

## TEACHERS' ASSESSMENT LITERACY: THE CASE OF IRANIAN K-12 MATH TEACHERS

Mohammad Nekoufar (Islamic Azad University, Iran.)

[mrnekoufar@gmail.com](mailto:mrnekoufar@gmail.com)

**Abstract:** *The current study surveyed Iranian K-12 math teachers in terms of their assessment literacy (AL). To this end, 150 math teachers were invited to answer a test of assessment literacy, comprising of 31 items on the seven dimensions of assessment literacy expressed in the Standards. The test was tailored to the contingencies of the Iranian education system and was translated into Persian. Consistent with findings from similar studies on teachers' assessment literacy in other educational system, results indicated that Iranian math teachers do not enjoy a sufficient knowledge base in assessment ( $\bar{x} = 12$ ,  $sd = 3.38$ ). An independent samples *t*-test was run to see if primary school teachers teaching math, whose education background is not in mathematics, are any different from secondary school math teachers with degrees in mathematics or math education. Results showed no significant differences between the two groups of teachers;  $t(118) = .92$ ;  $p = .36$ ). Possible causes for math teachers' poor AL and implications the results hold for teacher education are further discussed in the remaining of this paper. The paper closes with a few suggestions for enhancing assessment literacy among math teachers.*

**Keywords:** *Math teacher, assessment literacy, Iranian teachers, K-12, secondary school*

### 1. Introduction

Assessment literacy refers to the knowledge, skills, and competencies which teachers must possess in order to be able to make appropriate inferences about students' learning, and to take due measures to act on those inferences to enhance students' achievement.

Nekoufar, M. (2024). **Teachers' assessment literacy: the case of iranian k-12 math teachers.**

*International Journal of Quality in Education*

For teachers of all subjects across various levels from primary school to higher education, assessment literacy is considered to be a key competence, without which no teacher is likely to succeed. Some scholars go as far as to call teaching without assessment literacy as "professional suicide" (Popham, 2009). Considering the consequences that assessment illiteracy carries for education, the above statement is by no means an overestimation of the importance of assessment literacy. Despite this crucial role of AL in education in general and in math education in specific, research on teachers' AL is still in its infancy. In the Iranian context, we found literally no study addressing the Iranian math teachers' AL. As such, the current study is a humble exploration into Iranian math teachers' AL to make a modest contribution to the small body of existing literature on assessment literacy. The structure of the current paper is rather straightforward. After a brief review of the pertinent literature, the methods used in the collection and analysis of data are elaborated on. Next, we will present the results of the study and discuss them. The paper closes with the implications the findings carry as well as the limitations of the study.

## **2. Literature Review**

The credit for the coinage of the term assessment literacy is often given to Stiggins (1991). Yet, educators have always been aware of the central importance of assessment literacy. However, empirical investigations into teachers' level of competence in assessment are not older than a few decades.

The issue of what should constitute assessment literacy remains controversial, as is realized in the structure and content of various coursebooks on assessment. Whereas scholars in general education more often than not think of AL in terms of the competencies required of teachers in *Standards*, those in language education while having an eye on what goes in the *Standards* often perceive of assessment literacy as being comprised of the *how*, the *what*, and the *why* of assessment (Davies, 2008; Shohamy, 2008).

The *how* in assessment refers to the technicalities of constructing, administering and interpreting exams. Of particular concern here are the issues of validity and reliability and the numerous issues that come with them. The *what* in assessment refers to the knowledge of the content area to be tested, in our case math knowledge or competence. To be in a position to assess mathematics, one has to have a plausible answer to the

question 'what does it mean to know mathematics?' How one answers this question likely would exert an inevitable influence on the other two elements of AL, namely, how and why.

The why question has been relatively given far less attention than the former two AL components. This dimension of AL deals with teachers' reflections on the reasons assessments are carried out. On the surface, this might seem straightforward an issue. Yet, on further reflection, teacher would realize that assessments are embedded in complicated social political, and cultural contexts where the interests of a wide range of stakeholders are at play. Not only are teachers required to be aware of how assessment *of learning*, assessment *for learning*, and assessment *as learning* differ, assessment literate teachers would beware of the power issues that are involved in the act of assessment. Teachers must be conscious of how assessments, which emerged as the instrument to promoting meritocracy and social mobility, might be exploited to do the otherwise: to stifle and hamper social mobility and promote the agendas of powerful institutions, ideologies, and individuals. Of immediate interest here would be teachers' competence in identifying unethical assessment behavior and a commitment to be fair and ethical.

