

## Students' perceptions of mathematics teacher support on assigned homework during school breaks

Florence Kyaruzi, Innocent B. Rugambuka

Department of Educational Psychology and Curriculum Studies, Faculty of Education, University of Dar es Salaam, Dar es Salaam, Tanzania

### Article Info

#### Article history:

Received Aug 1, 2024

Revised Jan 14, 2025

Accepted Mar 19, 2025

#### Keywords:

Feedback quality  
Home-based learning  
Self-efficacy  
Student perceptions  
Teacher support

### ABSTRACT

Homework is a crucial formative assessment tool that helps to keep students engaged on tasks beyond school hours. This study investigated students' perceptions of teacher support on homework tasks during school breaks. Specifically, it focused on how students perceived the mathematics teachers' support in terms of task quality, feedback quality, and promoting mathematics autonomy. The study also focused on how these perceptions varied by gender and school ownership type, and how they related to students' self-efficacy in mathematics. It was carried out in Dar es Salaam, Tanzania, and involved a random sample of 579 students from six primary schools. Previously validated questionnaire scales were adapted for data collection. The data were analysed by using descriptive statistics, latent mean analyses, and structural equation modelling techniques. Results from the descriptive statistics indicated that students positively evaluated teacher support in homework. Besides, student perceptions did not significantly differ across genders but differed between school ownership. The findings indicate a significant relationship between students' perceptions of teacher support and their mathematics self-efficacy. The findings call for the effective utilisation of homework to augment classroom instructions.

This is an open access article under the [CC BY-SA](#) license.



### Corresponding Author:

Florence Kyaruzi  
Department of Educational Psychology and Curriculum Studies, Faculty of Education  
University of Dar es Salaam  
P. O. Box 2329, Dar es Salaam, Tanzania  
Email: sakyaruzi@gmail.com

## 1. INTRODUCTION

Homework serves as a critical element for reinforcing classroom learning, self-directed learning and students' academic progress particularly in mathematics [1]. Recent research shows the significance of teacher support in influencing student learning [2], highlighting that effective feedback and guidance improve learning [3], [4]. Despite this significance, there is a dearth of research on how teacher support impacts students' engagement in homework during school break periods when students and teachers are separated from face-to-face instructional support [5]. While the status remains so, school breaks are a common practice in education systems, but they do not mean a break from studying and learning. Research indicates that breaks can negatively affect student learning often forcing teachers to reteach students upon resuming school [6]. To overcome the school break effects, some countries develop programmes to maintain student learning, especially during long school breaks [7]. Further, research indicates that upholding academic engagement during such breaks can pose challenges, hence making the perception of students on teacher support during these times crucial [8]. This study attempts to bridge the mentioned gap by examining students' perceptions of mathematics teacher support on homework during school breaks focusing on the Tanzanian context.

Like any other country, Tanzania embeds school breaks within its education system to keep students studying in such circumstances. Notably, Tanzania's education system operates on two parallel structures which integrate national examinations at the end of every educational cycle. The 2-7-4-2-3+ structure (phasing-out) includes kindergarten (2 years), primary education (7 years), ordinary level secondary (4 years), and advanced secondary and tertiary education (a minimum of 3 years). A new structure, 1-6-4-2/3-3+ includes 1 year of kindergarten, 6 years of primary education, 4 years of O-level, 2 years of A-level or 3 years of vocational training (VT), and at least 3 years of tertiary education. In primary schools, students are required to take the Standard (STD) IV national assessment to be promoted to STD V. In STD VII or VI, they sit for the primary school leaving examination (PSLE) to qualify for O-level which marks the end of the compulsory education school cycle. During school breaks, an emphasis is usually placed on examination classes through home-based learning initiatives via online platforms or homework tasks in hard copy prints to keep students learning. Analysis of students' performance indicates that for the past decade (2012-2022), more than half of primary school students failed their mathematics examination in PSLE [9]. This backdrop creates a need for examining teacher support on mathematics homework tasks during school breaks as perceived by students.

– Students' perceptions of teacher support in homework tasks

Despite the perceived benefits of homework, the practice raises concerns among educational stakeholders particularly regarding its success. The success of homework depends not only on its implementation but also on meeting students' cognitive, affective and motivational requirements in the home-based learning modality [10]. In particular, the quality of homework tasks needs to be upheld to promote learning because students engage with such tasks under minimal supervision at home. In addition, the uptake of homework tasks depends on students' intrinsic motivation, autonomy support towards self-regulated learning, and teachers' ability to provide distant feedback [11], [12]. The teacher's involvement in homework includes preparing high-quality tasks, giving quality feedback, and preparing homework tasks that promote students' autonomy [13]. When students lack regular teachers' feedback, they can rarely maintain optimal learning levels to develop new skills and knowledge through self-regulated learning [14], [15]. Homework tasks should also foster a sense of relatedness by ensuring students have access to adequate support from their home environment and prioritise possible connections at home to avoid feelings of learning loneliness and isolation [16]. Generally, given the context of school breaks, students' self-efficacy would matter a lot for their successful engagement with homework tasks.

