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Research Article

Unlocking Potential: The Impact of Success Criteria as a Self-Assessment Strategy on Elevating Mathematics Achievement among Alkhair School Students in UAE

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ABSTRACT

This research aims to investigate the impact of success criteria as a self-assessment strategy on enhancing mathematics achievement among sixth-grade students in the United Arab Emirates (UAE), aligning with the "We the UAE 2031" vision for education. Employing a quasi-experimental quantitative design, the study involved 120 sixth-grade students from Al Khair public school in Al Ain, UAE, with two classes serving as the experimental group (60 students) and two other classes as the control group (60 students). Pre-test and post-test scores on national mathematics assessments, as well as international Measures of Academic Progress (M.A.P) scores, were analyzed. Teaching strategies included detailed steps using success criteria, remedial activities, and consistency checks across groups. Data analysis encompassed descriptive and inferential statistics, including independent t-tests in SPSS. The findings revealed a significant improvement in short-term mathematics achievement among students exposed to success criteria-based self-assessment compared to traditional assessment methods with as mean score difference of 10.572 ($p < 0.05$). Additionally, the analysis of M.A.P test scores showcased a substantial median score difference of 15.92 in favor of the success criteria-based self-assessment group, further reinforcing the effectiveness of this approach in promoting long-term academic growth and proficiency in mathematical concepts. Success criteria were found to enhance teacher clarity, student learning, and self-regulation abilities. Recommendations include integrating success criteria-based self-assessment into teaching practices and policy frameworks to enhance student engagement and academic performance. Future research directions involve exploring diverse populations, conducting longitudinal studies, and comparing different self-assessment strategies for effective implementation in education.

Keywords: Success Criteria; Self-Assessment; Long-Term Academic Growth; We the UAE 2031.

Introduction

The progress of nations is measured by the strength of the educational system, whose outputs are of a high degree of quality, to prepare a generation with a high degree of competence and experience, capable of developing society, and with high flexibility to develop and keep pace with changes and developments of the times. Therefore, the educational system requires modern means of measurement and evaluation that help to take objective educational decisions based on scientific foundations. Evaluation is considered a fundamental pillar of the educational system in all its dimensions and aspects due to its importance in determining the extent

to which the desired educational goals are achieved, which are expected to reflect positively on the student and the educational process alike (Fägerlind & Saha, 2016).

Any attempt to reform education must include developing the philosophy and tools of evaluation. Therefore, educational evaluation receives great attention from educators and researchers, because of its importance in the educational process. Success criteria can be one of those tools, because they support personal development and academic success. According to Almarode et al. (2021), success criteria answer three key questions: What am I learning? how am I learning this? How will I know that I have learned it? The first question refers to the content and objectives of the curriculum, the second question symbolizes its teaching methods, while the third question refers to its evaluation tools (Eagan, 2023).

Success criteria clarify learning targets for both teachers and students by detailing the knowledge and skills needed to meet daily learning objectives (Almarode et al., 2021). Research on effect size, which measures the impact of school-related influences on student learning, indicates that success criteria have a significant potential effect size of 0.88, far exceeding the average of 0.4 (Hattie, 2012). This suggests a substantial positive impact on learning. Almarode et al. (2021) emphasizes the connection between high-quality success criteria and key educational practices like meta-cognition, deliberate practice, feedback, and equity. They highlight the importance of strong student-teacher relationships in effectively implementing these elements to maximize the impact of success criteria in the classroom (Fisher & Frey, 2014; Hammond, 2015; Hattie, 2012).

Success criteria play a crucial role in enhancing teacher clarity and student learning. They help students understand what success looks like, enabling them to plan, set goals, and assess their progress effectively. This process aligns with assessment as learning, where students actively monitor their learning and adjust based on feedback (Eagan, 2023). By revealing the destination of learning and communicating learning intentions clearly, success criteria facilitate meaningful instruction and assessment, making learning visible and measurable for both teachers and students (Moss & Brookhart, 2019).

When considering the relationship between success criteria and self-regulation learning, success criteria play a vital role in supporting students' development of metacognitive skills and self-regulation abilities (Vrieling et al., 2018). By providing clear learning targets and criteria for success, success criteria help students understand what is expected of them, which enables them to set goals, monitor their progress to next levels, adjust, and regulate their learning strategies effectively (Li et al., 2018). This connection between success criteria and self-regulation learning enhances students' self-efficacy, motivation, and overall learning outcomes (Schunk, 2023).

Teachers can support students' self-regulation by addressing three key success criteria questions throughout the learning process. In the first stage, teachers identify the desired learning outcomes in terms of knowledge, understanding, and functions. The second stage involves determining assessment criteria aligned with proficiency targets to measure students' success. Finally, in the third stage, teachers develop learning plans that guide students towards achieving the desired learning outcomes (Zare et al., 2022; Eagan, 2023).

Problem Statement and Research Questions

Aligned with the "We the UAE 2031" vision for education, which emphasizes nurturing the skills and behaviors of children in their early years through state-of-the-art research and educational capabilities to achieve leading national and global outcomes, there is a pressing need to address gaps in educational research (Ahmed, 2023). Despite the ambitious reforms being implemented by the United Arab Emirates in accordance with the UAE 2031 vision, there are numerous challenges hindering the achievement of this vision (Ribeiro & Ribeiro, 2023; 'We the UAE' 2031vision).

