Conceptualizing and Measuring Collective Action In School Management Committees: Validity and Reliability of the CASC Scale

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Abstract

In spite of the numerous surveys of public goods provision in school management committees (SMCs) in low- and middle-income countries (LMICs), proper conceptualization and measurement of the underlying construct remain a challenge. This study argues that advancement in the survey of public goods in SMCs rests on an appropriate conceptualization and measurement of collective action. This article conceptualizes and measures collective action in school committees using a 10 items instrument, i.e., the CASC scale. The instrument was applied within the framework of a PhD project completed at the Institute of Development Studies (IDS), University of Dar es Salaam in 2015. The validity test, using exploratory factor analysis (EFA), demonstrates that the eigenvalue of the first factor is larger than the eigenvalue for the next factor (3.2 versus 1.2); and the first and second factors account for 46% of the total variance, indicating that the items of the CASC scale are *unidimensional*. Similarly, the reliability test using Cronbach's alpha shows that the coefficient for the 10 items is $\alpha = 0.75$, which is acceptable and respectable. It is expected that the availability of a CASC scale will inspire surveys of the provision of public goods in SMCs to adopt the relevant theoretical bases of collective action.

Keywords: *collaboration, construct, public goods, scale, survey*

1. Introduction

Under education decentralization, governments put institutions in place that allow citizens to play collaborative role in school management (Barr, Packard, & Serra, 2012; Bruns, Filmer & Patrinos, 2011; Gertler, Patrinos & Rubio-Codina, 2007). In Tanzania's public primary education, the forum for such collective action is in school committees. However, most research that survey the extent to which such school management committees (SMCs) provide public goods—for example, developing school plans (Mugabe, 2019; Nemes, 2013), promoting school accountability (Mugabe, 2019; van Wyk, 2004), or managing school finances (Kiprono, Nganga & Kanyiri, 2015; Mzelela, 2009)—tend to circumvent the relevant analytical frameworks. Even when applying collective action theories, such surveys still need to conceptualize the construct to be measured, and consider the possibility that it may be *multidimensional* (Gardner, 1995).

Thus far the survey research on public goods in SMCs is still emerging; and so are the instruments used to measure its underlying construct. Previous efforts include

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Parent-Teacher Relationship Scale (Dawson & Wymbs, 2016); Teacher-Parent Communication Competence Scale (TPCCS) (Ozcinar, 2020); Turkish Parental Involvement Scale (TPIS) (Gürbüztürk & Sad, 2010), and School Governance Scale (SGS) (Şahin & Arastaman, 2018). However, None of these instruments is intended to measure the underlying construct of collective action in SMCs. Therefore, this study builds on the existing psychometric research that has developed scales to measure performance issues of school-level actors in different contexts.

Taking a meso-scale approach (Fayse & Mustapha, 2017), the CASC scale considers the most important elements and concepts of understanding the processes of collective action in school committees, which can also be customized to measure the extent, degree or level of collective action in other statutory committees.[2] The purpose is to conceptualize and measure collective action in school committees using a 10 items instrument, i.e., the CASC scale. The measures of CASC are based on collaborative roles of members as mandated by the three phases of the Primary Education Development Program (PEDP), and the Education Circular No. 1 of 2018 (URT, 2001, 2006, 2012, 2018). The study labelled five proxies of CASC as: (i) collaboration on supervision of school operations (CSO), (ii) collaboration on school planning/budgeting (CSP), (iii) collaboration on school financial management (CSF), (iv) collaboration on information sharing (CIS), and (v) collaboration on ensuring school attendance (CSA).

Exploratory factor analysis (EFA), as well as Cronbach's alpha estimation, indicate that the CASC scale has acceptable validity and reliability. The results from descriptive statistics demonstrate differences in the extent of CASC between Iringa District and Arusha City on all proxies/sub-scales. Given the argument that the application of collective theoretical perspectives has been hampered by conceptualization and measurement difficulties among the survey researchers, the availability of the CASC scale can potentially become a part of the solution. To the best of my knowledge, this study is the first research initiative to operationalize and measure collective action in school committees in the context of low- and middle-income countries (LMICs).

2. The Concept and Measurement of CASC Scale
2.1 Conceptualizing CASC
In recent years, the school-based management (SBM) model has been adopted as a means to an end: providing good quality education to students, together with improving school governance (Gertler et al., 2007). In this view, school autonomy reforms tend to shift authority across school-level actors (Barr & Zeitlin, 2011). Therefore, SMC is a form of education decentralization that makes the school the

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[2]Meso-scale approach is a proposed common ground between two camps of polarized collective action theories, namely the **institutional economics** camp, which focuses on examining how actors find solutions collectively in a situation involving social dilemma, and the **sociology/anthropology** camp, which provide a detailed understanding of multiple dimensions of collective action in specific case studies (Fayse & Mustapha, 2017).

centrepiece of education improvement, and relies on the redistribution of responsibilities between teachers and parents (Bruns et al., 2011). In Tanzania, the Education (Amendment) Act, 1995, defines SMC as a committee established for the purposes of supervising and advising on the management of a primary school. This Act provides a legal framework for collaboration between parent representatives and teacher representatives in the provision of public goods.

As a concept, collective action has continued to evolve over the recent past. It is interpreted as a matter of people doing something together; and it is assumed that this involves their having a collective intention to do that thing together (Gilbert, 2007). Similarly, Pandolfelli, Meinzen-Dick and Dohrn (2007) consider it as both the processes by which voluntary institutions are created and maintained, and the fact that their members decide to act together. To be specific, Wade (1987) defined collective action as collaboration between more than one person that is intended to achieve a common goal, or satisfy a common interest. Therefore, collective action is easier to identify when there is a clearly defined group that takes part (Meinzen-Dick et al., 2004).[3] School committees are one example of such groups because they are granted an autonomy to provide public goods (Bruns et al., 2011) through collaboration (Beasley & Huilleryy, 2011; Mozumder & Halim, 2006).