Conceptually, homework tasks are attributed to assessment for learning (AfL), which involves teachers and students adapting their teaching and learning strategies to improve learning [17], [18]. This study considers homework tasks as part of homeschooling that attract parental support in fostering students' regular study habits. The homework tasks could serve as a formative assessment when associated with effective feedback. Predominantly, homework tasks are conceptualised based on AfL processes: establishing where the learners are in their learning, where they are going, and what needs to be done to get them there [18]. Unlike conventional learning environments where the learner interacts with peers and teachers, homework tasks involve interactions with parents and relatives who may lack pedagogical competences thus making high-quality tasks vital.

– Gender differences in student practices of homework tasks

Although homework tasks have been commended as a source of students' learning [9], empirical evidence shows that boys often have more time for them than girls, who are usually occupied with domestic duties [19]. This situation is rooted in the social norms in some societies that have unfortunately positioned girls as secondary to boys, even in educational matters [20]. As such, girls are underprivileged by insufficient time to deal with school assignments and are overwhelmed by domestic tasks compared to boys. Boys are privileged by social norms and they are more likely to succeed in mathematics compared to girls [21]. The cultural norms have created a gap between girls and boys in various educational aspects regarding enrollment, retention, and school performance [21]. Nevertheless, previous studies on student homework show that boys spend less time doing homework despite having more time available, as they spend less time on domestic responsibilities [20]. At the same time, Feng *et al.* [11] suggest no gender-significant differences in time spent on homework. Despite the commendable benefits, there is a scanty of empirical studies investigating student perceptions of teacher support on homework tasks during school breaks.

Research questions: the current study examines students' perceptions of teacher support on homework tasks during school breaks and its relationship to self-efficacy in mathematics. In particular, the study focuses on answering the following questions:

- What are the students' perceptions of teacher support on assigned homework regarding task quality, feedback quality and autonomy support?
- Do student perceptions of teacher support on homework tasks differ by gender and type of school ownership?
- How does students' perception of teacher support on mathematics homework tasks relate to their self-efficacy in mathematics?

## 2. METHOD

The study employed a cross-sectional survey to examine students' perceptions of teacher support on homework tasks. It was carried out in the Dar es Salaam region and involved a random sample of 579 students from six primary schools. Schools were purposefully sampled based on the criteria of homework practice during school breaks. The Dar es Salaam region was purposively sampled because it has many primary schools with students who practise homework tasks. The study involved 579 students, of whom 338 were STD V and 241 were in STD VII. Students in specified classes were purposefully sampled because STD V students had sat for the STD IV national examination after school break, and STD VII students were expected to sit for the PSLE. The researchers administered questionnaires face-to-face within three weeks after the school break. The study was permitted with research clearance from the University of Dar es Salaam and other relevant regional and district authorities. Besides, its purpose was communicated to students, and their participation was through informed consent. The study involved a relatively equal number of girls and boys from government and non-government schools as presented in Table 1.

Table 1. Participants' demographic characteristics

Demographics		Girls	Boys	Total
School ownership	Government	152 (51.7%)	145 (50.9%)	297 (51.3%)
	Non-government	142 (48.3%)	140 (49.1%)	282 (48.7%)
Class level	Grade V	170 (57.8%)	168 (59.2%)	338 (58.5%)
	Grade VII	124 (42.2%)	111 (40.8%)	241 (41.5%)
School type (residence)	Boarding	44 (15%)	41 (14.4%)	85 (14.7%)
	Day	250 (85%)	243 (85.6%)	493 (85.3%)
Mean age	Grade V	10.49 (.90)	10.66 (.90)	10.57 (.90)
	Grade VII	12.53 (.69)	12.69 (.78)	12.74 (.77)

### 2.1. Instruments

The teacher homework involvement scale (THIS) was used to assess students' perceptions of teacher support on homework tasks [13]. The scale comprised twelve items consisting of three sub-scales: homework quality, feedback quality, and autonomy support. In addition, four items were adapted from the mathematics self-efficacy scale to measure students' mathematics self-efficacy [22]. The self-efficacy scale was adopted to specify self-efficacy in doing mathematics homework. Since the adopted questionnaires had varied rating scales, the initial four points were changed to a five-point scale (strongly disagree, disagree, somewhat disagree, agree, and strongly agree) to increase the variability of the responses. See Table 2 for the item wording. Table 3 summarises the questionnaire sub-scales, sample items and Cronbach's  $\alpha$  from the original and present study.

