Validation of Questionnaire on Teachers' Beliefs and Practices of Cooperative Group Work Assessment

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Article Info	*Abstract*

This paper is aimed to validate a questionnaire intended to measure secondary school teachers' beliefs and pract[...] of cooperative group work assessment in selected secondary schools in Southern Nations Nationalities and Peop[...] Regional State (SNNPRS), Ethiopia. To this effect, five experts were selected to rate the content and face validi[...] the tool. To rate the questionnaire for construct validity, 213 secondary school teachers were selected u[...] systematic random sampling techniques. The validation procedures made use of the face validity index, Item Con[...] Validity Index (I-CVIs) and Content Validity Index for scale (S-CVI/Ave), principal component analysis (PCA), [...] Cronbach alpha. The results indicated the questionnaire has been found psychometrically valid and reliabl[...] measure teachers' beliefs and practices of cooperative group work assessment. However, further validation has t[...] conducted on larger samples at different educational levels and be tested in different cultural contexts fo[...] comprehensiveness.

Keywords: *assessment, belief, group work, practice, questionnaire validation, validity*

1. INTRODUCTION

Cooperative learning is a pedagogical practice that has drawn the attention of scholars for a long time. It is an effective teaching tool at all levels of education for different subject domains. Besides, it is a student-centered approach to teaching and learning through which learners work in small groups to make the best use of their own and each other's learning (Johnson & Johnson, 1999). Moreover, cooperative learning has been proven to enhance student performance, improve communication, higher self-esteem, problem-solving skills, and socialization (Johnson & Johnson, 2002). Furthermore, it has been believed to provide students with a non-threatening, more comfortable, and supportive learning environment as compared to individual or competitive group work (Gupta, 2004).

To be beneficiaries of cooperative learning, however, the roles of teachers in facilitating effective cooperative learning have no substitute (Johnson & Johnson, 1999). Among the assorted roles teachers are supposed to carry out in cooperative learning groups, the assessment of cooperative learning is central (Casal, 2016). Appropriate assessment of cooperative learning plays a vital role in directing quality learning (Casal, 2016; Gillies & Boyle, 2010). However, it should be noted that teachers' assessment beliefs of cooperative learning could influence their assessment practices (Casal, 2016) since beliefs largely direct teachers' instructional practices including assessment (Guadu & Boersma, 2018).

Literature reviews on the assessment of cooperative learning emphasized the importance of the group and individual performance assessment, the assessment of collaborative learning, and the involvement of learners in the assessment process (Strom & Strom, 2011; (Forsell, Forslund Frykedal & Hammar Chiriac, 2020) although the assessment of cooperative group work has been a complex task for teachers. In addition, the assessment of group outcome/product and the process is vital in the assessment of group work. Along with this, the assessment has to engage students via self and peer assessments in addition to teacher assessments (Sharp, 2006).

To conduct a survey study on teachers' beliefs and practices of cooperative group work assessment for an informed decision, the availability of standardized tools on the issue is fundamental. Despite an extensive electronic search for the validated tools on teachers' beliefs and practices of cooperative group work assessment, the researchers could not find any specific to the assessment of cooperative group work. It seems that there is no standardized questionnaire on the issue, and this situation triggered

the researchers to develop and validate a questionnaire on teachers' beliefs and practices of cooperative group work assessment. Therefore, this study was done to validate a tool that could measure teachers' beliefs and practices of cooperative group work assessment with a focus on some selected secondary school teachers in Sothern Nations, Nationalities Peoples Regional States (SNNPRS) of Ethiopia.

2. RESEARCH METHODOLOGY

2.1. Participants

To validate construct validity and examine the internal consistency reliability of the questionnaire on teachers' beliefs and practices of cooperative group work assessment, teachers from five secondary schools were selected through a simple random sampling technique for a questionnaire survey between June and December 2019. The secondary schools from which teachers were sampled include Arba Minch Secondary School, Karat Secondary School, Sawula Secondary School, Merab-Abaya Secondary School, and Konso Secondary School. The teachers were sampled from all academic subjects taught in the schools as per the curricula of the Federal State of Ethiopia. Accordingly, 254 teachers were considered for the study. However, the response rate was 85.5 %. Consequently, appropriately filled questionnaire data from 213 teachers were used for the analysis.

To validate the questionnaire for content and face validity, five senior professors were selected from the Departments of English Language and Literature, Geography and Environment Studies, and History and Heritage Management.