What most definitions have in common is that collective action requires the *involvement of a group of people*; it requires a *shared interest* within the group; and it involves some kind of a *common action* that works in pursuit of that shared interest (Meinzen-Dick et al., 2004). For example, Wade's definition suggests that an effective strategy for collective action is collaboration between teacher representatives and parent representatives, rather than separatism or integration. Collective action in a school committee is thus not a pure public good *(non-excludable)*; rather, it is an *excludable good* because incentives for collective action increase as the share of individual members in the education provided increases (Khan, 2003).

Basically, the efforts of the government of Tanzania (GoT) were meant to prepare and empower parents to provide broad-based collaboration in knowledge experiences (Mosha & Dachi, 2004). As Ahn and Ostrom (2002: 11) observed, "… collaboration is the standard term in collective action situation in which a conditionally cooperative individual acts on a belief that others would also cooperate." Even public goods games show that across individuals within communities, and also across communities, the decision to hold teachers accountable through participation at the school level correlates with collaboration (Barr et al., 2012).

According to the Education Circular No. 1 of 2018, the main roles and responsibilities of school committees in Tanzania are: (i) overseeing teaching and learning in school by ensuring that teachers are performing their duties in an

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[3]The boundedness of a group allows people to know who else is contributing; and hence fosters collective action (Meinzen-Dick, di Gregorio & McCarthy, 2004).

efficient manner; (ii) preparing/approving school plans and budgets; (iii) approving school expenditure and ensuring prudent management of recurrent and development expenditure; (iv) organizing and conducting parents' meetings where it will presents school development report; and (v) ensuring all students attend classes as required by the law. Therefore, in this paper CASC was operationally defined as *collaboration between and among parent/community representatives and teacher representatives in assuming their mandated roles and responsibilities in supervising school operations, school planning and budgeting, school financial management, information sharing, and ensuring enrolment and attendance.*

2.2 Measuring CASC

Since it is inherently difficult to measure collective action directly because it is a dynamic process that relates to social relationships, proxy indicators are generally used in operationalizing the concept (Meinzen-Dick et al., 2004). Using the operational definition above, five proxies of CASC were developed as sub-scales: (i) collaboration on supervision of school operations (CSO), (ii) collaboration on school planning/budgeting (CSP), (iii) collaboration on school financial management (CSF), (iv) collaboration on information sharing (CIS), and (v) collaboration on ensuring school attendance (CSA). Each sub-scale yielded two items, making a combined total of 10 items rated on a 5-point Likert-scale: 1 = *not at all*, 2 = *very few times*, 3 = *sometimes*, 4 = *most of the time*, and 5 = *all the time*.

Table 1: Items of the CASC Scale

Proxies	Items
Collaboration on supervision of school operations	• How often have you visited the school to monitor teaching in the last two years? • How often have you attended meetings per year since you joined the committee?
Collaboration on school planning and budgeting	• How often have you spoken at the school planning/budgeting sessions? • How often have you understood plans/budgets in your committee meetings?
Collaboration on school financial management	• How often have you participated in approving school procurements? • How often have you participated in approving school financial reports?
Collaboration on school information sharing	• How often have you reached consensus on information dissemination format? • How often have you reached consensus on the contents of information disseminated to the public?
Collaboration on school enrolments/attendance	• How often have you combined efforts to increase pupil enrolment? • How often have you taken joint measures to combat truancy in your school?

Note. Adapted from Manara (2015), Determinants of Collective Action in Public Primary School Committees in Arusha City and Iringa District. Doctoral thesis, University of Dar es Salaam.

Summated Likert items produce interval data, particularly if the scale meets the standard psychometric rule-of-thumb criterion of comprising at least eight reasonably related items (Carifio & Perla, 2008; Norman, 2010; Robitzsch, 2020). This practice is often recommended, particularly when measuring fewer concrete concepts (such as collaboration), where a single Likert item is unlikely to fully capture the concept being assessed (Sullivan & Artino, 2013). An assumption underlying this approach is that the items in the scale reflect a common construct, i.e., items sharing a common variance: *unidimensionality* (Gardner, 1995; Sijtsma, 2009).

2.3 The Importance of CASC Scale
Several types of collective action problems that exist in common pool resources (CPR)[4] also have relevance for school governance. In both contexts, problems arise from inadequate information, conflicting interests, or the nature of the public good being provided (Poteete & Ostrom, 2004). A consideration of such collaboration dilemmas in studies of SMCs, including school committees (SCs) in Tanzania, may provide a room for the adoption of relevant collective action theories (Hardin, 1968; Olson, 1965; Ostrom, 1990, 2009). Over the recent past, collective action research has been built on the foundation set by *social identity*, *self-categorization*, and *relative deprivation* theories (Wrights, 2009); but such models and concepts have been missing in the surveys of public goods provision in SMCs (see, e.g., Kayindu, Nakiyingi & Nkwanga, 2020; Meher & Patel, 2018; Sehrawat & Roy, 2021).

SMC studies in LMICs, particularly Tanzania, have missed an opportunity to capitalize on collaboration dilemma frameworks due to the low capacity of some authors to conceptualize and measure collective action (see, Meinzen-Dick, di Gregorio & McCarthy, 2004). A mixed methods research is an obvious alternative to game experiments (Poteete, Janssen & Ostrom, 2010); and its survey strand could be used to conceptualize and measure collective action in statutory committees such as SCs. Without attention to this methodical issue, the current practice of devolving managerial power to service delivery sites is likely to be misguided. The worst-case scenario involves researchers who fail to define their concepts, and throw together a diverse set of items that have no common underlying construct at all (Gardner, 1995). Therefore, the CASC scale was developed as an attempt to address this methodological issue in school governance research, and surveys of other participatory public service management teams.

3. Methodological Note
This study draws data from a PhD project 'Determinants of Collective Action in Public Primary School Committees in Iringa District and Arusha City', completed at the Institute of Development Studies (IDS), University of Dar es Salaam in 2015. Ethical approval was granted by the Postgraduate Committee, University of Dar es

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[4]Ostrom (1990) defined CPR as a type of public good consisting of a natural or human-made resource system (e.g., an irrigation system, forests, grazing land or fishing grounds), where it is costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.

Salaam, and research clearance was given by the Directorate of Research and Publication, University of Dar es Salaam. The project was a mixed-methods research, whose survey strand collected data using a Likert-style questionnaire.

