



Influence of Self-Talk Strategies on Students' Mathematics Performance in Public Secondary Schools in Dar es Salaam City Council, Tanzania

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Abstract : Mathematics performance remains a significant concern in secondary education, partly because students' negative thoughts, mathematics anxiety, low confidence, and fear of failure may reduce their participation and persistence in mathematical tasks. This study examined the influence of self-talk strategies on students' mathematics performance in public secondary schools in Dar es Salaam City Council. The main objective was to investigate how positive self-talk, replacement of negative thoughts, and encouragement of constructive internal dialogue influence students' mathematics performance. The study adopted a mixed-methods research approach and an explanatory sequential research design. The study involved 118 actual respondents comprising 100 students, 12 mathematics teachers, and 6 heads of schools. Data were collected using structured questionnaires and semi-structured interviews, supplemented by classroom observations. Quantitative data were analysed using frequencies and percentages in SPSS Version 26, while qualitative data were analysed thematically. Validity was enhanced through expert review and piloting, while reliability was addressed through test-retest procedures. Ethical considerations included institutional permission, informed voluntary participation, confidentiality, anonymity, and respect for participants' rights. Findings showed that 90% of students agreed or strongly agreed that teachers guided them to use positive self-talk in class; 90% reported that positive self-talk improved their mathematics performance; and 90% reported better performance when self-talk was encouraged. Furthermore, 88% indicated that teachers helped them replace negative thoughts with positive ones, while 88% reported that self-talk helped shy students participate actively. Interview findings indicated improved confidence, reduced mathematics anxiety, greater persistence, and increased classroom participation. The study concludes that self-talk strategies positively influence students' perceived mathematics performance. It recommends integrating positive self-talk into mathematics instruction, strengthening teacher training, and providing targeted support for learners experiencing mathematics anxiety.

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INTRODUCTION

Mathematics performance is an important educational outcome because success in mathematics is associated with students' academic progression, problem-solving competence, participation, and broader educational achievement. The dissertation identifies mathematics anxiety (Ashcraft & Moore, 2009), fear of failure, negative beliefs about mathematical ability, and avoidance of difficult tasks as factors that can interfere with students' engagement and achievement. Psychological approaches that address students' thoughts, emotions, and behaviours therefore have potential value in mathematics education. Cognitive-behavioural strategies are particularly relevant because they seek to help learners recognize unhelpful thinking patterns and replace them with more constructive responses to academic challenges (D'Elia, 1998). The dissertation similarly argues that negative thoughts about mathematics may encourage avoidance and low persistence, whereas constructive cognitive strategies can promote active engagement with mathematical tasks. James and Williams (2020) further position cognitive-behavioural strategies as approaches for strengthening student confidence and addressing psychological barriers to learning.

The importance of psychological support for adolescent learning is also recognized within the broader educational and mental-health literature. The World Health Organization (2021) emphasizes the importance of promoting adolescent mental health within school environments (Spielberger, 1972), while cognitive-behavioural approaches have increasingly been applied to address anxiety, stress, negative beliefs, and maladaptive behaviours (Spielberger, 1972). In mathematics classrooms, self-talk represents a relatively accessible cognitive strategy through which learners can consciously replace discouraging thoughts with positive, realistic and task-focused statements. The dissertation conceptualizes self-talk as one of the central cognitive-behavioural strategies through which students can reduce anxiety, strengthen confidence, persist with challenging problems, and participate more actively in learning. This perspective is consistent with evidence that cognitive-behavioural interventions can address school-related anxiety and improve students' psychological functioning (Putwain & von der Embse, 2021).

The Tanzanian context provides a particularly relevant setting for examining self-talk because the dissertation identifies limited systematic use of cognitive-behavioural interventions in public secondary schools. Although national education policies emphasize holistic student development, guidance and counselling, and improved learning outcomes, the dissertation reports that structured strategies targeting mathematics anxiety and negative academic beliefs remain underutilized. In Dar es Salaam City Council, students face crowded classrooms, high academic expectations, and limited individualized psychological support, while self-talk, gradual exposure, and other cognitive-behavioural strategies are not consistently implemented. Consequently, there is a need for context-specific evidence concerning whether and how self-talk strategies influence students' mathematics performance. This study addresses that need by focusing specifically on the first objective of the wider dissertation: investigating the influence of self-talk strategies on students' mathematics performance in public secondary schools in Dar es Salaam City Council.