Table 2. Final questionnaire items

Code	Statement
THIS_1	"Our Mathematics teacher knows what homework to give us so that we understand the material covered in the lesson."
THIS_2	"Our Mathematics homework assignments help us understand our lessons."
THIS_3	"Our Mathematics teacher almost always chooses homework assignments well."
THIS_4	"Our Mathematics homework assignments are always well integrated into the lessons."
THIS_5	"The performance feedback I receive from my Mathematics teacher is helpful."
THIS_6	"I value the feedback I receive from my Mathematics teacher."
THIS_7	"The feedback I receive from my Mathematics teacher helps me do my work."
THIS_9	"My Mathematics teacher encourages me to ask questions about homework assignments."
THIS_10	"My Mathematics teacher listens to my ideas about homework assignments."
THIS_11	"My Mathematics teacher listens to how I would like to do homework assignments."
THIS_12	"My Mathematics teacher has confidence in my ability to do homework assignments."
SSE_1	"I am sure I can understand even the most difficult questions in my Mathematics homework."
SSE_2	"I am convinced that I can understand even the most difficult questions in my Mathematics homework."
SSE_3	"I am convinced that I can achieve good results in mathematics homework."
SSE_4	"I know exactly what to do at home to understand the mathematics homework."

Table 3. Scales, sample items and estimates of reliability

Scale	k	Sample item	Study Cronbach's $\alpha$	
			Original	Current
Homework quality	4	"My maths homework assignments help us to understand our lessons."	.87	.70
Feedback quality	4	"The feedback I receive from my math teacher helps me do my work."	.88	.73
Autonomy support	4	"My maths teacher listens to how I would like to do homework assignments."	.85	.74
Self-efficacy	4	"I am sure I can understand even the most difficult questions in my mathematics homework."	.72	.73

Note: k=number of items per scale

## 2.2. Data analysis

Before analysing the data, seven respondents with missing values beyond 10% were removed resulting in a sample of 579 respondents as presented in Table 1. The missing data were minimal due to the face-to-face administration of the questionnaire which offered a clarification opportunity to respondents when needed. As confirmed by Little's missing completely at random (MCAR) test, which yielded no significant results ( $\chi^2(7451)=8593.19$ ,  $p>0.05$ ), the data were missing at random [18]. For that reason, the expectation maximisation (EM) method was used to impute the data that remained missing [23], [24]. The analysis was carried out by using SPSS version 24 and Mplus version 7.31 software for descriptive and inferential statistics respectively. In particular, the latent mean analysis (LMA) was estimated in Mplus to establish the differences in scale means across gender and school ownership. The LMA is recognised for its strength in responding to bias and measurement errors than conventional techniques like t-tests [25]. Furthermore, the structural equation model (SEM) was applied to establish the relationship between students perceived teacher support and self-efficacy.

## 2.3. Measurement models

The teacher homework involvement model was assessed in two iterations, with subsequent improvements made after each cycle. The model fit was evaluated using multiple indicators, with a good fit determined by a combination of the following criteria: a root mean squared error of approximation (RMSEA) and standardized root mean residual (SRMR) less than 0.05, comparative fit index (CFI) and gamma hat values greater than 0.95 [26]. At the same time, the model is considered to have an acceptable fit when the RMSEA and SRMR are less than .08, and the CFI and Gamma hat scores surpass 0.90 [26]. Besides, an acceptable fit is suggested when RMSEA and SRMR are less than 0.08, and CFI and Gamma hat values surpass 0.90 [26]. The initial 12-item structural model demonstrated moderate to good fit indices (CFI=0.925, Gamma hat=0.968, SRMR=0.0470, RMSEA=0.062 [90% CI=0.051, 0.072]).

Based on the modification indices, items THIS8 "*My math teacher consistently provides me with useful information about my homework performance*" and THIS3 "*Our math teacher almost always chooses homework assignments well*" had high modification indices implying that the two items had either similar implied meanings or were perceived wrongly. In the context of school breaks, homework quality (THIS3) and its corresponding feedback (THIS8) were issued online or through the assigned homework with less interaction than they used to be when teachers gave feedback in an asynchronous form. This scenario might be attributed to students' failure to notice the differences between the two items. As a result, item THIS8 was excluded based on modification indices and an analysis of its contextual meaning, leading to an improved model fit with good fit indices (CFI=0.966, Gamma hat=0.986, SRMR=0.0366, RMSEA=0.044 [90% CI=0.031, 0.057]). Likewise, a one-factor model for mathematics self-efficacy was estimated, and its model had good fit indices (CFI=0.966, Gamma hat=0.986, SRMR=0.0123, RMSEA=0.000 [90% CI=0.000, 0.076]).

## 2.4. Measurement invariances and latent means

The measurement invariance tests were carried out to elicit evidence for comparing scales across school ownership (private and government) and gender (girls and boys) based on the fact that measurement invariance helps to assess the similarity across groups [27]. Principally, measurement invariance is demonstrated if the difference in  $\chi^2$ , after accounting for the change in degrees of freedom (df), is not statistically significant ( $p>0.05$ ), and the change in the comparative fit index ( $\Delta CFI$ ) is 0.01 or less. Millsap and Olivera-Aguilar [25] have indicated that invariance is estimated using a combination of indicators based on critical values such as: -0.01  $\Delta CFI$  and  $\Delta$ Gamma hat for metric and scalar invariance and 0.015 for strict invariance, 0.015  $\Delta$ RMSEA for metric and scalar invariance, 0.030  $\Delta$ SRMR for metric invariance and 0.015 SRMR for scalar invariance. Due to the time interval between data collection and the school break, the students' starting values or intercepts may have changed and thus the configural (i.e., the same configuration of items and factors) and metric (i.e., equivalent regressions from factors to items) invariances were sufficient to compare mean scores [27] as indicated in Table 4.