2.2. Questionnaire Construction

The purpose of the questionnaire was to elicit accurate quantitative data from teachers concerning their beliefs and practices of cooperative group work assessment. To meet this objective, the close-ended questionnaire was developed based on a few empirical works (Gillies & Boyle, 2010; Le, Janssen & Wubbels, 2018) and related review pieces of literature on cooperative learning (Forsell, Forslund Frykedal & Hammar Chiriac, 2020; Paul & Ralph, 2005; Frykedal & Chiriac, 2011; Valente, 2018).

The original questionnaire consisted of 35 items with two scales. The cooperative group work assessment practice scale had (n=19) items while the cooperative group work assessment beliefs scale constituted (n=16) items. The draft questionnaire was prepared in two parts. The first part consisted of items that are

related to demographic information about the participants' sex, teaching experience, the subject they teach, and educational level. The second part focused on teachers' beliefs and practices of cooperative group work assessment on a 5-point Likert scale which included 1= strongly disagree, 2= disagree, 3= undecided, 4= agree, and 5= strongly agree to scales.

2.3. Validation Procedures

The validity and reliability of a new instrument have to be established to ensure its credibility and appropriateness for purpose before using it for actual data collection. Consequently, this section presented the validation procedures of the questionnaire on teachers' beliefs and practices of cooperative group work assessment. Accordingly, the face validity, content validity, construct validity, and internal consistency reliability of the questionnaire were performed.

The face validity of the questionnaire was rated in terms of its feasibility, wording clarity, and style/format consistency (DeVon et al., 2007). Hence, the feasibility, wording clarity, and style/format consistency of the questionnaire was rated on a 4-point Likert scale. The scale ranged from 1= strongly disagree, 2= disagree, 3= agree, and 4= strongly agree.

The second aspect examined was the content validity of the questionnaire. It was intended to assess if the tool was appropriate, clear, and relevant to a study that may use this tool. Accordingly, each evaluator independently rated the appropriateness, clarity, and relevance of each item of the questionnaire with a 4-point Likert scale which ranged from 1= strongly disagree, 2= disagree, 3= agree, and 4= strongly agree.

The other feature of the questionnaire for validation was its construct validity. Construct validity concerns the extent to which the items of the questionnaire were related to the underlying constructs (Kane, 2001). As a result, the questionnaire was rated by 213 secondary school teachers. To decide whether the items of the questionnaire measured the intended constructs and cluster the items of the questionnaire into appropriate factors, various statistical tools were employed. The subsequent section discussed these issues.

The final facet of the questionnaire validation was internal consistency reliability. Internal consistency reliability examines the inter-item correlations within an instrument and shows how well the items fit together conceptually (DeVon et al., 2007). In other words, it estimates the consistency of the entire

questionnaire. To this end, Cronbach alpha was run to find the internal consistency of the questionnaire for each subscale and the entire scale.

2.4. Methods of Data Analysis

The data collected through questionnaires were tallied, quantified, and converted into averages at item and scale levels for analysis. To analyze the face validity of the questionnaire as rated by 5 experts, the face validity index was computed. A face validity index of ≥0.80 was used as a cut-off point to judge the face validity of the instrument. Similarly, the Item Content Validity Index (I-CVIs) and Content Validity Index for scale (S-CVI/Ave) were used to estimate the content validity at an item and scale level, respectively (Trochim, 2001). Therefore, I-CVI with ≥0.80 for an item, and S-CVI/Ave ≥0.90 for the scale were applied as cut-off points, respectively.

To determine the construct validity of the questionnaire, factor analysis was used to cluster items meaningfully into common factors, interpret each factor according to the items having a high loading on it, and summarize the items into a small number of factors (Bryman & Cramer, 2005). Before running factor analysis, inter-item correlations among the items were done to check if the tool at the scale level measures the same underlying dimension(s). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity (Bryman & Cramer, 2005) were also run. To this effect, the KMO measure (KMO ≥0.50) and a significant level of Bartlett's test of Sphericity at ($p<.05$) were considered. In addition, ant-image correlation coefficients were checked for the minimum cut-off (>0.5) for all items before running principal component analysis for factor analysis (Field, 2005).

The last issue of questionnaire validation was internal consistency reliability. To test the internal consistency, Cronbach alpha was run for each set of factors and the entire scale. Thus, significant Cronbach alpha values (≥ 0.7) at ($p<0.05$) level were considered to claim the questionnaire for data collection. The assumptions necessary to apply Cronbach alpha were carefully checked before running the data (Cronbach & Shavelson, 2004).