The approach taken to conceptualizing AI by Brindley (2001) is more reductionist, dividing AL into core competencies and complementary competencies. Depending on teachers' needs and the specifics of the contexts in which they act some competencies of AL might be of immediate need and others might be less urgent to master by teachers. This flexible dichotomy with its emphasis on localizing and contextualizing AL sends the message that there is no rigid, universal body of assessment know-how that would act like a panacea to assessment problems. Rather, various teaching contexts demand different AL competencies. Therefore, the core and marginal modules of assessment competence are not set in stone but can change and rotate depending on the assessment context.

One of the earlier studies on teachers' assessment literacy was Plake, Impara, and Fager (1993). Surveying teachers in the United States, they found teachers to be largely assessment illiterate. Using an assessment literacy measure informed by *Standards*, they discovered that teachers performed best in the competency area of administering, marking and interpreting test results. On the other hand, they performed the

Nekoufar, M. (2024). **Teachers' assessment literacy: the case of Iranian k-12 math teachers.**

*International Journal of Quality in Education*

poorest in the area of communicating test results to parents and other stakeholders. They also found that assessment training, be it in-service or pre-service, is positively correlated with performance on the AL test.

More recently Deluka and colleagues (2013) investigated pedagogical circumstances under which student teachers are better prepared to enhance their assessment literacy. Using an open-ended questionnaire they found four pedagogical constructs which student teachers perceive of as being effective in helping them hone on their assessment competencies. These constructs are (a) perspective-building conversations, (b) praxis activities, (c) modeling, and (d) critical reflection and planning for learning.

Overall despite the surge of interest in teacher assessment literacy, to the best of our knowledge the assessment literacy of Iranian math teachers is uncharted territory. Thus, the current study seeks answers to the following research questions:

1. What is the overall assessment literacy of Iranian math teachers?
2. Is educational background a significant factor in determining math teachers' assessment literacy?

### **3. Methods**

The participants of the current study were 135 math teachers in public schools in Khuzestan, a province in the southwest of Iran. All three educational levels namely, primary, junior high school, and senior high schools were represented in the study sample. Participants were of diverse ages and educational levels. Yet, since such variables were of not of primary interest in this study, no attempt was made to document or control them. All participants were reached in person and handed the assessment literacy measure. They were briefed about the purpose of the study and were requested to try their best in answering the AL test items.

The data collection instrument for this study was an adapted version of the AL test developed and used by Plake, Impara, and Fager (1993). Given that participants were native speakers of Persian, the measure was first rendered in Persian and then given to an assistant professor of English to back translate it to ensure that no construct irrelevant variance had been introduced in the scores in the wake of translation. It is of

note that the approach we took in translation was a pragmatic one, that is every effort was made to make sure that the translated items make perfect sense in Persian. As such, staying faithful to the original wording of the items was not of concern. In so doing, in many cases we needed to create distractors and the keys so that they make sense to the Persian speaking math teachers. Besides, four items from the questionnaire were dropped because of their cultural incompatibility with the educational system of Iran. In other words, these items addressed educational issues for which there was no equivalent in the education system of Iran. One such example was the issue of school accountability, which is a hot topic in the educational system of the United States, especially in the wake of the No Child Left Behind legislation, where test scores are used to determine sanctions against poor performing schools and teachers. Because in Iran schools are not subject to similar accountability criteria, the item was dropped. As such items 14, 20, 25, and 31, were removed from the final version of the instrument. Similar to the original version of the instrument, the test did not enjoy a high reliability coefficient in this study either. The original authors of the measure believed that this low internal consistency measure is not enough to jeopardize the reliability of the test because of its criterion-referenced nature.

#### **4. Results**

Table 1 illustrates the descriptive statistics for participants' scores on the assessment literacy test. Before describing the results it is imperative to check the distribution of scores to see if there is any violation of normality characteristics. Two frequently used indexes for this purpose are measures of kurtosis and skewness, any of which if exceeds plus or minus two would be indicative of violation of data normality (Bachman, 2004). Table one shows that both skewness and kurtosis were within the acceptable range (.12 and -.38, respectively). The values noted above for the skewness and kurtosis of the data assure us that we can depend on mean and standard deviation of the data as proper indexes of both descriptive and inferential statistics. We now turn to the descriptive statistics of participants' scores on the assessment literacy test.

**Table 1.** *Descriptive statistics math teachers' scores on al test*

	N	Range	Mini- mum	Maxi- mum	Mean	Std. Devia- tion	Skewness		Kurtosis	
	Statis- tic	Statis- tic	Statis- tic	Statistic	Statis- tic	Statis- tic	Statis- tic	Std. Er- ror	Statis- tic	Std. Er- ror
Total	135	17.00	4.00	21.00	12.00	3.38	.12	.20	-.38	.41
Valid N (list- wise)	135									

As can be seen, the mean score was 12 out of 31, and the standard deviation of the scores is 3.38. The highest score obtained was 21 and the lowest was four, indicating that the test could adequately spread participants along a wide range of scores. Back to the mean score, the table shows us that the level of assessment literacy of math teachers is strikingly low. Even the most assessment literate teacher missed one third of the test items, providing us with further evidence for the extremely low assessment literacy of the participants.

