

Factors Related to Teachers' Analysis of Classroom Assessments

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Abstract—Analyzing classroom assessments is one of the responsibilities of the teacher. It aims improving teacher's instruction and assessment as well as student learning. The present study investigated factors that might explain variation in teachers' practices regarding analysis of classroom assessments. The factors considered in the investigation included gender, in-service assessment training, teaching load, teaching experience, knowledge in assessment, attitude towards quantitative aspects of assessment, and self-perceived competence in analyzing assessments. Participants were 246 in-service teachers in Oman. Results of a stepwise multiple linear regression analysis revealed that self-perceived competence was the only significant factor explaining the variance in teachers' analysis of assessments. Implications for research and practice are discussed.

Keywords—Analysis of assessment, Classroom assessment, In-service teachers, Self-competence.

I. INTRODUCTION

CLASSROOM assessment refers to the process used in the classroom by the teachers to obtain information about the extent to which students are achieving the target instructional outcomes [1]. It involves developing assessment methods; administering, scoring, and interpreting assessments; developing grading procedures; communicating assessments; and making educational decisions [2]. Classroom assessment can serve as a meaningful source for motivating students for learning and for enhancing instruction [1], [3]. This can be achieved through conducting qualitative and quantitative analyses of the classroom assessment results [3].

Unfortunately, findings from past and recent studies have expressed a concern about the adequacy of teachers' classroom assessment practices related to analyzing results of the classroom assessment. For example, in an earlier survey of statistical analyses of test results for 336 elementary and secondary school teachers, [4] found that a substantial proportion of teachers reported using relatively little statistical information such as means, medians, and standard deviations to describe assessment results. Also, these same teachers did not have an adequate understanding of basic testing concepts such as item difficulty and reliability. Parallel to [4]; [5] and

[6] found in studies of 625 K-12 Ohio state teachers that teachers did not spend much time conducting statistical analyses of the assessment data with no significant differences based on teacher's gender and years of teaching experience. Recently, [7] found in a study of 165 in-service teachers in Oman that less than one third of the teachers reported analyzing assessments most to all of the time, with no significant differences with respect to training in assessment and teaching experience. Also, [7] found that male teachers reported analyzing assessments more frequently than female teachers and that teaching load correlated negatively with frequency of teacher's analysis of assessment results.

Other studies have provided evidence that attitude towards assessment and self-perceived competence in performing assessment tasks might override the effects of assessment training on assessment knowledge and practices. For example, [8] found in a study of 516 in-service teachers that attitude toward educational assessment, self-perceived confidence in educational assessment, in-service assessment training, and teaching experience were the only reliable predictors of assessment knowledge. Further, in a study of 279 pre-service teachers and 233 in-service teachers, [9] found that although in-service teachers tended to have a lower level of educational assessment knowledge, those with a pre-service training in educational assessment had a better understanding of the educational assessment concepts and principles than those without pre-service educational assessment training. However, when compared to the high experienced teachers, those having low teaching experience had a higher level of educational assessment knowledge. In a two-week classroom assessment workshop for seven in-service teachers, [10] investigated pre- and post-tested teachers' assessment literacy using the 35-item of the ALI. The results showed that teachers' performance on the post-test ($M = 28.29$) was on average higher than their performance on the pre-test ($M = 19.57$). Also, the teachers indicated that the training had a positive impact on their feelings regarding assessment and confidence in using assessment.

Given the importance of utilizing classroom assessment for improving instruction and student learning and the inadequacy of teachers' assessment practices with regard to the analysis of assessments, it seems critical to examine the factors that might explain variation in teachers' analysis of classroom assessments. Thus, the purpose of the present study was to investigate the factors that might explain the teachers' assessment practices with regard to the analysis of classroom assessments. Based on the aforementioned literature, the factors that would be considered in the investigation were

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gender, in-service assessment training, teaching load, teaching experience, knowledge in assessment, attitude towards quantitative aspects of assessment, and self-perceived competence in analyzing assessments.