3. RESULTS

3.1. Content and Face Validity

The results of I-CVIs were found to range between acceptable content validity of 0.80–1.00. This implies that the items were considered appropriate at an item level. In addition, the result of S-CVI/Ave was exhibited to be 0.91. Since the 0.91 ≥0.90 cut-off value, the contents of the instrument seem valid. Concerning face validity, the content experts (n=5) rated for wording clarity, layout consistency, and feasibility of the tool. Accordingly, a face validity index of ≥0.92 was obtained. This shows that the instrument has acceptable face validity.

3.2. Construct Validity and Internal Consistency Reliability

The original questionnaire had two scales; namely the cooperative group work assessment practices with (n=19) items, and beliefs with (n=16) items. The data were checked for normality of distribution and possible outliers as preliminary tests before any statistical tools. Consequently, skewness and kurtosis of the data and plot boxes for checking outliers were used. The skewness and kurtosis values were below the absolute value of 2.00 which implied the normality of the data. In addition, plot boxes indicated there were no outliers in the data.

Before performing factor analysis, the 19 items on teachers' assessment practices of cooperative group work were tested for suitability of data for factor analysis. Accordingly, the Kaiser-Meyer-Olkin Measure of Sampling adequacy (KMO) =.835 was found. It was above the suggested value of 0.60 for good factor analysis (Tabachnick & Fidell, 2001). Bartlett's test of Sphericity was also significant, (171) = 1757.57, at a 99% confidence level (p < .001). Besides, the ant-image correlation coefficients were above the minimum cut-off (>0.5) for all items. This implies that the data qualified for factor analysis. An initial principal component analysis (PCA) was conducted with orthogonal Varimax rotation to obtain eigenvalues for each component in the data. Four components had eigenvalues over Kaiser's criterion of 1 with a cumulative 59.88 % of the variance. Nevertheless, the extracted communality values depicted that four items had values less than 0.50. As a result, the re-running of principal component analysis, deleting the item with the least commonality value at a time, continued until all items secured values above 0.5. Through these processes,

four items with extracted communality values less than 0.5 were removed from the assessment practice scale.

Having secured extracted communalities above 0.5 for all items, factor analysis was run with the rest 15 items. The result showed four components with eigenvalues exceeding 1, explaining 58.74 % cumulative variance. However, three factors were considered since the scree plot showed a clear break on the third component. Therefore, three factors solution with Varimax rotation was executed. For an acceptable interpretation, factor loading values above 0.4 were considered (Hair et al., 1998). All 15 items of the questionnaire were able to maintain loadings above 0.4. The factor loadings of the final PCA are shown in Table 1.

Table 1 The factor loadings for cooperative group work assessment practices scale

No	Items	F1	F 2	F3
1	I frequently check the contribution of each group member to the group work	.750		
2	I give relevant feedback timely on an individual contribution to the group work	.823		
3	I give relevant feedback timely on the performance of group work	.830		
4	I use peer assessments to assess the contribution of each member to the group work	.675		
5	I regularly monitor if group members listen to each other attentively to understand each other as they carry out group work	.656		
6	I oversee the respect each group member gives to others' opinions and feelings in the group as they carry out group work	.723		
7	I request group members to report the communications they had between them, the ideas, strategies, tools, and/or resources they used to carry out the activity	.570		
8	I involve students in suggesting assessment tasks for a group		.531	
9	I involve students in preparing assessment criteria (scoring rubrics) of group work		.696	
10	I use student self-assessments in assessing cooperative group work		.438	
11	I use student peer assessments in my assessment for learning in Cooperative group work		.812	
12	I ask for the support/feedback each group member gave to other groups members		.571	
13	I use only my assessments in assessing cooperative group work			.750
14	I give each member the same mark regardless of the quality of work done by each member			.758
15	I assess the final group outcome more than the group work processes			.732

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Based on the values of factor loadings, the factors have been named accurately. Consequently, factor 1, factor 2, and factor 3 have been labeled as assessment of group process, assessors involved, and assessment of group product, respectively. The factor loadings ranged from .438 to .830 implying mixed loadings of factors of fair to excellent (Field, 2005) for the cooperative group work assessment practices scale.