The absence of comprehensive action research in the fields of self-learning, self-assessment, and various learning strategies poses a major obstacle to improving the quality of education and achieving the desired educational outcomes at both the national and global levels. One significant gap is the lack of comprehensive studies on the effectiveness of success criteria as a self-assessment strategy in enhancing mathematics achievement among UAE students (Almarashdi & Jarrah, 2022). The UAE needs to strengthen scientific research in this area to ensure the provision of an educational environment that supports the development of students' skills and enhances their ability for self-learning, contributing to the achievement of the UAE 2031 vision and the development of an educational system that keeps pace with modern advancements and equips students with the necessary tools for future success (Al Murshidi, 2019; 'We the UAE' 2031vision).

The integration of success criteria in math education is crucial for achieving the UAE's vision of "Excellent Education in UAE 2071," enhancing students' self-learning and long-term goals. Authentic leadership, emphasizing balanced processing and ethical conduct, promotes 21st-century skills like critical thinking, creativity, and collaboration, making success criteria essential for student progress. These leaders value diverse perspectives, innovative teaching methods, and continuous learning for both students and educators (UAE Centennial Plan 2071). Moreover, the UAE's vision for education emphasizes ethical, transparent, participatory, inclusive, and global perspective education, aligning with the goal of preparing students for success in a technology-led society (Kinuthia, 2021). This vision can be achieved by adapting education to students' abilities through self-assessment processes that include success criteria that considered "at the heart of formative assessment" in education (Massouti et al., 2023; Snow, 2022; Hattie, 2012).

However, the implementation of equitable access to curricular topics, as proposed by the National Council of Teachers of Mathematics (NCTM), does not suggest that all students should explore the content to the same

depth or at the same level of formalism. This requires a deeper understanding of how self-assessment tools like success criteria can empower students of diverse backgrounds and abilities to maximize their potential in mathematics (NCTM, 1989; Almarashdi & Jarrah, 2022).

This research aims to address this gap by investigating the impact of success criteria on students' self-regulated learning and mathematics achievement in the UAE context. By exploring the relationship between success criteria usage, self-assessment practices, and academic outcomes, this study seeks to contribute valuable insights to educational policies and practices that align with the UAE's vision for excellence in education.

Accordingly, this action research aims to answer the main question: "How does the use of success criteria as a self-assessment strategy affect the enhancement of mathematics achievement in students?" through the examination of the following sub-questions and hypotheses:

1.Is there a significant difference in mathematics shot-term achievement between students who are exposed to success criteria-based learning and those who are not?

H1: There is a significant impact of success criteria-based self-assessment on short-term math achievement in 6th-grade students compared to traditional assessment methods

2. How do students' self-assessment processes, guided by success criteria, impact their mathematics achievement over long term time?

H2: There is a significant impact of success criteria-based self-assessment on long-term academic growth in 6th-grade students compared to traditional assessment methods.

Literature Review

2.1 Understanding Students' Self-Assessment Concept

Student self-assessment in education encompasses various mechanisms and techniques through which students describe and assess the quality of their learning processes and outcomes (Panadero, Brown, & Strijbos, 2016). This process involves reflecting on and monitoring the work done, including evaluating the characteristics and quality of their work. For instance, students might assess how well they have performed and the value of their work (Brown, Andrade, & Chen, 2015). By focusing on predefined criteria, self-assessment allows students to understand the learning process better, learn from their mistakes and achievements, and engage in a process of reflection (Massouti et al., 2023).

Student self-assessment is a crucial element in the assessment process, enabling students to receive appropriate feedback and continually improve (Garshasbi et al., 2019). This technique helps students perceive the value of their performance, identify their strengths and weaknesses, and enhance their learning outcomes. By assessing the quality of their work based on specific criteria, students can learn to improve their future work (Moss & Brookhart, 2019). This dynamic technique emphasizes qualitative assessment over scoring, promoting a deeper understanding of the learning process.

According to Yan and Brown (2017), student self-assessment is an internal psychological process where individuals evaluate the quality of their work based on internal factors like self-esteem, self-efficacy, and motivation. This process enhances the role of students as active participants in their learning and is often used as a formative assessment to encourage reflection on learning processes and outcomes (Panadero et al., 2017). Self-assessment also involves self-regulation, where students control their thoughts, actions, emotions, and motivations through personal strategies to achieve their goals (Ribeiro & Ribeiro, 2023). It is an active learning process that includes setting learning goals, identifying necessary approaches and resources, and responding to feedback to enhance final learning outcomes (Massouti et al., 2023).

2.2 Goal Setting and Success Criteria in Self-Assessment

Self-assessment involves students comparing their current performance with their goals, influenced by the type of standards used, the quality of the goals, and the importance placed on goal attainment and performance (Ng, 2016). When students value their goals, they are more likely to assess their performance and strive for improvement. Success criteria play a crucial role in this process by providing clear, specific benchmarks that help students understand what is expected of them. These criteria guide students in setting realistic and challenging goals, which in turn enhances their motivation and commitment to achieving them (Eagan, 2023). Goal setting guides students in the next steps of their learning, while metacognitive strategies help achieve these goals. According to Locke and Latham's goal-setting theory, five principles enhance this process: clarity, challenge, commitment (reinforced by self-efficacy), feedback for monitoring progress, and task complexity (Clift, 2015). These principles support autonomy and competence, boosting intrinsic motivation and engaging students actively in their learning (Clift, 2015; Papanthymou & Darra, 2023).