Introduced in 1932, the Likert-scale is among the scaling procedures for examining psychological concepts (Vaske, Beaman & Sponarski, 2017) such as collective action (Meinzen-Dick et al., 2004). The underlying structure of the CASC scale was confirmed using EFA (Pituch & Stevens, 2016; Tabachnick & Fidell, 2007; Williams, Onsman & Brown, 2010; Yong & Pearce, 2013). The reliability test was conducted using the Cronbach's alpha coefficient (Sijtsma, 2009; Streiner, 2003).

3.1 Sampling Procedure

The CASC scale was first applied in a survey that treated school committees as the unit of analysis. There were 145 public primary schools in Iringa District and 48 public primary schools in Arusha City, meaning that the target population for this research was 145 school committees in Iringa District and all 48 school committees in Arusha City.

In the analysis of who participate in a particular type of collective action, Meinzen-Dick et al. (2004) suggest that a sample of 200 households in, say, four villages (or 200 members in four committees), may be sufficient (n=200). However, in an analysis of correlates of a collective action in a village or committee, that same sample would be insufficient because these four villages/committees would be units of analysis (n=4). Therefore, the survey collected data at the committee level ($n = 52$).

The PEDP requires school committees to have 8 official members: 5 parent representatives, including a chairperson; and 3 teacher representatives, including the headteacher as the secretary. In each committee, 4 parent representatives and 2 teacher representatives participated in the survey. Thus, in each committee, 6 members filled in the questionnaire (4 parent representatives, and 2 teacher representatives), making a total of 156 respondents in Iringa District; and 156 respondents in Arusha City (Table 2) (Manara, 2015).

Table 2: Questionnaire Respondents in Iringa District and Arusha City

	Iringa District	Arusha City	Sub-total
Teacher representatives	52	52	104
Parent representatives	104	104	208
Total	**156**	**156**	**312**

Source*: Adapted from Manara (2015).*

3.2 Initial Scale Development

The scale items were formulated using the operational definition of CASC. Wade's (1987) definition of collective action was the starting point because it is based on the collaborative aspect of public good provision. Two items were developed for each

proxy/sub-scale, which segmented the main roles and responsibilities of school committees mandated to them by the PEDP and the Education Circular No. 1 of 2018. Ultimately, the 10 items were incorporated in a Likert-type questionnaire as questions about collaboration among SC members in accomplishing their mandated roles and responsibilities (see Table 3).

Table 3: The CASC Scale

Please indicate your level of agreement with each of the following statements about your collaboration in school committee from **Not at All (NaL), Very Few Times (VfT), Sometimes (SoT), Most of the Time (MoT)** to **All the Time (AtT)**. Your answers are confidential.	1 NaL	2 VfT	3 SoT	4 MoT	5 AtT
1 How often have you visited the school to monitor teaching in the last two years?					
2 How often have you attended meetings per year since you joined the committee?					
3 How often have you spoken at the school planning/budgeting sessions?					
4 How often have you understood plans/budgets in your committee meetings?					
5 How often have you participated in approving school procurements?					
6 How often have you participated in approving school financial reports?					
7 How often have you reached consensus on information dissemination format?					
8 How often have you reached consensus on the contents of information disseminated to public?					
9 How often have you combined efforts to increase pupil enrolment?					
10 How often have you taken joint measures to combat truancy in your school?					

The final draft (English version) of the questionnaire was submitted to a panel of language experts for translation into Swahili. The Swahili version was further reviewed by a parent and a teacher, who sat in the pilot SC, to establish if it was relevant to their situations; and whether members could respond to it (*pre-test*). This was followed by a debriefing in which experiences were shared and shortcomings of the tool identified. The feedback was taken on-board, and the second draft of the Swahili version was developed.

The Swahili version was *pilot-tested* in a public primary school committee in Arusha City, which was selected on the basis of its successful public goods provision, particularly collaborative monitoring of school finances, as explained by the Arusha City Council (2013). The piloting was done at the school site, involving 3 parent representatives and 2 teacher representatives. The results reflected accurately the type of data available, and informed the researcher on how to

administer the questionnaire. All teachers and one parent were able to fill in the questionnaire within the specified time. One parent needed assistance on how to respond to three questions, while another asked the researcher to administer it to her. Thus, the decision was taken to give respondents flexibility in filling in the questionnaire during the fieldwork.

The questionnaire was revised after the piloting, and thereafter returned to the panel of language experts for aligning it with the English version, since it was the Swahili version that was used for data collection because this is the national language commonly spoken in public primary school committees. Respondents who wished to have ample time to fill in the questionnaire were allowed to do so, and hence some questionnaires were dropped off and picked up later. Ultimately, the questionnaire survey elicited a response rate of 100%.

The draft CASC scale was one of the presentations that were made to the academic staff of the IDS (UDSM) during the Research Week held from 27th to 28th April, 2021. The comments and inputs from the session focused on whether the items reflected their respective proxies/sub-scales. There was a consensus among the participants that the items represented the proxies emanating from the operational definition of the CASC, and hence they validated the contents of the scale.

3.3 Data Analysis
Data analysis was performed using Stata 15 software (StataCorp., 2017). The study first presented a frequency table to display the values of the background characteristics of respondents, weighted with the number of occurrences of each single value displayed on percentages. After examining the reliability and validity test of the CASC scale, the study performed descriptive statistics to measure variations for each sub-scale and the whole scale between Arusha City and Iringa District.

In determining the adequacy of EFA sample size, Comrey and Lee (1992) provided the following guidance: 100 = poor, 200 = fair, 300 = good, 500 = very good, and 1,000 or more = excellent. Although there is little empirical evidence to support these recommendations, in most studies the sample size ranges from 100 to 1,000 (Mundfrom, Shaw & Ke, 2005). Therefore, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were used to evaluate the data.

The *dimensionality* of the CASC scale was investigated using the criterion of the eigenvalue-greater-than-one rule (Kaiser, 1960). The study considered the rule that at least two or three variables must load on a factor to give a meaningful interpretation (Williams et al., 2010). The items were subjected to a principal component factor (PCF); and two factors were retained to arrive at the most interpretable solution (Young & Bryan, 2015).