After demonstrating evidence for measurement invariance, LMA was used to assess the differences in scale means across school ownership and gender. LMA evaluates the differences in a latent scale mean relative to the reference group which is set to zero. Accordingly, the LMA has a strong framework to account for response bias, and random and non-random measurement errors [25]. For that reason, the LMA was carried out in Mplus version 7.31 using strong maximum likelihood (MLR) estimation, which is credited as an effective estimator [28]. In LMA, the mean of a latent factor is determined, and differences between other groups with a similar latent factor are estimated as z-scores relative to the reference group. The statistical significance of the differences in latent means was determined by using the Wald  $\chi^2$  test.

Table 4. Measurement invariances across gender and school ownership

Models	$\chi^2(df)$	$\Gamma$	CFI	SRMR	RMSEA (90% CI)	$\Delta\chi^2(\Delta df)$	$\Delta\gamma$	$\Delta CFI$	$\Delta SRMR$	$\Delta RMSEA$
Invariances across gender (girls vs. boys)										
Configural	135.530 (82)	.983	.962	.0471	.034 (.023, .043)	—	—	—	—	—
Metric	141.952 (90)	.984	.963	.0534	.032 (.021, .041)	6.422 (8)	.001	.001	.006	-.020
Scalar	152.271 (96)	.982	.960	.0593	.032 (.022, .041)	10.319 (6)	<.001	<.001	.006	.000
Residual	222.480 (107)	.965	.917	.0758	.043 (.035, .051)	70.209 (11)	-.017	-.043	.017	.011
Invariances across school ownership (government vs. private)										
Configural	149.436 (82)	.979	.951	.0471	.038 (.028, .047)	—	—	—	—	—
Metric	159.403 (90)	.978	.950	.0518	.037 (.027, .046)	9.967 (8)	.001	<.001	.005	-.010
Scalar	176.860 (96)	.975	.942	.0556	.038 (.029, .047)	17.457 (6)	-.003	<.001	.004	.010
Residual	246.914 (107)	.930	.827	.0612	.062 (.053, .075)	70.054 (11)	-.045	-.115	.006	.024

Note:  $\Gamma$ =Gamma hat, CI=confidence interval, CFI=comparative fit index, RMSEA=root mean squared error of approximation, SRMR=standardized root mean residual, and df=degree of freedom.

### 3. RESULTS AND DISCUSSION

#### 3.1. Students' perceptions of teacher support on homework tasks

The first research question investigated students' perception of teacher support on homework tasks concerning homework task quality, autonomy support, and feedback quality. Findings indicated that students perceived positively teacher support on homework tasks. In particular, students thought that the homework had high quality ( $M=4.68$ ,  $SD=0.42$ ) enabling them to understand the content covered in the mathematics lesson. Students also valued teacher feedback ( $M=4.62$ ,  $SD=0.46$ ) on the homework tasks that helped them to understand the subject. However, since the tasks were home-based, students reported relatively less autonomy ( $M=4.25$ ,  $SD=0.72$ ) in deciding how to do their homework tasks. Besides, students had a higher positive perception of the quality of homework tasks and lower autonomy support.

The findings regarding aspects of teacher support in homework indicate that students were less autonomous in deciding how to do their homework, implying that students would display low motivation towards the homework activities. Hagger *et al.* [29] indicated that perceived autonomy support could promote students' academic behaviours in the classroom and outside school contexts. Similarly, Feng *et al.* [11] insisted that autonomy support provided by teachers is essential in meeting students' basic psychological needs, which subsequently boosts their homework effort. Thus, teachers need to focus on creating a more motivating environment for learning which concurs with Black and Wiliam [17], who pointed out that teachers' role in assessment is to create the conditions where opportunities for learning and the development of learning autonomy are maximized. The findings call for improved student autonomy support in homework activities. As teachers designed tasks that students solely attempt without direct teacher support, this might have attracted low student autonomy. Tam and Chan [30] also insist that it is essential for teachers to explain the purpose of tasks to learners to instil positive homework attitudes.

#### 3.2. Student perceptions of teacher support by gender and type of school ownership

The second question aimed to determine whether student perceptions of teacher support on homework tasks varied across gender and school ownership or not. Consequently, the LMA was estimated in two phases; first, LMA for gender had a good model with  $CFI=0.969$ ,  $RMSEA=0.030$  (0.006, 0.045) and  $SRMR=0.064$ , while LMA for school ownership had a good model with  $CFI=0.994$ ,  $RMSEA=0.014$  (0.000, 0.035) and  $SRMR=0.055$ . The findings indicated no statistically significant difference across gender, implying that boys and girls had relatively similar positive perceptions of teacher support on homework tasks. Besides, the analysis showed statistically significant differences in student perceptions of teacher autonomy in homework tasks across school ownership, as summarised in Table 5.