The impact of goals on behavior depends on specificity, proximity, and difficulty. Specific goals with clear performance standards enhance learning and self-assessment more than general goals. Proximal goals, being more immediate, are more motivating and easier to measure, thus increasing self-efficacy. Difficult goals require more effort, and working towards them builds self-efficacy despite initial doubts (Schunk, 1990). The POWER goal framework helps in identifying student learning goals by focusing on positivity, ownership, specificity, evidence, and relationships (Clift, 2015).

Clarifying and exemplifying assessment criteria through model answers and checklists can improve students' understanding and application of success criteria (Ahmed, 2018). Proper training in layout, organization,

objectives, and developmental strategies is essential. Discussing success criteria with students can enhance learning outcomes if the teacher emphasizes their purpose. However, rigid guidance can lead to dependency and limited critical thinking, potentially hindering lifelong learning skills (Crisp, 2012). Promoting self-regulatory skills and conceptual understanding of quality learning is crucial. Detailed criteria generate quality feedback, successful peer collaboration, active learning, autonomy, and lifelong engagement (Ndoye, 2017).

2.3 The Impact of Self-Assessment Using Success Criteria on Student Achievement

The implementation of success criteria as a self-assessment strategy has received significant attention for its potential to enhance mathematics achievement among students. Research by Hattie and Timperley (2007) underscores the importance of self-assessment in improving student learning outcomes. When effectively integrated, success criteria provide students with clear guidelines and expectations, leading to a deeper understanding of mathematical concepts (Moss & Brookhart, 2019). This approach empowers students to monitor their progress and develop metacognitive skills, such as goal setting and reflection, which are crucial for academic success (Nicol & Macfarlane-Dick, 2006; Yeatman & Hewitt, 2020).

Marchant et al. (2001) highlight the role of self-assessment in enhancing motivation and academic performance. They note that students exhibit higher motivation when they have a personal connection to their success, feel competent, set personal goals, and perceive control over their achievements. Self-assessment strategies enable students to evaluate their progress, fostering intrinsic motivation and a sense of ownership in their learning journey (Ahmad & Safaria, 2013; Panadero et al., 2017). This approach, coupled with timely and constructive teacher feedback, significantly strengthens students' self-efficacy and fosters sustained positive changes in classroom behavior and engagement (Garshasbi et al., 2019).

Research by McMillan and Hearn (2008) further underscores the positive impact of self-assessment on student motivation and engagement. When students assess their work against established criteria, they become more invested in their learning process and take ownership of their academic progress (Sharma et al., 2016). This active involvement promotes a growth mindset, where students view challenges as opportunities for learning and strive for continuous improvement (Dweck, 2006; Almasraf, 2023). Overall, integrating success criteria as a self-assessment strategy enhances mathematics achievement and fosters a positive learning environment conducive to student growth and development (Clift, 2015; Stohlmann & Yang, 2024).

Andrade and Valtcheva (2009) explore criteria-referenced self-assessment, where students gauge their performance against clear standards and revise their work accordingly. This formative assessment promotes reflective thinking and deeper understanding, enhancing academic achievement while offering valuable feedback that supplements teachers' input (Taylor, 2014). Zare et al. (2022) further emphasize how self-assessment boosts high school students' math achievement by enhancing self-regulation and self-efficacy. Successful assignments increase confidence, and belief in one's learning ability fosters perseverance (Salami, 2010). Self-assessment is crucial for academic progress and self-regulated learning, especially at advanced educational levels (Nemat Tavousi & Ghahri Saremi, 2017).

Moreover, Eagan (2023) underscores the role of success criteria in improving academic performance and strengthening teacher-student relationships. Clear success criteria clarify learning targets, enhance motivation, and engage underperforming students, supporting academic success and a positive learning environment. Furthermore, López Carrillo et al. (2024) focus on self-regulated learning in STEAM education, highlighting how it fosters positive attitudes towards science, enhances problem-solving skills, and builds a positive self-concept. These metacognitive skills are essential for boosting student confidence and achievement.

The extensive body of research highlights the significant benefits of self-assessment and success criteria in enhancing student learning outcomes, motivation, and engagement. Studies demonstrate how these strategies promote metacognitive skills, self-efficacy, and a growth mindset, contributing to improved academic performance and positive learning environments. Despite these findings, there is a notable lack of studies focused on the application of these strategies in the United Arab Emirates (UAE) educational context. This gap underscores the need for the current research. By investigating the effectiveness of success criteria in a specific UAE school setting, this study aims to provide valuable insights that could inform educational practices and policies, ultimately enhancing mathematics achievement and fostering a more effective learning environment for students in the UAE.

Methodology

A quasi-experimental quantitative design was employed to determine the effect of success criteria on student mathematics achievement. Due to the difficulty of obtaining administrative approval for random selection and removing a small number of students from their classes, entire classes were used for the study.