In addition, the study determined the cut-off for a statistically meaningful rotated factor loading based on the sample size (Yong & Pearce, 2013). Of recently, Pituch and Stevens (2016) observed that for a sample size of 300, factor loadings are significant at a 0.01 level when they are larger than 0.298. This is a slight adjustment of Tabachnick and Fidell (2007), who pointed out that a factor loading for a sample size of 300 may need at least .32 to be considered statistically significant. Since our sample size is 312, we use a minimum cut-off value of over 0.30 to determine significant factor loading as applied in Williams et al. (2010). Therefore, items with factor loadings of 0.30 or greater, and communalities above .30, were retained for the final factor scales (Pett, Lackey & Sullivan, 2003).

Finally, the study determined the reliability of the CASC scale by computing the Cronbach's alpha for the items retained on the scale (Cronbach & Shavelson, 2004; Vaske et al., 2017; Young & Bryan, 2015). As an index of reliability, Cronbach's alpha provides a measure of the internal consistency of a scale, expressed as a number between 0 and 1 (Gliem & Gliem, 2003; Tavakol & Dennick, 2011). A higher value indicates a strong relationship between the items on the scale (i.e., excellent, good and acceptable); whereas a lower value indicates a weaker relationship between the items (i.e., questionable, poor and unacceptable) (Bland & Altman, 1997).

4. Validity and Reliability of the CASC scale
4.1 Construct Validity
EFA was used to assess the internal structure of the scale to ensure that items load on the factors (construct validity check). Both the Kaiser-Meyer-Olkin measure of sampling adequacy (0.818), and the Bartlett test of sphericity (558.037, df. = 45, p = 0.000) were significant. The first two factors (factor 1 and factor 2) were identified using the eigenvalue-greater-than-one rule. Table 4 shows that the eigenvalue of the first factor is larger than the eigenvalue of the next factor (3.2 versus 1.2); and the first and second factors account for 46% of the total variance.

Table 4: Eigenvalue of the Factors

Factor	1	2	3	4	5	6	7	8	9	10
Eigenvalue	3.2589	1.2947	0.9741	0.8576	0.7585	0.6883	0.6369	0.5603	0.4936	0.4772

A cumulative percentage of variance of 46% is higher than the 40.6% obtained by Williams et al. (2010) in a total of 7 factors having an eigenvalue greater than one. This suggests that the items of the CASC scale are *unidimensional*. Of the 10 items, there are only 2 items that have initial eigenvalue of greater than one, meaning that those 10 items are clustered into 2 groups of factors. Therefore, two factors were selected. Consistent with the concept underlying the CASC scale, the extracted factors were named: 'collaborative efforts directed at realizing the mandated roles and responsibilities', and 'collaborative efforts not directed at realizing the mandated roles and responsibilities'.

Looking at the factor loading estimates in Table 5, it can be seen that the variables are sorted according to their loadings on the factors: from variables with the highest loadings to those with the lowest loadings. The first factor has a total of 10 variables, all of them with factor loading greater than 0.30 (>0.30). The most dimension that reflects the construction of the CASC is Item 4 (Understanding Plans/Budget), with a loading factor of 0.698. The lowest dimension that reflects the underlying construct is Item 10 (Joint Measures to Combat Truancy), with a loading factor of 0.327.

Table 5: Factor Loading Estimates

Variable	Factor1	Factor2
Item 1	0.5375	-0.1159
Item 2	0.5069	-0.4685
Item 3	0.6706	-0.2439
Item 4	0.6981	0.0658
Item 5	0.6188	-0.1074
Item 6	0.6541	0.0607
Item 7	0.5992	0.0785
Item 8	0.5853	-0.1718
Item 9	0.3957	0.6899
Item 10	0.3271	0.6864

The analysis indicates that there were no items in the CASC scale that have factor loadings equal to, or less than, 0.30. A factorability of 0.30 shows that the factors account for approximately 30% relationship within the data, meaning that a third of the variables share too much variance, and hence becomes impractical to determine if they are correlated with each other, or with the dependent variable (Williams et al., 2010). Therefore, the selection of threshold of over 0.30 is appropriate for the assessment of the scale items.

Moreover, communalities were reported to indicate the proportion of variance in each variable that is predicted by the factors. Table 6 demonstrates how much a single item has in common with all the factors.[5] It has been observed that Item 9 (Combined Efforts to Increase Enrolment) is the highest commonality item, and Item 1 (Teachers Monitoring Visits) is the lowest commonality item. Therefore, the CASC scale can be accepted to measure collective action in school committees because the underlying construct is consistent with the survey data.

The higher commonality of the 'Combined Efforts to Increase Enrolment' suggests that this variable is explained more by the common factor, and therefore it is highly reliable (Fabrigar, Wegener, MacCallum & Strahan, 1999). This is expected given the national prioritization of pupil enrolments to achieve universal primary education targets spelt out in the then Millennium Development Goals (MDGs)

[5]A relatively high communality indicates that an item has much in common with the other variables taken as a group. A relatively low communality means an item does not sustain an established relationship with the others.

for the period 2000–2015. Nevertheless, all items with substantial communalities are related to the domain of interest, and thus considerably reflect the underlying construct (Fabrigar & Kan, 2018).

Table 6: Measuring Communality

Variable	Uniqueness	Communality	
		(1-Uniqueness)	*Percentage*
Item 1	0.6977	0.3023	30.23
Item 2	0.5236	0.4764	47.64
Item 3	0.4908	0.5092	50.92
Item 4	0.5084	0.4916	49.16
Item 5	0.6056	0.3944	39.44
Item 6	0.5684	0.4316	43.16
Item 7	0.6347	0.3653	36.53
Item 8	0.6279	0.3721	37.21
Item 9	0.3674	0.6326	63.26
Item 10	0.4219	0.5781	57.81

The higher commonality of the 'Combined Efforts to Increase Enrolment' suggests that this variable is explained more by the common factor, and therefore it is highly reliable (Fabrigar, Wegener, MacCallum & Strahan, 1999). This is expected given the national prioritization of pupil enrolments to achieve universal primary education targets spelt out in the then Millennium Development Goals (MDGs) for the period 2000–2015. Nevertheless, all items with substantial communalities are related to the domain of interest, and thus considerably reflect the underlying construct (Fabrigar & Kan, 2018).