Table 5. Student perceptions of teacher support on homework tasks by gender and school ownership

Scales	Manifest means ( <i>SD</i> )				Latent means ( <i>z-value</i> )			
	Gender		School ownership		Gender		School ownership	
	Girls	Boys	Government	Private	Girls	Boys	Government	Private
Homework quality	4.66 (.43)	4.70 (.41)	4.70 (.42)	4.65 (.42)	—	.137	—	-.180
Feedback quality	4.63 (.47)	4.69 (.44)	4.70 (.44)	4.62 (.48)	—	.132	—	-.212
Autonomy support	4.24 (.71)	4.27 (.73)	4.41 (.61)	4.09 (.80)	—	.062	—	-.641**

Note: \*\* $p<0.05$  for Wald  $\chi^2$  test

Table 5 indicates a statistically significant difference in students' perceptions of teacher support between government and non-government schools. Specifically, students in government schools had a higher positive perception than non-government schools regarding homework quality, feedback quality, and autonomy support.

However, the differences were only statistically significant in perceived teacher autonomy support. The findings suggest that students in government schools felt that homework tasks were an additional learning opportunity compared to everyday practice, while students in non-government schools expressed lower satisfaction with teacher support for homework tasks during school breaks. Regarding perceived autonomy support, the observed differences were close to a moderate effect, implying that students in government schools autonomously engaged more with homework tasks than students in non-government schools.

The findings showed that gender did not significantly affect how students perceived teachers' support for homework tasks. In other words, boys and girls were similarly optimistic and likely to benefit concurrently from the perceived teachers' support. This proposition is contrary to a study by Xu [13] which indicates that female students (compared to males) tend to display a more positive homework attitude and thus exhibit greater vigour in attempting the related tasks. The difference between the current and previous studies' findings may be attributed to contextual disparity in teacher-learner proximity. While the present study involved students who received teacher support at a distance during school break, the previous studies involved students in a face-to-face learning modality.

Meanwhile, the data regarding how students perceived teacher support based on school ownership showed a statistically significant difference in favour of government-owned schools. Such findings suggest that students in government schools felt that homework tasks are a valuable additional opportunity for learning compared to the common practice. The findings corroborate previous studies indicating that students in Tanzanian government primary schools are rarely given homework to support their learning [31]. Notably, homework is increasingly viewed as a formative assessment practice that should promote student learning [12]. Nevertheless, the large class size discourages teachers from providing homework because the chance to give meaningful feedback on homework tasks is limited in such situations [31].

Furthermore, students in non-government schools expressed less satisfaction with teacher support on homework tasks during school breaks, which could justify that these schools have a built-in academic system where homework is part of their culture, unlike government schools [31]. Besides, homework tasks in non-government schools seem relatively common practice where teachers involve students in designing instructional-based homework and provide daily feedback. Regarding autonomy support, the observed differences were close to a moderate effect, meaning that students in government schools autonomously engaged with homework tasks compared to private schools. The findings correspond with Paul [31] that students in government schools in Tanzania approach learning tasks independently compared to ones in private schools.

### 3.3. Relationship between perceived teacher support and self-efficacy in mathematics homework tasks

The structural equation model linking the constructs on perceived teacher homework support and students' self-efficacy in mathematics was estimated. The model had good fit indices (CFI=0.925, Gamma hat=0.972, SRMR=0.0524, RMSEA=0.051 [90% CI=0.042, 0.060]). The findings in Figure 1 indicate a strong relationship between students' perception of autonomy support, feedback quality, and the quality of homework. On the other hand, the relationship between the factors for teacher homework support and students' self-efficacy in mathematics had the following findings. Students perceived homework autonomy support was highly related to students' self-efficacy in mathematics ( $r=0.51$ ), and students' mathematics self-efficacy was moderately associated with the perceived feedback quality ( $r=0.48$ ) and the perceived quality of homework ( $r=0.42$ ). In other words, when students perceive that mathematics teachers prepare quality homework tasks and provide feedback that helps them improve their work, their self-efficacy in mathematics improves. The role of teacher support is widely recognised in setting homework objectives, designing tasks, and providing feedback on homework tasks [13], [32]. While previous studies have documented the positive role of student homework perceptions on actual practices [33], [34], the present study shows that students' self-efficacy in homework explains their judgment on the quality of homework and the associated teacher feedback. In particular, students' intentions and reasons for doing homework influence how they engage in homework practices. Xu *et al.* [32] indicate that students' self-efficacy in homework was strongly related to their perceived autonomy, implying that students' engagement in homework is greatly influenced by their motivation to acquire competence.

The study emphasises the crucial association between students' perceived teacher support in homework and self-efficacy in mathematics. Thus, students with higher mathematics self-efficacy are more likely to perceive homework as valuable and appreciate the feedback provided by the teachers. Conversely, if teachers prepare quality homework and provide quality feedback, students can solve even challenging homework assignments because quality homework with associated feedback promotes students' autonomy, contributing to improved mathematics self-efficacy. The findings support Kyaruzi [35], who noted that students' mathematics self-efficacy was highly related to the perceived use of teacher feedback which jointly predicted students' mathematics performance. The relationship between students' perceived teacher support in homework and self-efficacy in mathematics homework invites further studies to infer a causal relationship between the variables.