Two classes served as the experimental group, using self-regulates assessment through detailed success criteria for each mathematics lesson throughout the term1 in 2023/2024, while two other classes served as the control group in term 1 2022/2023, using traditional assessment methods without explicit success criteria. Pre-test and post-test scores on national mathematics assessments were collected to establish a cause-and-effect relationship between the use of success criteria and academic short-term achievement. Additionally, students' international Measures of Academic Progress (M.A.P) in Math test scores for control and experimental group

were analyzed to understand how self-evaluation processes, guided by success criteria, impact long-term academic growth in mathematics.

Participants

This study was conducted in Al Khair public school for grade 6 students from the general stream, with a sample of 120 students. All students were purposefully selected from a public school and the same age group (sixth grade) to minimize differences between participants, as students in public schools study the same curriculum and are subjected to the same assessment methods. Additionally, teaching in public schools is standardized by the Ministry of Education, whereas students in private schools may follow different curricula that could influence their knowledge of mathematics.

Al Khair School was specifically selected for this study due to the researchers' professional affiliation with the institution. Furthermore, to the best of the researchers' knowledge, Al Khair School is pioneering the implementation of this assessment strategy among public schools in Al Ain UAE. This selection is in harmony with the school's administration's commitment to adopting cutting-edge educational strategies aimed at optimizing student performance aligned with the UAE's 2031 educational targets. The administration's proactive approach and dedication to enhancing educational outcomes make Al Khair School an ideal setting for evaluating the effectiveness of innovative assessment methods.

Study Instruments and Procedures

Procedure

The sixth-grade mathematics teacher designed new teaching plans that include training steps according to the self-assessment strategy (success criteria). Lessons for the experimental group, which cover the same topics as the control group, were designed with these steps, incorporating the new assessment strategy as follows:

1. **Introduction and Elicitation of Prior Knowledge**: Begin by identifying and activating students' existing knowledge or experiences.
2. **Lesson Objectives and Success Criteria**: Write the lesson objectives, success criteria, and steps on the board.
3. **Instruction**: The teacher and students address the lesson objectives sequentially. The lesson is divided into several segments, each covering a specific objective. After explaining each objective, students solve concept-checking questions. Based on their ability to answer these questions, students apply the self-assessment strategy using success criteria stickers provided by the teacher at the beginning of the lesson, as illustrated in Figure 1.

Unit : 1 Lesson-5 Solve Ratio Relationships			Date:
learning objective: 1) To solve real-world problems involving ratio relationships using equivalent ratio			
Success Criteria :		SC	TC
I can Identify the ratio relationship between two quantities.			
I can Find equivalent ratio relationship.			
I can Solve real world ratio problem using equivalent ratio			

Figure 1: Sample of Success Criteria Sticker for Self-Assessment provided to students at the beginning of the lesson.

4. **Self-Assessment Application**: Students in the experimental groups apply the self-assessment strategy after completing a series of activities. The teacher distributes these activities, which are related to the objectives that have been explained. Students complete the activities, discuss them, and correct any mistakes with the teacher's guidance. Students then evaluate their own performance and reflect on their satisfaction. For example, if a student feels they have not mastered an objective, they shade the success criterion in red. If they have mastered the objective and can complete all related activities, they shade it in green as shown in the following Figure 2.

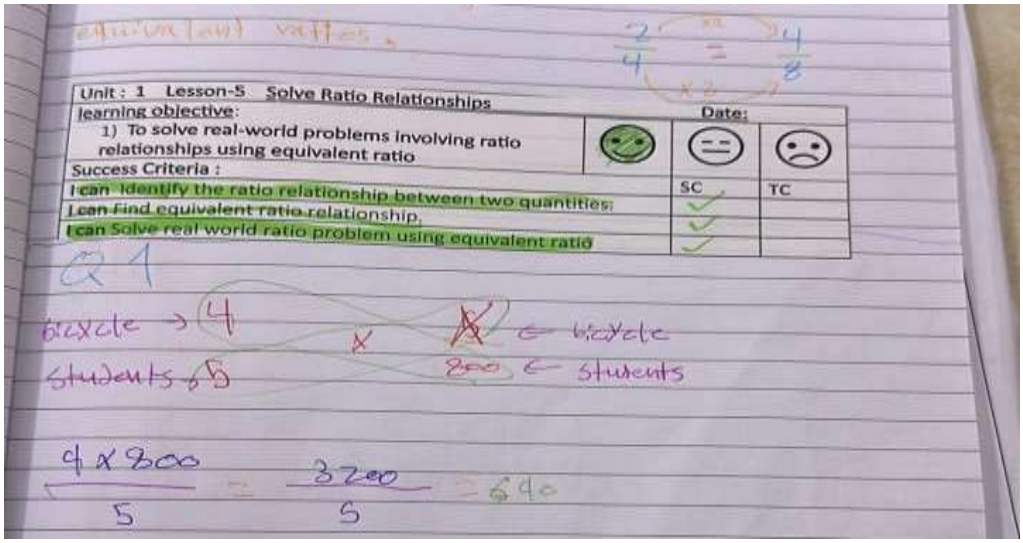

Figure 2: sample of a student self-assessment using success criteria for a mathematics lesson on solving ratio problems**.**

5. Remedial, Supportive, or Enrichment Activities: After completing all lesson objectives and their self-assessment, the teacher provides activities tailored to each student's level and assessment paper-wise and electronically in different platforms. Performance level stickers, aligned with the student's abilities, are attached to the activity or worksheet, etc. If a student masters only one criterion, they move to remedial activities labeled "Let's Go" and “Continue”. Mastery of two criteria leads to supportive activities labeled "One Step to Go" and "Two Steps to Go". Mastery of all three criteria results in enrichment activities labeled "Level Up" and "A+" designed to encourage further creativity and excellence. These levels align with Bloom's Taxonomy model of learning progression, as detailed in Table 1 below.