4.2 *Reliability Analysis*
This sub-section presents alpha coefficients to show internal consistency reliability of the CASC scale. Results in Table 7 indicates that the Cronbach's alpha coefficient for the 10 items is $\alpha = .75$; and hence the CASC scale is acceptable. The reliability of the scale range from .72 to .77, which indicates greater internal consistency of the items in the scale. Therefore, it can be stated that the items used in the CASC scale are reliable.

Table 7: Alpha Values

	Observation	Sign	Item-test correlations	Item-retest correlations	Inter-item covariance	Alpha
Item 1	307	+	0.5862	0.4269	0.2545	0.7346
Item 2	312	+	0.5050	0.3669	0.2766	0.7424
Item 3	311	+	0.6443	0.5352	0.2557	0.7210
Item 4	309	+	0.6549	0.5583	0.2579	0.7198
Item 5	312	+	0.5865	0.4628	0.2636	0.7299
Item 6	312	+	0.6381	0.5015	0.2472	0.7224
Item 7	312	+	0.6091	0.4849	0.2588	0.7267
Item 8	311	+	0.5351	0.4184	0.2789	0.7383
Item 9	310	+	0.5154	0.3517	0.2708	0.7460
Item 10	311	+	0.4344	0.2216	0.2844	0.7716
Test scale					**0.2648**	**0.7555**

As expected, the results in Table 7 show positive signs for all items. This means the questions of the CASC scale were worded positively in all Items 1 and 2 (Collaboration on School Operations); 3 and 4 (Collaboration on School Planning/Budgeting); 5 and 6 (Collaboration on School Operations); 7 and 8 (Collaboration on School Operations); and 9 and 10 (Collaboration on School Operations). In other words, the items of the CASC scale were related as a group.

4.3 Descriptive Statistics

Lastly, the study tested the applicability of the CASC scale by measuring the amount of variation within and between the two samples (Arusha City and Iringa District) in terms of average scores for each factor (i.e., sub-scale of CASC). Table 8 indicates that the mean CSP (collaboration on school planning/budgeting) in Arusha City is higher, and the mean CSO (collaboration on school operations) is lower. Similarly, the mean CSP in Iringa City is higher; and the mean CSA (collaboration on school attendance) is lower. Therefore, the individual mean scores indicate variations among the CASC sub-scales in both Arusha City and Iringa District.

Table 8: Variations in CASC within Arusha City and Iringa District

Sub-Scale	Arusha City			Iringa District		
	Obs.	*Mean*	*Std. Dev.*	*Obs.*	*Mean*	*Std. Dev.*
CSO	156	4.2120	0.9244	156	4.1883	0.9040
CSP	156	4.5886	0.6594	156	4.4286	0.8391
CSF	156	4.4019	0.8567	156	4.3312	0.8425
CIS	156	4.5506	0.7275	156	4.3377	0.8021
CSA	156	4.2880	0.8452	155	3.2810	0.9369

Looking at the standard deviation, it is clear that there is less variability in mean CSP than in other sub-scales; hence, confirming the high mean of this factor. In other words, participatory planning is the major form of collective action in both Arusha City and Iringa District. For example, apart from the usual quarterly meetings that deliberate on capitation spending, some SMCs also meet twice a year to discuss school development issues (Manara, 2015).

Overall, it was observed that differences between the two study sites have been significant for all sub-scales. Therefore, the distributions of CASC scores by areas behave as expected; that is, the data is well spread out across the two study sites for most items of the scale. This indicates that respondents who endorsed one dimension of CASC were likely to have endorsed the other.

The study compared the mean CASC between Arusha City and Iringa District to test the hypothesis that there is a statistically significant difference of CASC between the two study sites. The results in Table 9 demonstrates that the mean CASC in Arusha City is higher than the mean CASC in Iringa District. The t-tests (t (310) = 4.5, *SEM* = 0.00, $p < 0.001$) confirm the observed mean difference between the two sites. Since the sampling unit is the SMC, the observed collective action is for all 156 members who participated in the survey in Arusha City, and 156 members in Iringa District.

Table 9: Difference in CASC between Arusha City and Iringa District

Group	Obs.	Mean	T-test	*df.*	Sig. (2-tailed)
Arusha City	156	4.4091			
Iringa District	156	4.1136	4.5127	310	0.000
Combined	312	4.2633			

One possible explanation for the high mean CASC in Arusha City is that SMC members are more skilled in managerial issues than their counterparts in Iringa District. For example, the mastery of the school planning and budgeting processes may require some skills that are mostly obtained at the post-secondary level. Looking at the background characteristics of the respondents, it is clear that almost 22% of the surveyed SC members in Arusha City have at least some post-secondary education, compared to 6% in Iringa District.

Similarly, given the high proportion of informal workers among the respondents of Iringa District, rural SCs can be expected to underperform in the provision of skills-based public goods because members tend to lack in-service training opportunities provided by employers. In contrast, employees in the formal sector are more likely to be skilled because public and private institutions tend to invest in training, mentoring and coaching of their staff. In other words, members from the formal sector are likely to be more reliable in technical tasks such as planning, budgeting and financial management. This indicates the multifaceted ways in which parent representatives in SMCs are engaged in the provision of public goods through collaboration.

From the descriptive analysis above, it can be said that the CASC scale is reliable and valid for the study of collective action in school committees within and across geographical locations. The *t test* confirmation suggests that urban school committees have comparative advantages for collective action. Although the school autonomy reform has been implemented across the country, the ability of school-level actors to work together between the two sites differs. This should not be a surprise given that Arusha City is an urban centre, while Iringa District is a rural locality.

4.4 Discussion

The purpose of this study was to conceptualize and measure collective action in school committees using the CASC scale. Consistent with the argument that advancement in the survey research of public goods in SMCs rests on an appropriate conceptualization and measurement of collective action, this article confirms the validity and reliability of the CASC scale. With eigenvalue of the first factor larger than the eigenvalue for the next factor (3.2 versus 1.2), and a Cronbach's alpha value $\alpha = .75$, the observed CASC variations between Arusha City and Iringa District confirm that the scale can be used in cross-section surveys of collective action in school committees in both rural and urban settings of LMICs. In other words, collaborative behaviours of members in fulfilling their mandated roles and responsibilities provides right fit proxies for measuring collective action in school committees.