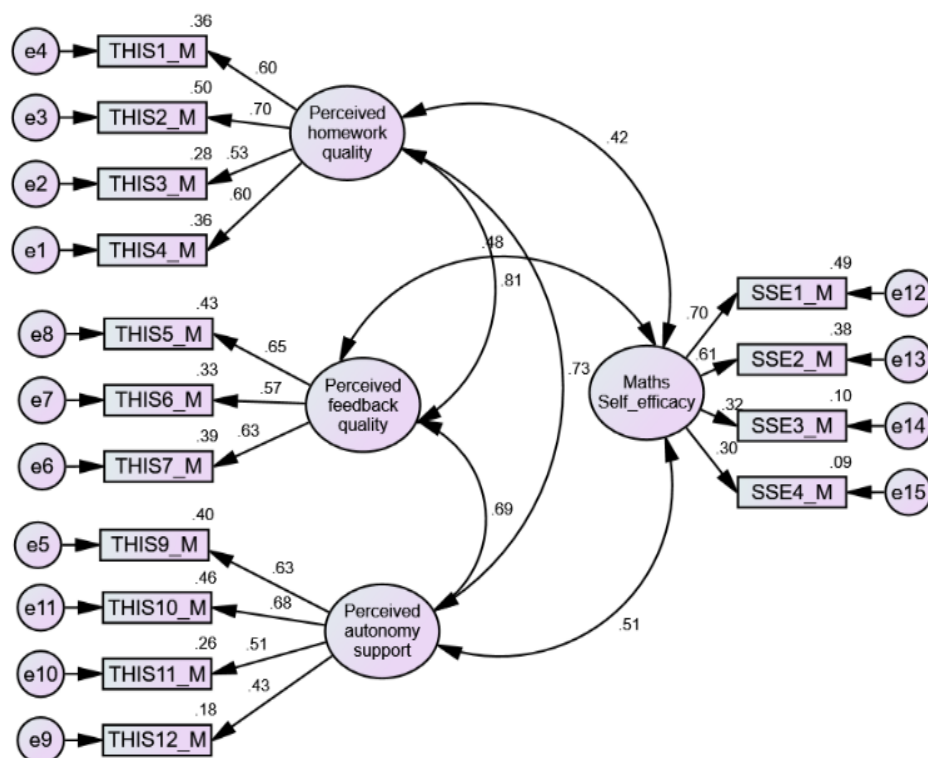


Figure 1. Structural model illustrating the relationship between student perceptions of teacher homework support and mathematics self-efficacy

#### 4. CONCLUSION

The findings indicate that students positively perceived that their teachers prepared high-quality homework tasks, which promoted their learning during school breaks. Furthermore, the findings indicate that boys and girls had relatively similar perceptions of teacher support in homework tasks. Moreover, the findings suggest that students in government schools benefited more from teacher support than their counterparts in non-government schools. Additionally, students' perception of teacher support was positively related to their self-efficacy in mathematics homework, particularly perceived autonomy support. Several implications emerge from the study. First, given that students positively perceived homework tasks during school breaks, teachers could integrate it into teaching and learning to complement classroom instructional practices. Second, the findings signal that homework tasks could be considered an equally valuable learning opportunity for students in public and private schools by addressing the observed disparity. Thirdly, the observed significant association between self-efficacy and perceived teacher support suggests that homework tasks could promote students' improved learning if effectively used.

Nonetheless, the findings of this study should be interpreted in light of the following limitations. First, we mainly used self-report cross-sectional data from student questionnaires that could be limited in scope. Hence, further studies could complement our findings with robust longitudinal and observational methods to draw strong causal-effect relationships. Second, the study assessed students' experience of teacher support during school breaks, which could be relatively different if the same study were conducted during the normal school calendar. Nevertheless, the applied sophisticated analysis methods guarantee the validity of the study findings.

#### ACKNOWLEDGEMENTS

The authors are grateful to all participants who participated in this study. Also, the authors are thankful to Dr. Kondrada Haule for the constructive feedback on this project at various stages.

#### FUNDING INFORMATION

The authors express sincere gratitude to the University of Dar es Salaam for the competitive research grant through contract No. DUCE-20125, 2020/2021.

## AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Florence Kyaruzi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Innocent B. Rugambuka	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓

C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

## CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

## INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

## ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the University of Dar es Salaam review board.

## DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author [FK]. The data, which contain information that could compromise the privacy of research participants, are not publicly available due to certain restrictions.