The 16 items on teachers' beliefs of cooperative group work assessment were checked for suitability of data for factor analysis. Consequently, the Kaiser-Meyer-Olkin Measure of sampling adequacy was found to be KMO=.749, above the suggested value of 0.60 for good factor analysis (Tabachnick & Fidell, 2001). Bartlett's test of Sphericity was also significant, (120) = 2659.114, p < .001. Moreover, the ant-image correlation coefficients were above the minimum cut-off (>0.5) for all items. To this effect, an initial principal component analysis (PCA) was conducted with orthogonal Varimax rotation. Four components, which had eigenvalues of greater than 1 with a cumulative variance of 73.29%, were obtained. The scree plot also showed a break after the fourth component. Furthermore, the extracted communality values for all the items were above the 0.5 minimum value required. Therefore, four factors were considered for PCA of orthogonal Varimax rotation with 16 items. Interpretations of factors were made with factor loading values above 0.4 (Hair et al., 1998). As a result, all the 16 items of the questionnaire were retained. The factor loadings of the final PCA are shown in Table 2.

Table 2 The factor loadings for cooperative group work assessment beliefs scale

No	Items	F1	F 2	F 3	F4
1	Peer assessment accurately assesses group member's performance	.725			
2	Peer assessment assesses individual contribution to the group work fairly	.687			
3	Student peer assessment is an effective assessment method	.772			
4	Student self-assessment is a valuable method of assessing cooperative group work	.750			
5	The ability to assess group work is an important skill for a teacher	.724			
6	Students assess their peers in a responsible manner	.655			
7	Assessment of group work plays an important role in fostering learning		.784		
8	Assessment of group work provides feedback to students on their performances		.808		
9	Students should take part in assessing their peers in group work		.738		
10	The assessment of how students cooperatively worked (group process) is important		.600		

No	Items	F1	F 2	F 3	F4
11	How students cooperatively worked on the task (group process) should be assessed		.691		
12	Feedback on the assessed group tasks helps students to improve their learning			.813	
13	Social skills among students should be monitored to develop collaborative behavior			.838	
14	The assessment of group work should include an assessment of social skills			.596	
15	The assessment of the final group work (group product) is important				.823
16	The final group work (group product) should be assessed				.576

Similar to the cooperative group work assessment practices scale, factors have been named for the cooperative group work assessment beliefs scale as well. To this end, factors 1, 2, 3, and 4 have been labeled as beliefs about the assessors involved, assessment of group process, assessment of social skills, and assessment of group product, respectively. The factor loadings ranged from .576 to .838 showing mixed loadings of factors from fair to excellent (Field, 2005).

Table 3 Internal consistency reliability of factors and scales

Factors (assessment practices)	No of items (N)	Cronbach alpha
F1 (group process)	7	.87
F 2 (assessors involved)	5	.74
F3 (group product)	3	.66
Scale	15	.85
Factors (assessment Beliefs)		
F 1 (assessors involved)	5	.88
F 2 (group process)	6	.89
F 3 (social skills)	3	.80
F 4 (group product)	2	.68
Scale	16	.92

After having done factor analysis for the construct validity of cooperative group work assessment beliefs and practices scales, internal consistency reliability tests were computed with Cronbach's alpha. The suggested alpha value of .70 for a new instrument (DeVon et al., 2007) has been accepted. Thus, the alpha value computed for the two scales and each subscale exceeded the acceptable cut-off value of .7 except for the assessment of group product (α= .66) and beliefs about assessment of group product (α= .68) subscales. Items or scales with marginal alpha values could be retained provided that the items are deemed important

(DeVon et al., 2007). Accordingly, the two sub-scales were maintained as part of the tool as the assessment of group products is an essential aspect.

4. CONCLUSIONS

As introduced in the earlier section, this study aimed to establish the validity and internal consistency reliability of a questionnaire intended to measure teachers' beliefs and practices of cooperative group work assessment. To this effect, the face, content, construct validities, and internal consistency reliability of the questionnaire was analyzed. The results indicated the questionnaire had an acceptable face and content validity. The construct validity of the questionnaire also showed that it is an accurate measure of beliefs and practices of cooperative group work assessment.

The internal consistency reliability obtained through Cronbach's alpha coefficients indicated high reliability (α= 0.85) for the practice scale and (α= 0.92) belief scale. Nonetheless, group product assessment practices and group process assessment beliefs subscales showed marginally reliable values. This could be due to a small number of items retained (accounted) in the factors.

The study aimed to validate a questionnaire that measure teachers' beliefs and practices of cooperative group work assessment. The results indicated that the tools are reliable and valid to measure the two dimensions (beliefs and practices of group work assessments). Thus, the tools have acceptable psychometric properties to use in education. Therefore, the questionnaire could be used to explore teachers' beliefs and practices of cooperative group work assessment in secondary schools regardless of the taught subjects. However, it should be noted that the validation has to be done again on larger samples at different educational levels to claim the wide use of the questionnaire. In addition, it has to be tested in different cultural contexts for its comprehensiveness.

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