The adoption of a CASC scale may help survey and mixed-methods researchers in their attempts to create a deeper understanding of the performance of school autonomy reforms, particularly in fostering collective action in school committees. This is highly relevant for parental participation in school management because the expected public good is *excludable*; that is, only parents with children in a particular school can be motivated to collaborate with other parents and teachers in managing schools (Khan, 2003). As the harvesting of natural resources is a driving factor for collective action in CPR, so is having a child in primary school a motivating factor for parental involvement in school management (Manara, 2015).

Comparatively, the CASC scale is consistent with the School Governance Scale (SGS) (Şahin & Arastaman, 2018), in which participants' school governance differed significantly in terms of task. The sub-scales align with the underlying construct of the School Counsellor Leadership Survey Instrument (Young & Bryan, 2015), which retained the Item, 'I work collaboratively with stakeholders to accomplish goals' on the factor 'Systemic Collaboration'. This factor reflected the participants' self-reported practices about how they actively work with stakeholders to initiate new programs (ibid.). Therefore, the CASC scale can perform well across samples, as well as within study sites.

5. Conclusion and Recommendations

The current study presented a CASC scale: a 10 item measure of collective action in school committees based on five proxies of collaboration efforts directed at realizing mandated roles and responsibilities of school committees; presented as sub-scales CSO, CSP, CSF, CIS and CSA. Items of the CASC scale were identified using EFA. Similarly, the reliability analysis indicated that the scale exhibited very strong internal validity. Therefore, proxies emanating from the CASC operational definition reflect the underlying construct of collective action in school committees.

It is expected that the availability of CASC scales will inspire researchers, particularly in academic communities, to adopt collective action theoretical bases in their surveys of public goods in school committees, and other public service management teams (e.g., health facility management committees, water users associations, etc.). In particular, researchers who employ CASC scales will be able to compare the extent of collective action between two or more samples. Simply put, CASC scales will allow researchers to track changes in collective actions directed at SMC members in realizing their mandated roles and responsibilities over time.

Overall, the study provides a strong preliminary evidence to suggest that items and factor structure of CASC scale are appropriate for use in examining collective action in school committees. In this view, survey researchers, particularly those involved in school governance, can adapt and incorporate the CASC scale in their questionnaires. It is expected that doing so will improve the knowledge base of collective action in school management committees.

6.1 Limitations and Future Directions

Despite providing an encouraging evidence for the adoption of CASC scale to assess collective action in school committees—and possibly other statutory committees—this study has a number of limitations.

First, the construction of the CASC scale was based on a cross-sectional study; that is, data was collected from SC members at a given point of time. Therefore, there is a possibility that some underlying trends of collective action in a SMC could be missed. Survey researchers using the CASC scale should consider complementing it with a qualitative strand (e.g., interviews and focus group discussions) in a mixed-method research designed to capture historical perspectives of CASCs in the study sites.

Second, construct validity was derived from EFA only. Given its simplicity, the inference inferred from EFA may not be reliable when compared to similar studies using the confirmatory factor analysis (CFA). Although the usefulness of EFA depends on an author's ability to have *a priori* conceptualization of an underlying assumption, this limitation suggests that there might be a room for the improvement of CASC scales in the future.

Third, a CASC scale can be useful in identifying variations in terms of *free riding* problem between teacher representatives and parent representatives in SMCs. Given its *excludable* character, collaboration between the two sets of members appears to be an important construct in understanding collective action in school management committees. It is reasonable that a CASC scale could be used in future research to examine whether collaboration between teacher representatives and parent representatives enhance the provision of public goods in SMCs.

References

Ahn, T. K. & Ostrom, E. (2002, August). *Social Capital and the Second Generation Theories of Collective Action*: *An Analytical A, roach to the Forms of Social Capital*. Paper presented at the 98th Annual Meeting of the American Political Science Association (APSA) 2002, Boston, Massachusetts. Retrieved from www.uv.es/.../Second% 20*generation%* 20*of%* 20*PA%*20*theories.pdf*.

Arusha City Council. (2013). *Arusha City Socio-Economic Profile.* Online Version. Retrieved from http://www.arusha.go.tz/index.php/councils/arusha-city-council?showall= 1&limitstart=.

Barr, A. & Zeitlin, A. (2011). Conflict of Interest as a Barrier to Local Accountability. CSAE Working Paper No. 2011–13, Oxford, UK: Center for the Study of African Economies (CSAE), University of Oxford. Retrieved from https://assets.publishing. service. gov.uk/media/57a08af1e5274a31e000087c/csae-wps-2011–13.pdf.

Barr, A., Packard, T. & Serra, D. (2012). Participatory Accountability and Collective Action: Evidence from Field Experiments in Albanian Schools. Impact Evaluation Series No. 55. Washington, DC: The World Bank. Retrieved from https:// openknowledge. worldbank.org/handle/10986/6029.

Beasley, E. & Huilleryy, E. (2011). Understanding Parental Participation to Make School Work. Working Paper, Paris, France: Sciences Po. Retrieved from http://spire. sciencespo.fr/hdl:/2441/eu4vqp9ompqllr09iatqiagpl/resources/huillery2011.pdf.

Bland, J. M. & Altman, D. G. (1997). Cronbach's Alpha. *BMJ* (*Clinical research ed.*), 314(7080): 570–572. doi: 10.1136/bmj.314.7080.572.

Bruns, B., Filmer, D. & Patrinos, H.A. (2011). Making Schools Work: New Evidence on Accountability Reforms. Washington DC: World Bank. Retrieved from http:// siteresources.worldbank.org/EDUCATION/Resources/278200–1298568319076/ makingschoolswork.pdf.

Carifio, J. & Perla, R. (2007). Ten Common Misunderstandings, Misconceptions, Persistent Myths and Urban Legends About Likert Scales and Likert Response Formats and Their Antidotes. *Journal of Social Sciences,* 3(3): 106–116. doi: 10.3844/jssp.2007.106.116.