Literature Review

1. Theoretical Review

The study is primarily informed by Cognitive-Behavioural Theory, which emphasizes the interconnectedness of thoughts, emotions, and behaviours (Meichenbaum, 1977). Within educational settings, the theory assumes that students' interpretations of academic situations can influence their emotional responses and subsequent behaviour. A student who believes that he or she is incapable of solving mathematics problems may experience anxiety and subsequently avoid participation or difficult tasks. Conversely, changing such beliefs into realistic and constructive thoughts may reduce anxiety and encourage active engagement. The dissertation therefore applies the theory to mathematics learning by arguing that self-talk can help students identify and replace negative thinking patterns, thereby supporting more positive emotional and behavioural responses to mathematical tasks.

Social Cognitive Theory also provides an important explanation for the relationship between self-talk and mathematics performance. The dissertation's theoretical review emphasizes self-efficacy as a central mechanism (Bandura, 1997) through which students' beliefs about their capabilities influence persistence and learning behaviour. Students who believe that they can successfully perform mathematical tasks are more likely to continue working when difficulties arise. Positive self-talk can reinforce such beliefs by encouraging students to interpret difficulty as a challenge that can be managed rather than as evidence of inability. The dissertation specifically connects positive self-talk with confidence-building, goal setting, persistence, and active engagement in mathematics.

Cognitive-Behavioural Theory further provides a practical explanation of how self-talk can operate during actual mathematics lessons. Self-talk can function as an immediate cognitive-regulation strategy when a learner encounters a difficult equation, examination question, or public classroom task. Instead of responding with panic or statements (Beck & Clark, 1997) such as "I cannot do this," the learner can use constructive internal dialogue to break the task into manageable steps. The dissertation describes the theory as practical for school settings because teachers and counsellors can incorporate cognitive-behavioural techniques without necessarily requiring complex resources. However, it also recognizes that successful implementation requires appropriately trained teachers or counsellors and that individual-focused approaches may not fully address social, cultural, and resource-related factors affecting students.

2. Empirical Review

Research reviewed in the dissertation generally indicates a positive relationship (Dowker, Sarkar, & Looi, 2016) between constructive self-talk and students' confidence, persistence, engagement, and academic behaviour. Nguyen and Nguyen (2025), as discussed in the dissertation, found that learners taught positive self-talk persisted longer and maintained better focus during challenging tasks. The study recommended incorporating self-talk skills into school learning because positive self-talk combined with determination appeared to strengthen students' engagement and self-belief. Similarly, the dissertation reports findings from Syväoja et al. (2026), indicating that constructive internal dialogue helped secondary students manage difficult academic tasks, improve emotional control, and persist when faced

with challenges. These findings provide theoretical and empirical support for examining self-talk within mathematics classrooms.

Evidence from African and Tanzanian contexts further supports the importance of internal dialogue and confidence-building. The dissertation reports that Mbabazi et al. (2025), working with public secondary school learners in Uganda, found that more positive internal dialogue and self-instruction were associated with higher mathematics performance and classroom participation. The study recommended integrating reflective self-talk prompts and confidence-building activities into classroom teaching. In Tanzania, Seni (2026) is reported as having found that counselling strategies involving self-verbalization were associated with stronger student self-efficacy and academic engagement. The study recommended professional counselling support and regular guidance sessions through which students could practise positive self-talk and related confidence-building techniques.

Despite these findings, important gaps remain. Some previous studies have examined broad internal dialogue, self-efficacy, counselling, or psychological interventions rather than isolating structured self-talk strategies as a specific classroom practice. The dissertation notes that the study by Velandia et al. (2024), for example, connected negative automatic thoughts with lower levels of student performance but did not directly investigate specific self-talk interventions. Similarly, the Tanzanian study discussed by Seni (2026) combined self-verbalization with other counselling strategies, making it difficult to determine the independent contribution of self-talk. The present study therefore contributes context-specific evidence by examining teacher-guided positive self-talk, replacement of negative thoughts, encouragement of self-talk, and the participation of shy learners specifically within public secondary schools in Dar es Salaam City Council.

METHODOLOGY

The study employed a mixed-methods research approach, combining quantitative and qualitative methods (Creswell & Creswell, 2022) to obtain both numerical evidence and contextual explanations concerning self-talk and students' mathematics performance. The mixed approach was considered appropriate because questionnaires could provide measurable patterns of students' responses, while interviews could provide deeper explanations of how self-talk was implemented and how teachers and school leaders perceived its influence. The dissertation describes the study as an explanatory sequential mixed-methods study in which quantitative data were collected and analysed before qualitative information was used to provide additional explanation.

An explanatory sequential research design was used. The design involved a quantitative phase followed by a qualitative phase, with the quantitative findings informing the subsequent qualitative inquiry. The study was conducted in Dar es Salaam City Council, an urban educational setting selected because of its large public secondary-school population (Gough, 1954) and the educational challenges associated with resources, support services, and students' academic engagement. The target population comprised 22,116 students from selected public secondary schools (Carey, Hill, Devine, & Szücs, 2016). The sampling framework identified students, teachers, and heads of schools as relevant participants. The dissertation reports 100 students, 12 teachers, and 6 heads of schools as the actual respondent categories, giving 118 participants in the response-rate table. Students were selected through stratified

and simple random sampling (Richardson & Suinn, 1972), while heads of schools were selected purposively.

