE **A** – AGREE **N** – NEUTRAL **D** – DISAGREE **SD -** STRONGLY DISAGREE

Questions	**SA**	**A**	**N**	**D**	**SD**
1.I made myself ready in all my subjects.					
2.I pay attention and listen during every discussion.					
3.I want to get good grades in every subject.					
4.I actively participate in every discussion.					
5.I start papers and projects as soon as they are assigned.					
6.I enjoy homework and activities because they help me improve my skills in every subject.					
7.I exert more effort when I do difficult assignments.					
8.Solving problems is a useful hobby for me.					

Part Four: Self-Efficacy for Learning and Performance

Items	1 Not at all true of me	2 Slightly true of me	3 Somewhat true of me	4 Moderately true of me	5 Mostly true of me	6 Very true of me	7 Extremely true of me
1.I believe I will receive an excellent grade in this class							
2. I'm certain I can understand the most difficult material presented in the readings for this course							
3. I'm confident I can understand the basic concepts taught in this course.							
4. I'm confident I can understand the most complex material presented by the instructor in this course							
5. I'm confident I can do an excellent job on the assignments and tests in this course.							
6. I expect to do well in this class							
7.I'm certain I can master the skills being taught in this class.							
8.Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class							

Part Five: Self-Regulation Scale

Please rate the following items based on your behavior in this class

Items	1 Not at all true of me	2 Slightly true of me	3 Somewhat true of me	4 Moderately true of me	5 Mostly true of me	6 Very true of me	7 Extremely true of me
1. During class time I often miss important points because I'm thinking of other things. (REVERSE)							
2.When reading for this course, I make up questions to help focus my reading.							
3. When I become confused about something I'm reading for this class, I go back and try to figure it out.							
4. If course materials are difficult to understand, I change the way I read the material.							
5. Before I study new course material thoroughly, I often skim it to see how it is organized.							
6. I ask myself questions to make sure I understand the material I have been studying in this class.							

7. I try to change the way I study in order to fit the course requirements and instructor's teaching style.							
8. I often find that I have been reading for class but don't know what it was all about. (REVERSED)							
9. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.							
10. When studying for this course I try to determine which concepts I don't understand well.							
11. When I study for this class, I set goals for myself in order to direct my activities in each study period.							
12. If I get confused taking notes in class, I make sure I sort it out afterwards.							

Thank you for your cooperation

الملخص

الخلفية: إن تحسين التعليم أمر بالغ الأهمية لتعزيز تحصيل الطلاب. يواجه النظام التعليمي الفلسطيني تحديات مثل الموارد المحدودة وعدم الاستقرار السياسي. يمكن أن يؤدي المنهاج الدراسي المكثف في التمريض إلى زيادة القلق من الاختبارات، مما يؤثر على الأداء الأكاديمي، والثقة بالنفس، والتنظيم الذاتي. يمكن لاستراتيجيات التقييم التكويني في تعليم التمريض أن تساعد في مراقبة تعلم الطلاب وتقديم التغذية الراجعة لكل من المحاضرين والطلاب؛ مما يتيح التعرف على نقاط القوة والضعف وضمان تحقيق نتائج تعلم فعالة. على الرغم من استخدام هذه التقييمات، يبقى فهم تأثير مجموعة من الاستراتيجيات على نتائج التعلم تحديًا. هناك حاجة لإجراء أبحاث للكشف عن الاستراتيجيات الأكثر فعالية لتعظيم فوائدها على النتائج التعليمية.

هدف البحث: تهدف الدراسة الى استكشاف تأثير استراتيجيات التقييم التكويني على قلق الاختبار، والأداء الأكاديمي، والكفاءة الذاتية، والتنظيم الذاتي لطلبة التمريض في السنة الأولى في فلسطين.

منهجية الدراسة: استخدمت منهجية البحث دراسة مختلطة الأساليب بتصميم شبه تجريبي مع مجموعات الاختبار القبلي والاختبار البعدي غير المتكافئ في الكلية الجامعية الحديثة في فلسطين خلال الفصل الدراسي الثاني 2022–2023. تم تعيين عينة ملائمة من طلاب التمريض الجامعيين المسجلين في مساق علم ووظائف الاعضاء "2" تم تقسيم الطلاب إلى مجموعتين: تجريبية وضابطة ؛ بواسطة تقييمات ما قبل الاختبار وبعده لقياس القلق والأداء والكفاءة الذاتية والتنظيم الذاتي. وأجريت مقابلات فردية نوعية مع 12 طالب من المجموعة التجريبية. استمر هذا الاختيار حتى تم تحقيق تشبع البيانات مع ستة طلاب. تم تحليل البيانات الكمية باستخدام اختبارات t وANOVA. تم تحليل البيانات النوعية باستخدام تحليل المحتوى الموضوعي الذي يتضمن تحديد وترميز الموضوعات والأنماط والقطاعات ذات المعنى بشكل منهجي داخل البيانات.

النتائج: من بين 90 طالبًا شاركوا في الدراسة ، تم تعيين 46 منهم إلى مجموعة التجريبية و44 إلى المجموعة الضابطة.. أظهرت مجموعة التدخل انخفاضًا كبيرًا في مستويات القلق، حيث انخفض متوسط الدرجات من 17.2 إلى 10.4 ($P < 0.001$). بالإضافة إلى ذلك، تفوقت المجموعة التجريبية على المجموعة الضابطة في متوسط الأداء الأكاديمي (53.97 مقابل 44.55، ($P < 0.01$). كما شهدت

الكفاءة الذاتية والتنظيم الذاتي تحسينات كبيرة في المجموعة التجريبية مقارنة بالمجموعة الضابطة (الكفاءة الذاتية: 39.6 مقابل 31.9، $p < 0.0001$؛ التنظيم الذاتي: 39.6 مقابل 31.9، ($p < 0.001$). في الجزء النوعي من الدراسة، أعرب الطلاب عن تقديرهم للأساليب التكوينية مثل الاستراتيجيات المفتوحة، والتغذية الراجعة، ومراجعات الأقران، التي تعزز الأداء الأكاديمي، والتفكير النقدي، والتعلم النشط، والتقييم الختامي، والكفاءة الذاتية، وتحديد الأهداف، و إدارة الوقت .

الاستنتاجات: وجدت الدراسة أن طلاب التمريض في السنة الأولى الذين استخدموا التقييمات التكوينية التكامليّة قد شهدوا انخفاضًا في قلق الاختبارات، وتحسنًا في الأداء الأكاديمي، وزيادة في الثقة بالنفس والتنظيم الذاتي. تُعدّ هذه الطريقة فعّالة جدًا في تنمية طلاب تمريض مؤهلين وواثقين بأنفسهم.

الكلمات المفتاحية: التقييم التكويني؛ التقييم الختامي؛ طالب التمريض، قلق الاختبار، الأداء الأكاديمي، الكفاءة الذاتية، التنظيم الذاتي.