II. METHODS

A. Participants

The participants were 246 in-service teachers (111 males and 135 females) teaching the second cycle grades of the basic education in Oman. Their teaching experience ranged from 1 to 27 years with an average of 9 years and a standard deviation of 4.80 years. The teaching load of the participants ranged from 4 to 22 classes per week with an average of about 14 classes and a standard deviation of 4.70 classes. About 75% of the participants reported not having any assessment training course during in-service.

B. Procedures

Permission was requested from the Ministry of Education and school principals to collect data from the teachers. The participants were informed that a study is being conducted to investigate teachers' assessment practices with regard to analyzing assessments. The teachers were also informed that they were not obligated to participate in the study, and that if they wished, their responses would remain anonymous and confidential. Those who wished to participate in the study were provided a cover letter and a questionnaire along with brief instructions about the information that was requested in the questionnaire, how to respond to the items, and where to find directions that were also included both on the cover letter and the questionnaire.

C. Instrumentation

A self-report questionnaire of five sections was used in this study. The first section was about background and demographic data of the participants including gender, weekly teaching load, teaching experience, and in-service assessment training. The other four sections were about attitude towards quantitative aspects of assessment, self-perceived competence in analyzing assessments, knowledge in analysis of assessment, educational assessment practices related to analyzing assessments. To establish content validity, the questionnaire was given to a group of seven experts in the areas of educational measurement and psychology from Sultan Qaboos University and Ministry of Education. They were asked to judge the clarity of wording and the appropriateness of each item and its relevance to the construct being measured. Their feedback was used for further refinement of the questionnaire.

Attitude towards Quantitative Aspects of Assessment

This section of the questionnaire contained 8 items from the Arabic version of the Attitude Toward Educational Measurement Inventory [7], [11]. Responses were obtained on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scoring of the negative items was reversed so that a high score reflected a more positive attitude towards

quantitative aspects of assessment. An individual's attitude towards quantitative aspects of assessment was represented by an average rating score across all the items. Internal consistency reliability coefficient was .74 as measured by Cronbach's alpha.

Self-Perceived Competence in Analysis of Assessment

This section of the questionnaire contained 9 items from Self-Confidence Scale in Educational Measurement developed by [12] to assess teachers' perceptions of confidence in their abilities to perform certain educational assessment tasks related to analyzing assessment results such as conducting item analysis in terms of difficulty and discrimination, calculating descriptive statistics of assessment scores, and conducting validity and reliability analyses for an assessment. Responses were obtained on a 5-point Likert scale ranging from 1 (*very low competence*) to 5 (*very high competence*) with high scores reflecting a high level of competence in analyzing assessments. An individual's self-perceived competence in analyzing assessments was represented by an average rating score across all the items. Internal consistency reliability coefficient was .89 as measured by Cronbach's alpha.

Knowledge in Analysis of Assessment

This section of the questionnaire consisted of 24 items from the Arabic version of the Teacher Assessment Literacy Questionnaire [13], [14]. It assesses teachers' knowledge and understanding of the basic principles and concepts related to the analysis of classroom assessments. All items followed a multiple-choice format with four options, one being the correct answer. The KR20 reliability coefficient for the scores was .62.

Analysis of Assessments

This section of the questionnaire consisted of 6 items from Teachers' Assessment Practices Questionnaire developed by [15]. The items assess the extent to which teachers conduct item analysis in terms of difficulty and discrimination, calculate descriptive statistics of students' scores on an assessment, and conduct validity and reliability analyses of an assessment. Responses were obtained on a 5-point Likert scale ranging from 1 (*never*) to 5 (*all of the time*) with high scores reflecting more frequent analysis of the assessments. An individual's frequent analysis of the assessments was represented by an average rating score across all the items. An internal consistency reliability coefficient as measured by Cronbach's alpha was .78.

D. Data Analysis

Means, standard deviations, and Pearson-product moment correlations were computed for the variables considered in the study to describe the data. A stepwise multiple linear regression analysis was conducted to identify the combinations of variables (gender, in-service assessment training, teaching load, teaching experience, knowledge in assessment, attitude towards quantitative aspects of assessment, and self-perceived competence in analyzing

assessments) that may explain the variation in teachers' analysis of assessments. Gender was dummy coded (0 for males and 1 for females). In-service assessment training was dummy coded (0 for not having any in-service assessment training and 1 for having at least one in-service assessment training).