Table 1: The designed level stickers and success criteria corresponding to Bloom’s Taxonomy Model

Stickers’ levels for activities	Bloom's Taxonomy Levels	Success criteria
 	**Remember:** Recall basic math facts, terms, and concepts. Activities: listing formulas, identifying shapes, and retrieving definitions. **Understand:** Grasp the meaning of math concepts by interpreting and explaining them. Activities: summarizing procedures, explaining ideas, and comparing methods.	Mastery of 1 or none of success criteria.
 	**Apply:** Use learned math concepts in new situations. Activities: solving problems, applying formulas, and demonstrating procedures. **Analyze:** Break down math problems to understand their structure. Activities: comparing methods, identifying patterns, and organizing data.	Mastery of 2 of success criteria.
 	**Evaluate:** Make judgments about math solutions based on criteria. Activities: critiquing methods, assessing solutions, and justifying answers. **Create:** Generate new ideas and solutions in math. Activities: designing experiments, constructing models, and producing new problem-solving methods.	Mastery of 3 of success criteria or more.

6. Consistency Across Groups: The lessons for both the experimental and control groups follow the same steps, except for the self-assessment strategy (success criteria) applied after each segment of the lesson objectives. This strategy (intervention method) is only included in the teaching plan for the experimental group and not used by the control group, which follows the traditional method. Also, to verify the consistency among two groups in the level of previous achievement in a mathematics course, a pre-diagnostic test was applied to the students before initiating the new intervention strategy.

Study Instrument

The diagnostic test tool was utilized as a pre-test assessment, designed by the teacher in a format similar to the final ministerial exam. Its validity was examined by experienced educators in the assessment and evaluation field to ensure its comprehensiveness and scientific accuracy. Moreover, the tool's reliability was tested using Cronbach's alpha coefficient, which reached 0.85, indicating a high level of consistency. The correlation coefficients ranged from 0.65 to 0.91, further enhancing result reliability. This test was employed to verify the equivalence of the two groups in the previous achievement level in the mathematics, ensuring that the final results accurately reflect the impacts of the implemented educational strategies.

The primary tool for measuring the short-term math achievement was the final achievement test prepared by the UAE Ministry of Education. This post- test is designed according to standards that encompass various thinking skills, facts, recall, application, analysis, and evaluation included in the subject matter. It typically consists of 15 multiple-choice questions administered electronically and 5 paper-wise free response questions aimed at assessing the students' achievement levels.

Additionally, the study utilized the M.A.P test, an adaptive assessment designed to measure students' academic progress and long-term academic growth in mathematics. The M.A.P test relies on adaptive mode, where the difficulty of the questions changes based on the student's previous answers, providing an accurate evaluation of the student's ability level. The test consists of 40 questions and aims to measure student learning by presenting questions of varying difficulty, determining the student's current academic level, and comparing their performance over time as well as against other students locally and globally (M.A.P nwea, 2024).

The study instrument, represented by the final exams designed by the UAE Ministry of Education, is known for its high validity and reliability. These exams are prepared according to precise educational standards that ensure they encompass various thinking skills such as recall, application, analysis, and evaluation. They undergo review and supervision by a team of educational experts, ensuring their fairness and reliability in measuring students' academic achievement. Consequently, there is no need to test their validity and reliability again, as they are verified before being approved and implemented nationwide.

As for the M.A.P international exam, it is an internationally accredited adaptive test widely used to measure students' academic progress in various subjects, including mathematics. This exam enjoys a strong reputation in the global educational community, as it undergoes rigorous validation processes by specialized educational institutions, ensuring the validity and reliability of its results. The M.A.P exam employs adaptive technology that accurately assesses the student's level by adjusting the difficulty of questions based on previous answers. Therefore, there is no need to revalidate the M.A.P exam's validity and reliability, as it is recognized as a reliable and effective tool both locally and globally.

Method of Data Analysis

Descriptive and inferential statistics were used to address the research questions posed. An independent t-test was conducted on the quantitative achievement data to identify any differences in the achievement mean scores of the students in experimental and control groups. The students' short-term mathematical achievement level was accounted for by comparing pre-test and post-test scores. The arithmetic mean of the students' scores on the international M.A.P exam for the two groups was also compared using the independent t-test to identify the impact of self-assessment processes, guided by success criteria on students' mathematics achievement over long term time. A p-value of less than 0.05 was considered statistically significant.