## REFERENCES




- [1] W. C. Brandt and W. Lorie, "Measuring student success skills: a review of the literature on analytical thinking," National Center for the Improvement of Educational Assessment, 2024.
- [2] C R, S. Kumar, "A study on attitude towards homework among secondary level students," *International Journal of Enhanced Research in Educational Development*, vol. 11, no. 4, pp. 2320–8708, 2023, doi: 10.55948/IERED.2023.0718.
- [3] M. Finch, "Context and cognitive levels of teachers' written feedback: probing Hattie and Timperley's (2007) model in action in feedback for writing," *English in Australia*, vol. 56, no. 3, pp. 47–58, 2021.
- [4] G. Ozyildirim, "Time spent on homework and academic achievement: a meta-analysis study related to results of TIMSS," *Psicologia Educativa*, vol. 28, no. 1, pp. 13–21, 2022, doi: 10.5093/psed2021a30.
- [5] S. Rodríguez, I. Piñeiro, B. Regueiro, and I. Estévez, "Intrinsic motivation and perceived utility as predictors of student homework engagement," *Revista de Psicodidactica*, vol. 25, no. 2, pp. 93–99, 2020, doi: 10.1016/j.psicod.2019.11.001.
- [6] M. F. Mavilidi, R. Drew, P. J. Morgan, D. R. Lubans, M. Schmidt, and N. Riley, "Effects of different types of classroom physical activity breaks on children's on-task behaviour, academic achievement and cognition," *Acta Paediatrica, International Journal of Paediatrics*, vol. 109, no. 1, pp. 158–165, 2020, doi: 10.1111/apa.14892.
- [7] K. Lynch, L. An, and Z. Mancenido, "The impact of summer learning programs on low-income children's mathematics achievement: a meta-analysis," (EdWorkingPaper No. 21-379), Annenberg Institute at Brown University, 2021.
- [8] C. Gillen-O'Neel, "Sense of belonging and student engagement: a daily study of first- and continuing-generation college students," *Research in Higher Education*, vol. 62, no. 1, pp. 45–71, 2021, doi: 10.1007/s11162-019-09570-y.
- [9] A. Kissima, G. S. Lema, and S. Mwakalinga, "Analysing mathematics performance in Tanzanian primary schools through the lens of candidate items response analysis reports," *Education*, vol. 15, no. 5, pp. 14–22, 2024.
- [10] L. Y. Tay, S. S. Lee, and K. Ramachandran, "Implementation of online home-based learning and students' engagement during the COVID-19 pandemic: a case study of Singapore mathematics teachers," *Asia-Pacific Education Researcher*, vol. 30, no. 3, pp. 299–310, 2021, doi: 10.1007/s40299-021-00572-y.
- [11] X. Feng, K. Xie, S. Gong, L. Gao, and Y. Cao, "Effects of parental autonomy support and teacher support on middle school students' homework effort: Homework autonomous motivation as mediator," *Frontiers in Psychology*, vol. 10, 2019, doi: 10.3389/fpsyg.2019.00612.
- [12] P. M. Mbogo, "Does homework type affect pupils' homework management? experience from standard five pupils in Dar es Salaam, Tanzania," *Huria: Journal of the Open University of Tanzania*, vol. 28, no. 1, 2022, doi: 10.61538/huria.v28i1.978.
- [13] J. Xu, "A study of the validity and reliability of the teacher homework involvement scale: a psychometric evaluation," *Measurement: Journal of the International Measurement Confederation*, vol. 93, 2016, doi: 10.1016/j.measurement.2016.07.012.
- [14] M. Saha, S. Islam, A. A. Akhi, and G. Saha, "Factors affecting success and failure in higher education mathematics: students' and teachers' perspectives," *Heliyon*, vol. 10, no. 7, pp. e29173, 2024, doi: 10.1016/j.heliyon.2024.e29173.