III. RESULTS

Table I presents means, standard deviations, and Pearson correlation coefficients for teachers' analysis of assessments, attitude towards quantitative aspects of assessment, self-competence in assessment, and knowledge of analysis of assessment. It appears that the participants tended to analyze assessment results some of the time. On average, the participants tended to have a positive attitude towards quantitative aspects of assessment and a moderate level of self-perceived competence in analyzing assessments. On average, the participants answered correctly about 80% of the items of the Teacher Assessment Literacy Questionnaire.

TABLE I
MEANS, STANDARD DEVIATIONS, AND PEARSON CORRELATIONS FOR ANALYSIS OF ASSESSMENTS, ATTITUDE TOWARDS QUANTITATIVE ASPECTS OF ASSESSMENT, SELF-COMPETENCE IN ANALYSIS OF ASSESSMENTS, AND KNOWLEDGE IN ANALYSIS OF ASSESSMENTS (N = 246)

Variable	M	SD	1	2	3	4
1. Analysis of assessment	3.03	.81	-			
2. Attitude	3.03	.46	.15*	-		
3. Self-competence	3.13	.81	.68***	.26***	-	
4. Knowledge	19.37	2.77	-.03	-.05	-.05	-

* $p < .05$. *** $p < .001$.

As shown in Table I, analysis of assessments correlated positively and significantly with attitude towards quantitative aspects of assessment ($r = .15, p < .05$) and self-perceived competence in analyzing assessments ($r = .68, p < .001$). Also, there was a statistically significant positive relationship between attitude towards quantitative aspects of assessment and self-perceived competence in analyzing assessments ($r = .26, p < .001$). Knowledge of analysis of assessments did not correlate significantly with any of the variables. Results of the stepwise multiple regression analysis showed that self-perceived competence in analyzing assessments was the only statistically significant factor related to teachers' frequent analysis of assessments; $r = .68, p < .001$. It accounted for about 46% of the variance in teachers' practices with regard to the analysis of assessments.

IV. DISCUSSION AND CONCLUSION

Analyzing results of classroom assessment is one way of making classroom assessment a useful source for teachers to enhance classroom instruction and student learning [1], [2]. Unfortunately, past studies have documented that teachers tended not to spend the necessary time required for analyzing classroom assessments [4]-[7]. The present study contributes to the limited existing knowledge about teachers' practices with regard to analyzing classroom assessments by investigating factors related to teachers' analysis of the

classroom assessments. Results pointed to a conclusion that teachers' self-perceived competence in analyzing assessments was a powerful contributor for teachers' analysis of classroom assessment results. Other factors such as gender, in-service assessment training, teaching load, teaching experience, knowledge in assessment, and attitude towards quantitative aspects of assessment collectively did not contribute significantly to teachers' practices with regard to the analysis of classroom assessments. These results partially agree with findings of past studies [5]-[7].

The present study findings tended to support Bandura's social cognitive theory in that a person's belief in his or her capability to do a particular task can be an indicator of how he or she regulates the behavior related to that task [16]. In light of Bandura's social cognitive theory, social persuasion can have an influence on one's beliefs in his or her ability to execute a course of action [16]. As such, the findings of the present study imply that teachers might need encouragement and verbal support from supervisors, school administrators, and other teachers that they are capable of analyzing results of the classroom assessment. In addition, [17] asserted the need for a continuous in-service training in classroom assessment for the teachers. The in-service assessment training was found to have a positive impact on teachers' sense of confidence in performing classroom assessment-related tasks [10], [18]. As such, the current study findings imply that teachers should be given in-service training in analyzing results of classroom assessment. Such kind of training may help change teachers' views about the importance of analyzing classroom assessments and foster their self-confidence in analyzing classroom assessments.

Finally, the present study was limited by the use of a correlational research design and as such no causal inferences can be drawn from the findings. In addition, the study was limited by the use of a self-report questionnaire. Future research might use multiple data collection methods to triangulate the findings.

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