Comrey, A. L. & Lee, H. B. (1992). A *first course in factor analysis*, Hillsdale, NJ: Erlbaum.

Cronbach, L. J. & Shavelson, R. J. (2004). My Current Thoughts on Coefficient Alpha and Successor Procedures. *Educational and Psychological Measurement*, 64(3): 391–418. doi: 10.1177/0013164404266386.

Dawson, A. E. & Wymbs, B. T. (2016). Validity and Utility of the Parent–Teacher Relationship Scale–II. *Journal of Psychoeducational Assessment,* 34(8): 751–764. doi: 10.1177/0734282915627027.

Fabrigar, L. R. & Kan, M. P. H. (2018). Exploratory Factor Analysis. In Frey, B.B. (Ed.), the *SAGE Encyclopaedia of Educational Research, Measurement, and Evaluation* (,. 649–653). New York, NY: SAGE Publications, Inc. doi: 10.4135/9781506326139.n252.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C. & Strahan, E. J. (1999). Evaluating the Use of Exploratory Factor Analysis in Psychological Research. *Psychological Methods,* 4(3): 272–299. doi: 10.1037/1082–989X.4.3.272.

Faysse, N. & Mustapha, B.A. (2017). Finding Common Ground Between Theories of Collective Action: The Potential of Analyses at a Meso-Scale. *International Journal of the Commons*, 11(2): 928–949. doi: 10.18352/ijc.776.

Gardner, P. L. (1995). Measuring Attitudes to Science: Unidimensionality and Internal Consistency Revisited. *Research in Science Education,* 25(3): 283–289. doi: 10.1007/ bf02357402.

Gertler, P., Patrinos, H., A. & Rodriguez-Oreggia, E. (2012). Parental Empowerment in Mexico: Randomized Experiment of the "Apoyos a La Gestion Escolar (Age) Program in Rural Primary Schools in Mexico. Evanston, IL: Society for Research on Educational Effectiveness. Retrieved from www.invalsi.it/invalsi/ri/ improving education/ papers/ patrinos/142.doc.

Gilbert, M. (2007). Rationality in Collective Action. *Philosophy of the Social Sciences,* 36(1): 3–17. doi: 10.1177/0048393105284167.

Gliem, J. A. & Gliem, R. R. (2003, October). Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales. Paper presented at the 2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Columbus, Ohio. Retrieved from https://scholarworks.iupui.edu/ bitstream/ handle/1805/344/gliem+&+gliem.pdf?sequence=1.

Gürbüztürk, O. & Sad, S. N. (2010). Turkish Parental Involvement Scale: Validity and Reliability Studies. *Procedia Social and Behavioral Sciences,* 2(2): 487–491. doi: 10.1016/ j.sbspro.2010.03.049.

Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162(3859): 1243–48. doi: 10.1126/science.162.3859.1243.

Kaiser, H. F. (1960). The Application of Electronic Computers to Factor Analysis. *Educational and Psychological Measurement,* 20(1): 141–151. doi: 10.1177/ 0013164 46002000116.

Kayindu, V., Nakiyingi, S. & Nkwanga, A. (2020). Are School Management Committees Properly Instituted and Are They Functional? the Case of Mayuge District, Uganda. *International Journal of Research and Innovation in Social Science, IV*(IX): 57–62.

Khan, S. (2003). Participation via Collective Action in Government and NGO Schools in Pakistan. *Development in Practice,* 13(4): 361–376. doi: 10.1080/09614520320001122419.

Kiprono, F. J., Nganga, M. & Kanyiri, J. (2015). An Assessment of School Management Committees' Capacity in the Implementation of FPE Funds in Public Primary Schools: A Survey of Eldoret East District, Kenya. *International Journal of Education and Research,* 3(3): 243–260.

Manara, K. (2015). Determinants of Collective Action in Public Primary School Committees in Iringa District and Arusha City (Unpublished doctoral thesis). Institute of Development Studies (IDS), University of Dar es Salaam, Tanzania.

Meher, V. & Patel, I. (2018). Functioning of School Management Committee at Elementary Level. *International Journal of Recent Scientific Research,* 9(5): 26954–26958. doi: 10.24327/ijrsr.2018.0905.2157.

Meinzen-Dick, R., Di Gregorio, M. & McCarthy, N. (2004). Methods for Studying Collective Action in Rural Development. Working Paper No. 33, Washington, DC: International Food Policy Research Institute (IFPRI). Retrieved from *www.ifpri.org/sites/default/files/publications/CAPRiWP*33.*pdf*.

Mosha, H. J. & Dachi, H. A. (2004). Decentralization of Education Delivery and Provision as a Strategy for Poverty Alleviation in Tanzania. In Galabawa, J. & Narman, A. (Eds.). *Education, Poverty and Inequality* (,. 169–197). Dar es Salaam, Tanzania: KAD Associates.

Mozumder, P. & Halim, N. (2006). Social Capital Fostering Human Capital: The Role of Community in Primary School Management in Bangladesh. *Journal of International Development*, 18(2): 151–162. doi: 10.1002/jid.1184/pdf.

Mugabe, R. (2019). Challenges Experienced by School Management Committees in Monitoring the Implementation of Universal Primary Education in Uganda. *International Journal of Current Research,* 11(6): 4687–4693. doi: 10.24941/ ijcr.35420.06.2019.

Mundfrom, D. J., Shaw, D.G. & Ke, T. L. (2005). Minimum Sample Size Recommendations for Conducting Factor Analyses. *International Journal of Testing,* 5(2) 159–168. doi: 10.1207/s15327574ijt0502_4.

Mzelela, J.L. (2009). An Assessment of School Committees' Performance in Managing Primary Schools in Tanzania: A case study of Bagamoyo District in Coast Region (Masters dissertation, University of Dar es Salaam). Retrieved from http://localhost: 8080/xmlui/handle/123456789/4340.

Nemes, J. (2013). School Committees in the Context of Preparing and Implementing Whole School Development Planning. *Journal of Education and Practice,* (4)7: 73–79.

Norman, G. (2010). Likert Scales, Levels of Measurement and the "Laws" of Statistics. *Advances in Health Sciences Education,* 15(5): 625–632. doi: 10.1007/s10459–010–9222–y.