Results

The equivalence and consistency of the experimental and control groups in the previous achievement level in mathematics was verified using a diagnostic test as a pre-achievement on students from both groups before teaching commenced. The significance of differences between the experimental and control groups was tested using independent t-test. Table 2 illustrates the results obtained:

Table 2: Independent T-test results for students in pre-achievement test

Group	N	Mean	SD	*t*-value	DF	Sig. *p*
Control	60	40.92	14.22	0.576	118	0.566
Experimental	60	39.33	15.85			

Table 2 shows that the value of (t) is not statistically significant ($p > 0.05$), indicating no statistically significant differences between the mean scores of the experimental and control groups in prior achievement levels. This confirmation of equivalence ensures that any subsequent effects on academic achievement can be reliably attributed to the teaching strategies and intervention methods used in the study.

To address the first research question: Is there a significant difference in mathematics shot-term achievement between students who are exposed to success criteria-based learning and those who are not?? And to test the first hypothesis: H1: There is a significant impact of success criteria-based self-assessment on short-term math achievement in 6th-grade students compared to traditional assessment methods; an Independent Samples T-Test was conducted using SPSS to calculate the significance of the difference between the mean scores of the

control and experimental groups in the post-test achievement test. Additionally, the effect size of the independent variable (self-assessment using success criteria) on the dependent variable (academic achievement) was calculated using Eta squared. Table 3 illustrates the significance of the difference between the mean scores of the control and experimental groups in the post-achievement test and the effect size.

Table 3: Independent T-test results for students in post-achievement test

Group	N	Mean	SD	*t*-value	DF	Sig. *p*	Eta squared *η2*
Control	60	68.89	17.117	2.923	118	0.004	0.98
Experimental	60	78.89	22.178				

The difference in the mean scores (10.572) of students in the experimental and control groups on the post-test is statistically significant at the 0.05 level in favor of the experimental group. This result leads to the acceptance of the first hypothesis, indicating that the short-term achievement level of the experimental group students who used the self-assessment strategy based on success criteria is higher than that of their counterparts in the control group who followed traditional methods. Additionally, the effect size of the independent variable (self-assessment based on success criteria) on the dependent variable (academic achievement) is large (0.98), demonstrating the effectiveness of using self-assessment in teaching the mathematics course.

The effectiveness of using self-assessment based on success criteria in teaching mathematics and improving students' short-term academic achievement is attributed to several factors. This approach provides students with a clear understanding of learning objectives and evaluation criteria, enabling them to better organize and direct their efforts towards achieving these goals. It enhances their sense of control and motivation, while also fostering critical and analytical thinking skills. By continuously evaluating their performance against set standards, students can identify and improve their strengths and weaknesses, leading to continuous learning and self-improvement. Additionally, it allows teachers to accurately track each student's progress and provide tailored feedback and support, creating an interactive learning environment that promotes academic excellence and personal growth.

Figure 3 below illustrates the mean score differences between the control and experimental groups in the post-final achievement test prepared by the UAE Ministry of Education:

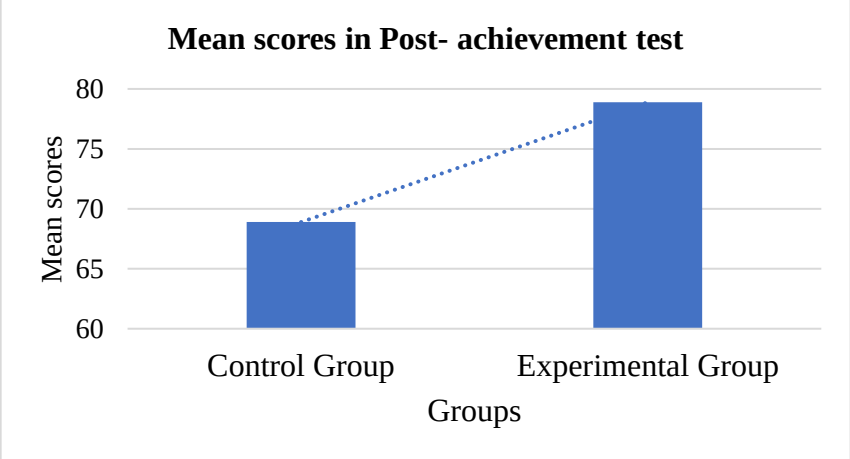

Figure 3*:*The difference between the mean scores of the control and experimental groups in the post- achievement test.

Furthermore, to identify the long-term effect of students' self-assessment processes, guided by success criteria, on their mathematics achievement represented by the second question as well as testing the second hypothesis: H2: There is a significant impact of success criteria-based self-assessment on long-term academic growth in 6th-grade students compared to traditional assessment methods, an Independent Samples T-Test was conducted using SPSS. This test calculated the significance of the difference between the RIT scores and median scores of the control and experimental groups. Table 4 illustrates the significance of the difference between the RIT scores and median scores of the control and experimental groups in the M.A.P test.