Data were collected using structured questionnaires and semi-structured interviews. The student questionnaire used five-point Likert-scale statements ranging from strongly agree to strongly disagree. The self-talk section included items concerning teacher guidance in positive self-talk, the influence of positive self-talk on mathematics performance, encouragement of self-talk, replacement of negative thoughts, and participation of shy students. Semi-structured interviews were used to obtain detailed information from teachers and heads of schools regarding the implementation and perceived effects of self-talk. The dissertation indicates that interviews were designed to complement questionnaire findings by allowing probing and collection of more nuanced information. Data collection followed institutional and administrative authorization. The researcher obtained permission from the relevant university and government education authorities, met education officers and heads of schools, explained the purpose of the study, arranged appointments, distributed questionnaires, and conducted interviews.

Quantitative data were entered and analysed using SPSS Version 26 (Wu, Cieslik, Askari, Hadwin, & Hood, 2024). Descriptive statistics, particularly frequencies and percentages, were used to summarize students' responses to the self-talk statements. The wider dissertation also indicates the use of inferential statistics for the overall study, although the present article focuses on the objective-specific descriptive results and qualitative evidence rather than introducing inferential statistics not reported specifically for this objective. Qualitative interview data were analysed thematically through familiarization, coding, grouping of similar codes, development and refinement of themes, and narrative presentation. Validity was strengthened through review by supervisors, research experts, lecturers, research personnel, and peers, focusing on face and content validity (Novotny, 2014). The instruments were piloted with one head of school and eight teachers in a public secondary school that was excluded from the main study. Reliability was addressed through test-retest procedures, while qualitative trustworthiness was addressed through credibility, dependability, transferability, and confirmability. Ethical considerations included obtaining institutional and administrative permission, informing participants about the study, ensuring voluntary participation, protecting confidentiality and anonymity, respecting participants' dignity and cultural sensitivities, and obtaining ethical clearance.

FINDINGS AND DISCUSSION

The findings for Objective One demonstrate a consistently positive perception of self-talk as a strategy for strengthening students' mathematics performance. Quantitative data were obtained from 100 students, and the five self-talk statements all produced strong levels of agreement. Overall, the results indicate that students recognized self-talk not merely as a motivational practice but as a strategy associated with confidence, persistence, reduced anxiety, improved classroom participation, and better perceived mathematics performance.

First, 90 students (90.0%) agreed or strongly agreed that teachers guided students to use positive self-talk in class. Specifically, 48 students (48.0%) strongly agreed and 42 (42.0%) agreed, while only 6 (6.0%) were neutral, 3 (3.0%) disagreed, and 1 (1.0%) strongly disagreed. This suggests that teacher-guided self-talk was sufficiently visible to students to be recognized

as a classroom practice. Interview evidence reinforced this result. One mathematics teacher explained that when students froze while working on problems, the teacher encouraged them to tell themselves that they could work through the problem step by step. The teacher observed that repeated use of this approach reduced fear and changed students' classroom participation. The finding is consistent with the cognitive perspective underlying the study because students are encouraged to actively reinterpret their own thinking rather than passively accept negative beliefs about their mathematical ability. It also agrees with the dissertation's review of Nguyen and Nguyen (2025), which associates positive internal dialogue with greater willingness to engage with difficult tasks.

Second, 90 students (90.0%) agreed or strongly agreed that positive self-talk improved their performance during mathematics lessons. Half of the students, 50 (50.0%), strongly agreed and 40 (40.0%) agreed. Only 5 (5.0%) were neutral, 3 (3.0%) disagreed, and 2 (2.0%) strongly disagreed. This result indicates that students perceived a direct connection between their internal dialogue and their ability to complete mathematics tasks. Head Teacher A similarly observed that students who had learned to talk themselves through difficult problems calmly tended to persist and make fewer errors, whereas students who engaged in negative self-talk were more likely to give up. The finding is consistent with the dissertation's theoretical interpretation of self-talk as a cognitive-regulation mechanism. It also corresponds with the reviewed evidence from Syväoja et al. (2026), which associated constructive internal dialogue with better stress management, focus, and persistence during challenging academic activities.