Olson, M. (1965). *The Logic of Collective Action*: *Public Goods and the Theory of Groups.* Cambridge, MA: Harvard University Press.

Ostrom, E. (1990). *Governing the Commons*: *The Evolution of Institutions for Collective Action.* New York, NY: Cambridge University Press.

Ostrom, E. (2009). Collective Action Theory. In Carles Boix and Susan C. Stokes (Eds.). The *Oxford Handbook of Comparative Politics* (,. 186–208). doi: 10.1093/oxfordhb/ 9780199566020.003.0008.

Ozcinar, Z. (2020). Development of Teacher-Parent Communication Competence Scale (TPCCS). *Cypriot Journal of Educational Sciences,* 15(2): 349–357. doi: 10.18844/ cjes.v15i2.4806.

Pandolfelli, L., Meinzen-Dick, R. & Dohrn, S. (2007). Gender and Collective Action: A Conceptual Framework for Analysis. CAPRi Working Paper No. 64, Washington, DC: CGIAR SystemWide Program on Collective Action and Property Rights, International Food Policy Research Institute (IFPRI). Retrieved from http://ebrary. ifpri.org/ utils/ getfile/collection/p15738coll2/id/34991/filename/34992.pdf.

Pett, M. A., Lackey, N. R. & Sullivan, J. J. (2003). Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research. Thousand Oaks, CA: Sage Publications. doi: 10.4135/9781412984898.

Pituch, K. A. & Stevens, J.P. (2016). *A, lied Multivariate Statistics for the Social Sciences*. London, UK: Routledge.

Poteete, A., Janssen, M. & Ostrom, E. (2010). *Working Together*: *Collective Action, the Commons, and Multiple Methods in Practice*. Princeton, NJ: Princeton University Press. doi: 10.2307/j.ctt3fgxrd.

Poteete, A. R. & Ostrom, E. (2004). In Pursuit of Comparable Concepts and Data About Collective Action. *Agricultural Systems,* 82(3): 215–232. doi: 10.1016/ j.agsy.2004.07.002.

Robitzsch, A. (2020). Why Ordinal Variables Can (Almost) Always Be Treated as Continuous Variables: Clarifying Assumptions of Robust Continuous and Ordinal Factor Analysis Estimation Methods. *Frontiers in Education,* 5(589965): 177. doi: 10.3389/ feduc.2020.589965.

Şahin, B. M. & Arastaman, G. (2018). Psychometric Analyses of the School Governance Scale and a Study for Principals, Teachers and Other School Personnel. *Kastamonu Education Journal,* 27(1): 1–13. doi: 10.24106/kefdergi.417776.

Sehrawat, M. & Roy, M. M. (2021). Expected Roles and Functions of the School Management Committee: An Investigation for Effective Functioning. *South Asian Journal of Social Sciences and Humanities,* 2(1): 79–92. doi: 10.48165/ sajssh.2021.2107.

Sijtsma, K. (2009). on the Use, the Misuse and the Very Limited Usefulness of Cronabch's Alpha. *Psychometrika,* 74(1): 107–120. doi: 10.1007/s11336–008–9101–0.

StataCorp. 2017. *Stata Statistical Software*: *Release* 15. College Station, TX: StataCorp LLC.

Streiner, D. L. (2003). Starting at the Beginning: An Introduction to Coefficient Alpha and Internal Consistency. *Journal of Personality Assessment,* 80(1): 99–103. doi: 10.1207/ S15327752JPA8001_18.

Sullivan, G. M. & Artino, A. R., Jr (2013). Analyzing and Interpreting Data from Likert-Type Scales. *Journal of Graduate Medical Education*, 5(4): 541–542. doi: 10.4300/JGME-5–4–18.

Tabachnick B. G. & Fidell L. S. (2007). *Using Multivariate Statistics*. Boston, MA: Pearson Education Inc.

Tavakol, M. & Dennick, R. (2011). Making Sense of Cronbach's Alpha. *International Journal of Medical Education*, 2, 53–55. doi: 10.5116/ijme.4dfb.8dfd.

United Republic of Tanzania. (2001). *Primary Education Development Plan*. Dar es Salaam, Tanzania: Ministry of Education and Vocational Training (MoEVT).

United Republic of Tanzania. (2006). *Primary Education Development Program II* (2007–2011). Dar es Salaam, Tanzania: Ministry of Education and Vocational Training (MoEVT).

United Republic of Tanzania. (2012). *Primary Education Development Program III* (2012–2016). Dar es Salaam, Tanzania: Ministry of Education and Vocational Training (MoEVT).

United Republic of Tanzania. (2018). Education Circular No. 1 2018: Guideline for formation and management of school committee and boards. Dodoma, Tanzania: Ministry of Education, Science and Technology (MoEST).

Van Wyk, N. (2004). School Governing Bodies: The Experience of South African Educators. *South African Journal of Education* 24(1): 49–54.

Vaske, J. J., Beaman, J. & Sponarski, C.C. (2017) Rethinking Internal Consistency in Cronbach's Alpha. *Leisure Sciences,* 39(2): 163–173. doi: 10.1080/ 01490400. 2015. 1127189.

Wade, R. (1987). The Management of Common Property Resource: Finding a Cooperative Solution. *Research Observer,* 2(2): 219–234. doi: 10.1093/wbro/2.2.219.

Williams, B. A., Onsman, A. & Brown, G. T. (2010). Exploratory Factor Analysis: A Five-Step Guide for Novices. *Journal of Emergency Primary Health Care*, 8(3): 1 - 13. doi: 10.33151/ajp.8.3.93.

Wrights, S. C. (2009). The Next Generation of Collective Action Research. *Journal of Social Issues,* 65(4): 859–879. doi: 10.1111/j.1540–4560.2009.01628.x.

Yong, A. G. & Pearce, S. (2013). A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutorials in Quantitative Methods for Psychology,* 9(2): 79–94. doi: 10.20982/tqmp.09.2.p079.

Young, A. & Bryan, J. (2015). The School Counselor Leadership Survey: Instrument Development and Exploratory Factor Analysis. *Professional School Counseling,* 19(1): 1–17. doi: 10.5330/1096–2409–19.1.1.