Table 4: Descriptive statistics and Independent T-test results for M.A.P test (RIT scores and median scores of the control and experimental groups)

Group	N	Mean	SD	*t*-value	DF	Sig. *p*
M.A.P RIT Scores						
Control	60	198	6.365	10.791	118	0.000
Experimental	60	209	4.753			
M.A.P Median						
Control	60	13.10	7.075	14.472	118	0.000
Experimental	60	29.02	3.925			

The results presented in Table 4 reveal significant differences between the control and experimental groups in both the M.A.P RIT scores and the M.A.P median scores. The difference in the mean RIT scores (11) of students in the experimental and control groups is statistically significant at the 0.05 level, with a t-value of 10.791 and a p-value of 0.000 in favor of the experimental group. Furthermore, the difference in the median scores (15.92) between the experimental and control groups is also statistically significant at the 0.05 level, with a t-value of 14.472 and a p-value of 0.000, again in favor of the experimental group. This result leads to the acceptance of the second hypothesis, indicating that the long-term achievement level of the experimental group students who used the self-assessment strategy based on success criteria is higher than that of their counterparts in the control group who followed traditional methods

The Figure 4 below show a significant improvement in the mathematics achievement of the experimental group, with a median score of 29, compared to the control group's median score of 13. This radical improvement underscores the long-term impact of the self-evaluation intervention implemented on the experimental group. The intervention not only enhanced the students' understanding of the subject but also equipped them with the skills to assess their progress and address their weaknesses effectively.

Figure 4: Significant improvement in M.A.P achievement for the experimental group (median score) compared to the control group after the success criteria self-evaluation intervention.

Additionally, in Figure 5 below, a sample of two students from the experimental group demonstrated substantial growth over time. In the last M.A.P exam following the intervention term, these students improved from an orange performance level, indicating they were previously performing below grade-level expectations and required targeted support, to a blue performance level, suggesting they are now performing at or above grade-level expectations and demonstrating proficiency or higher performance. This transition from orange to blue reflects the effectiveness of success criteria in improving achievement. The self-evaluation strategy helped students identify their weak points and provided a clear roadM.A.P for improvement, fostering a deeper understanding of mathematical concepts and enhancing their ability to meet academic standards. This approach not only boosts immediate academic performance but also promotes sustained academic growth by empowering students with the tools to self-regulate their learning and continuously strive for excellence.

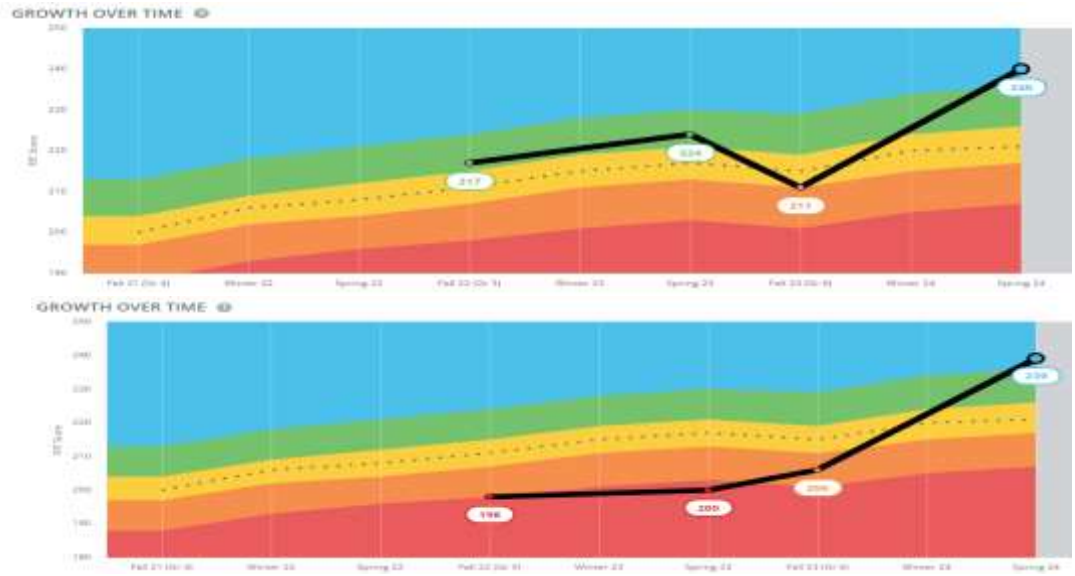

Figure 4: A sample of two students' M.A.P results from experimental group showed significant growth

These findings suggest that self-assessment based on success criteria not only enhances overall academic achievement but also has a significant long-term impact on students' learning and development. The M.A.P test is an adaptive assessment designed to measure students' long-term learning and the development of their knowledge and skills over time. The statistically significant differences in both the RIT scores and median scores between the experimental and control groups indicate that students who engaged in self-assessment based on success criteria not only achieved higher immediate academic results but also demonstrated sustained improvement in their mathematical understanding and abilities.

Discussion

The study's findings reveal a statistically significant improvement in mathematics achievement among students who utilized success criteria-based learning and self-assessment compared to those who followed traditional assessment methods. Specifically, the mean score difference of 10.572 in favor of the experimental group underscores the effectiveness of the self-assessment strategy. This result aligns with existing literature that emphasizes the benefits of clear learning objectives and success criteria in enhancing student outcomes (Eagan, 2023; Fisher & Frey, 2014). By implementing success criteria, students can better understand what success looks like, enabling them to plan, set goals, and effectively assess their progress.

Success criteria play a crucial role in enhancing teacher clarity and student learning. This was supported by Almarode et al. (2021) who argue that success criteria help students understand the learning objectives, facilitating goal-setting and self-assessment. This process aligns with the concept of assessment as learning, where students actively monitor their progress and adjust their learning strategies based on feedback. By making learning intentions explicit, success criteria support meaningful instruction and assessment, making the learning process visible and measurable for both teachers and students (Moss & Brookhart, 2019).