Third, 90 students (90.0%) agreed or strongly agreed that they performed better in mathematics when self-talk was encouraged. Forty-six students (46.0%) strongly agreed and 44 (44.0%) agreed, compared with 6 (6.0%) who were neutral, 3 (3.0%) who disagreed, and 1 (1.0%) who strongly disagreed. Interview evidence indicated that encouragement of self-talk could contribute to a classroom atmosphere in which mistakes were viewed as part of learning rather than as evidence of failure. This is important because mathematics anxiety can be reinforced when students interpret mistakes as confirmation that they lack ability. Positive self-talk may interrupt this cycle by changing the meaning students attach to difficulty. The result is also consistent with the dissertation's discussion of Seni (2026), which associates repeated positive messages with stronger beliefs in mathematical ability and greater engagement.

Fourth, 88 students (88.0%) agreed or strongly agreed that teachers reminded them to replace negative thoughts with positive ones. Forty-seven students (47.0%) strongly agreed and 41 (41.0%) agreed; 7 (7.0%) were neutral, 3 (3.0%) disagreed, and 2 (2.0%) strongly disagreed. This result is particularly important from a cognitive-behavioural perspective because it represents a practical form of cognitive restructuring. Mathematics Teacher B explained that some students entered mathematics lessons already believing that they were "not good at mathematics." The teacher deliberately challenged this belief by encouraging students to understand difficulty as part of the learning process rather than evidence of inability. The finding corresponds with the dissertation's review of Velandia et al. (2024), which links negative automatic thoughts with poorer learning-related outcomes and recommends cognitive strategies that replace negative self-statements with more constructive alternatives.

Fifth, 88 students (88.0%) agreed or strongly agreed that self-talk strategies helped shy students participate actively during mathematics lessons. Forty-five students (45.0%) strongly agreed and 43 (43.0%) agreed, while 8 (8.0%) were neutral, 3 (3.0%) disagreed, and 1 (1.0%)

strongly disagreed. Head Teacher C reported that shy students appeared to benefit particularly from self-talk because reassuring themselves before answering questions or working on the board helped some of them participate for the first time. This suggests that the value of self-talk may extend beyond academic task completion to classroom participation. The result is consistent with the dissertation's discussion of Mbabazi et al. (2025), which links positive internal dialogue with self-belief and classroom participation.

The qualitative findings further identified three interconnected themes: development of confidence and reduced mathematics anxiety, enhancement of self-efficacy and persistence, and improved participation among reserved learners. Teachers reported that structured self-talk could help students remain calm when confronted with difficult equations and approach problems more rationally. One teacher described students learning to pause, breathe, and remind themselves that they could attempt a problem step by step, with perceived improvements in test performance. Teachers also described self-talk as supporting persistence because students were encouraged to interpret difficulty as temporary rather than as proof of inability.

Taken together, the quantitative and qualitative findings provide convergent evidence that self-talk was perceived positively by students and educators. The five questionnaire items produced agreement levels ranging from 88% to 90%, while interviews explained how self-talk was believed to operate through anxiety reduction, confidence-building, persistence, and participation. The findings therefore support the study's theoretical proposition that changing negative thought patterns can influence emotional responses and learning behaviours. At the same time, the findings should be interpreted carefully: the objective-specific questionnaire evidence primarily represents respondents' perceptions of the influence of self-talk rather than an experimental measurement of causal improvement in mathematics test scores. The dissertation itself notes that its cross-sectional nature limits observation of long-term effects.

CONCLUSION AND RECOMMENDATIONS

The study concludes that self-talk strategies have a strong positive perceived influence on students' mathematics performance in public secondary schools in Dar es Salaam City Council. The evidence indicates that positive self-talk, teacher encouragement, replacement of negative thoughts, and structured internal dialogue can contribute to greater confidence, reduced mathematics anxiety, persistence with difficult mathematical tasks, and increased participation, particularly among shy and low-confidence students. The consistency between the questionnaire responses and interview evidence strengthens the conclusion that self-talk is a useful and relatively practical cognitive-behavioural strategy for mathematics education. However, the findings should be understood primarily as evidence of perceived influence and observed classroom changes rather than definitive experimental evidence of causality.

The Ministry responsible for education should support the integration of basic cognitive-behavioural and self-talk techniques into teacher professional development and guidance and counselling programmes. Teacher education programmes should equip mathematics teachers with practical techniques for identifying negative mathematical beliefs, modelling constructive self-talk, and helping students replace discouraging thoughts with realistic and task-focused statements. At school level, heads of schools should encourage mathematics departments to incorporate brief self-talk prompts into ordinary lesson activities,

particularly before challenging exercises, tests, presentations, and problem-solving tasks. Schools should also strengthen guidance and counselling services so that students experiencing persistent mathematics anxiety can receive appropriate support. Special attention should be given to shy and low-confidence learners because the findings indicate that self-talk can help reduce participation barriers. Finally, future research should employ longitudinal or experimental designs and direct mathematics achievement measures to determine the extent to which self-talk causes improvements in mathematics performance over time.

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