- [15] Y. Wang, L. Tian, and E. S. Huebner, "Basic psychological needs satisfaction at school, behavioral school engagement, and academic achievement: longitudinal reciprocal relations among elementary school students," *Contemporary Educational Psychology*, vol. 56, pp. 130–139, 2019, doi: 10.1016/j.cedpsych.2019.01.003.
- [16] C. Lamparki, A. Hoffman, A. Roquet, and D. S. Jopp, "Loneliness during COVID-19: development and influencing factors," *PLoS ONE*, vol. 17, no. 3, p. e0265900, 2022, doi: 10.1371/journal.pone.0265900.
- [17] P. Black and D. Wiliam, "Classroom assessment and pedagogy," *Assessment in Education: Principles, Policy & Practice*, vol. 25, no. 6, pp. 551–575, Nov. 2018, doi: 10.1080/0969594X.2018.1441807.
- [18] F. Kyaruzi, J. W. Strijbos, S. Ufer, and G. T. L. Brown, "Teacher AfL perceptions and feedback practices in mathematics education among secondary schools in Tanzania," *Studies in Educational Evaluation*, vol. 59, 2018, doi: 10.1016/j.stueduc.2018.01.004.
- [19] S. Jones, "Gender issues in mathematics education in Tanzania," Aga Khan University, Apr. 2016.
- [20] S. Gershenson and S. B. Holt, "Gender gaps in high school students' homework time," *Educational Researcher*, vol. 44, no. 8, pp. 432–441, 2015, doi: 10.3102/0013189X15616123.
- [21] F. Kyaruzi, "Unraveling factors for gender discrepancies in students' mathematics performance in Tanzanian secondary schools," *Papers in Education and Development*, vol. 41, no. 1, pp. 106–124, 2023.
- [22] H. Goldstein, "International comparisons of student attainment: some issues arising from the PISA study," *Assessment in Education: Principles, Policy and Practice*, vol. 11, no. 3, pp. 319–330, 2004, doi: 10.1080/0969594042000304618.
- [23] T. Emmanuel, T. Maupong, D. Mpoeleng, T. Semong, B. Mphago, and O. Tabona, "A survey on missing data in machine learning," *Journal of Big Data*, vol. 8, no. 1, p. 140, 2021, doi: 10.1186/s40537-021-00516-9.
- [24] C. K. Enders, *Applied missing data analysis*. 2nd ed. New York: Guilford Publications, 2022.
- [25] R. E. Millsap and M. Olivera-Aguilar, "Investigating measurement invariance using confirmatory factor analysis," in *Handbook of Structural Equation Modeling*, R. H. Hoyle, D. Kaplan, G. A. Marcoulides, and S. West, Eds., New York: Guilford Press, 2012.
- [26] N. Foldnes and S. Grønneberg, "The sensitivity of structural equation modeling with ordinal data to underlying non-normality and observed distributional forms," *Psychological Methods*, vol. 27, no. 4, pp. 541–567, 2021, doi: 10.1037/met0000385.
- [27] A. D. Wu, Z. Li, and B. D. Zumbo, "Decoding the meaning of factorial invariance and updating the practice of multi-group confirmatory factor analysis: a demonstration with TIMSS data," *Practical Assessment, Research and Evaluation*, vol. 12, no. 3, pp. 1–26, 2007, doi: 10.7275/mhqa-cd89.
- [28] T. Niemand and R. Mai, "Flexible cutoff values for fit indices in the evaluation of structural equation models," *Journal of the Academy of Marketing Science*, vol. 46, no. 6, pp. 1148–1172, 2018, doi: 10.1007/s11747-018-0602-9.
- [29] M. S. Hagger, S. Sultan, S. J. Hardcastle, and N. L. D. Chatzisarantis, "Perceived autonomy support and autonomous motivation toward mathematics activities in educational and out-of-school contexts is related to mathematics homework behavior and attainment," *Contemporary Educational Psychology*, vol. 41, pp. 111–123, 2015, doi: 10.1016/j.cedpsych.2014.12.002.
- [30] V. Tam and R. Chan, "What is homework for? Hong Kong primary school teachers' homework conceptions," *School Community Journal*, vol. 26, no. 1, pp. 25–44, 2019.
- [31] P. Paul, "Public private partnership model interventions for enhancing primary education quality: a case study of Kilimanjaro region, Tanzania," *East Africa Journal of Social and Applied Sciences (EAJ-SAS)*, vol. 5, no. 1, pp. 128–141, 2023.
- [32] J. Xu, J. Du, J. Cunha, and P. Rosário, "Student perceptions of homework quality, autonomy support, effort, and math achievement: testing models of reciprocal effects," *Teaching and Teacher Education*, vol. 108, p. 103508, 2021.
- [33] J. C. Núñez, B. Regueiro, N. Suárez, I. Piñeiro, M. L. Rodicio, and A. Valle, "Student perception of teacher and parent involvement in homework and student engagement: the mediating role of motivation," *Frontiers in Psychology*, vol. 10, p. 1384, 2019, doi: 10.3389/fpsyg.2019.01384.
- [34] R. M. Ryan and E. L. Deci, "Intrinsic and extrinsic motivation from a self-determination theory perspective: definitions, theory, practices, and future directions," *Contemporary Educational Psychology*, vol. 61, 2020, doi: 10.1016/j.cedpsych.2020.101860.
- [35] F. Kyaruzi, "The role of self-efficacy and use of teachers' feedback on students' mathematics performance in Tanzanian secondary schools," *Journal of Education, Humanities & Sciences (JEHS)*, vol. 8, no. 1, pp. 30–46, 2019.

## BIOGRAPHIES OF AUTHORS



**Florence Kyaruzi**    is the senior lecturer in psychometry and mathematics education and the current director of research and innovation at Dar es Salaam University College of Education (DUCE), University of Dar es Salaam. He holds a PhD in the Learning Sciences from the Ludwig-Maximilians University of Munich (LMU), Germany. His research expertise includes student and teacher conceptions of assessment, mathematics education, gender issues in education, teacher education, feedback, and mentorship. He can be contacted at email: sakyaruzi@gmail.com or florence.kyaruzi@duce.ac.tz.



**Innocent B. Rugambuka**    is a lecturer in curriculum studies. He attained a PhD in education at the University of Dar es Salaam, Tanzania in 2018 by researching conceptions and practices of classroom assessment by primary school English language subject teachers in Tanzania. He has been teaching at various levels of education including primary school, secondary school and university levels. He is currently teaching some bachelor and postgraduate courses in the Department of Educational Psychology and Curriculum Studies (EPCS)-Faculty of Education. He can be contacted at email: innoruga@gmail.com.