When considering the relationship between success criteria and self-regulation learning, the former supports the development of students' metacognitive skills and self-regulation abilities. Clear learning targets and success criteria enable students to set goals, monitor their progress, and adjust their learning strategies effectively. This connection enhances students' self-efficacy, motivation, and overall learning outcomes (Li et al., 2018; Schunk, 2023).

Moreover, the M.A.P's results, showing significant differences in favor of the experimental group, underscore the long-term impact of success criteria-based self-assessment. Specifically, the mean RIT score differences of 11 and median score differences of 15.92 highlight substantial improvements in student performance. These findings align with existing literature on the sustained benefits of self-assessment and formative feedback in enhancing student learning (Andrade & Valtcheva, 2009; Clift, 2015; Sharma et al., 2016). The individual student growth, illustrated by the transition from below grade-level to at or above grade-level performance, further validates the effectiveness of success criteria in fostering a deeper understanding of mathematical concepts and promoting sustained academic growth.

Success criteria-based self-assessment's effectiveness in improving mathematics achievement can be attributed to several factors. Providing students with a clear understanding of what is expected allows them to organize and focus their efforts effectively. This approach enhances their sense of control and motivation, fostering critical and analytical thinking skills. By continuously evaluating their performance against established standards, students can identify and improve their weaknesses, leading to continuous learning and self-improvement. These findings are consistent with Hattie and Timperley's (2007) emphasis on the importance of feedback in promoting student learning. Moreover, teachers can use this strategy to track student progress accurately and provide tailored feedback, creating an interactive learning environment that promotes academic excellence and personal growth (Snow, 2022; Zare et al., 2022).

Linking these results to the UAE's 2031 educational targets, the study underscores the importance of self-regulated learning and success criteria in achieving long-term academic growth goals. The UAE's Vision 2030 emphasizes the development of 21st-century skills, including critical thinking, problem-solving, and self-regulation, which are essential for navigating a technology-driven society. The significant improvements observed in the experimental group's mathematics achievement demonstrate how success criteria can effectively support these educational goals. By equipping students with the skills necessary for continuous learning and growth, this approach aligns with the UAE's vision of fostering a high-performing educational system that prepares students for future challenges.

Conclusion and Recommendations

The results of this study underscore the substantial benefits of employing success criteria-based self-assessment in enhancing mathematics achievement among sixth-grade students. One primary reason for this effectiveness is that success criteria provide students with clear, concrete goals, allowing them to understand

precisely what is expected. This clarity helps students focus their efforts, leading to better organization and increased motivation. Additionally, success criteria facilitate continuous self-evaluation, encouraging students to monitor their progress and identify areas needing improvement. This ongoing process of self-assessment fosters critical thinking and self-regulation skills, which are essential for academic success. Teachers, in turn, can use these criteria to track student progress more accurately and offer personalized feedback, creating a supportive and interactive learning environment. The alignment of these practices with formative assessment principles, as highlighted in the literature and previous studies, further validates their effectiveness. Overall, the clear structure and feedback loop provided by success criteria-based self-assessment significantly contribute to higher mathematics achievement and sustained academic growth.

The long-term impact of success criteria-based self-assessment on students' M.A.P growth is notably significant. This sustained improvement can be attributed to several key factors. Firstly, success criteria provide a clear framework for learning, which helps students understand their learning objectives and what constitutes success. This clarity fosters a focused approach to learning, enabling students to direct their efforts more effectively toward achieving their goals.

Furthermore, success criteria-based self-assessment encourages continuous self-evaluation. By regularly comparing their performance against established criteria, students develop the ability to identify their strengths and weaknesses. This process not only enhances their self-awareness but also motivates them to take proactive steps to address their learning gaps. The development of such metacognitive skills is crucial for long-term academic growth, as it promotes a habit of reflective learning and self-improvement.

The research underscores the potential of success criteria-based self-assessment to significantly improve mathematics achievement among sixth-grade students, suggesting its integration into teaching practices for enhanced learning outcomes and student success. Policymakers can leverage these findings to align educational policies with national goals like UAE Vision 2031, emphasizing the need for professional development programs to equip educators with the necessary skills. To build on these positive outcomes, it is recommended that educational institutions integrate success criteria-based self-assessment strategies into their curricula. Training teachers to effectively implement these strategies can further enhance student engagement and academic performance.

However, the study's generalizability is limited to sixth-grade students in a specific context, urging future research to explore diverse populations, conduct longitudinal studies, and compare different self-assessment strategies for a more comprehensive understanding and effective implementation of success criteria-based self-assessment in education. Additionally, incorporating regular formative assessments that utilize success criteria will help maintain continuous student growth and self-regulated learning.

Future research should explore the long-term effects of success criteria-based self-assessment across various subjects, educational levels, and different UAE schools to generalize the findings. Investigating the impact of this approach on different student demographics, including those with special educational needs, could provide valuable insights into its broader applicability. Moreover, longitudinal studies that track student progress over several years would help to better understand the sustained benefits of success criteria-based self-assessment in fostering lifelong learning and academic excellence.

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