To address the second research question, the participants were divided into two groups: math teachers teaching at secondary schools and primary school teachers teaching mathematics. What sets the two groups of apart is their educational background. The former, math teachers, are educated in the various math related major such as math education, applied mathematics, or pure mathematics whereas the latter groups have a degree in primary school education, which is not directed at any specific subject matter. The question is about the extent to which educational background of teachers moderates their assessment literacy. The comparison between the two groups of teachers was made using independent samples t-test. It should be noted that fifteen participants were excluded from the analysis because they did not specify which level they were teaching,

hence; they could not be assigned to any of the groups. Table 2 shows the descriptive statistics for the two groups.

Table 2. *Group descriptive statistics for primary and secondary math teachers*

Group	N	Mean	Std. Deviation	Std. Error Mean
Total primary	54	11.85	3.53	.48051
secondary	66	12.42	3.30	.40628

As the table illustrates the scores on the assessment literacy measure for the two groups do not seem different. The mean score for primary school teachers was 11.58 and the standard deviation was 3.53 while secondary school math teachers seemingly outperformed their primary peers slightly, with a mean of 12.42 and a standard deviation of 3.30. Nevertheless, to make sure such differences are large enough to dispel chance occurrence, we performed an independent samples t-test, the outcome of which is presented in table 3.

Table 3. *Independent Samples Test*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total	Equal variances assumed	.149	.700	.916	118	.362	-.57	.624	-1.81	.665

Table 3. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Total	Equal variances assumed	.149	.700	.916	118	.362	-.57	.624	-1.81	.665
	Equal variances not assumed			.910	110.018	.365	-.57	.629	-1.81	.674

As table 3 illustrates, the independent samples t-test indicates that the apparent difference between primary and secondary school math teachers is not significant at a p value of .05. ( $t(118) = .92$ ;  $p = .36$ ). In conclusion, it can be argued that though secondary math teachers obtained a slightly higher mean score on the assessment literacy measure, the difference was not large enough to be significant.

## 5. Discussion and Conclusions

The present study surveyed the assessment literacy of Iranian math teachers. The aggregate mean score of 12 out of 31 for the participants leaves little room for reservations about the extremely low level of assessment literacy of the participants. Though in light of global assessment illiteracy of teachers attested to by numerous studies (see Stiggins, 1991; Popham, 2009; Plake, Impara, and Fager, 1993), we did not expect Iranian math teachers to be exceptionally assessment literate, we did not expect a performance this



poor either. A comparison of teachers' scores in this study with those in plake and colleagues reveals that the average performance of teachers in that study was larger than even the maximum score of this study's participants. Whereas teachers in that study averaged 23 items correct, the highest score in this study was 21. Therefore, it seems safe to conclude that Iranian teachers' assessment literacy appears to be extremely low. There are a number of reasons for this state of affairs.

First, the very issue of educational assessment is not given the importance it deserves in the Iranian educational system. Given the meager share of the education sector from the country's GDP, the system is barely able to pay teachers' salaries. On the other hand, if students learning outcomes are measured through rigorous assessment mechanisms, this would exact further expenses on the already financially drained system because many students would have to repeat grades and courses, something the system cannot afford to provide for. In this situation, though tests and exams are ubiquitous across grades and levels, their resultant scores are not taken seriously. Though officials are reluctant to admit it publically, the common practice is for principals to put pressure on teachers to inflate scores. When teachers are aware that the real scores their students obtain from their exams do not carry any weight and they will have to boost scores under the pressure of the administration, they are left with little motivation or reason to pursue rigorous assessment procedures. Reasonably, when teachers' assessments are not valued, they gradually come to see assessment irrelevant. The leap from this state to assessment illiteracy is a short one.

A second reason for math teachers' assessment illiteracy has to do with the teacher training curriculum in which assessment issues are lacking or marginalized. Whereas teachers take numerous courses aimed at increasing their math knowledge in the belief that better knowledge of mathematics amounts to better math teaching, they hardly, if ever, take a course in assessment. In few cases where they do have an assessment courses, the content of such courses are usually about theoretical issues often more pertinent to high stakes examinations, which are often beyond the province of teachers. Therefore, a two credit course on general issues in assessment is not likely to lead to considerable increases in teachers' assessment competence.

Lastly, there is a ritualized understanding of assessment prevailing in the education system which hampers the development of math teachers' assessment competen-

Nekoufar, M. (2024). **Teachers' assessment literacy: the case of iranian k-12 math teachers.**

*International Journal of Quality in Education*

cies. This assessment dogma is so institutionalized that it is difficult to imagine it disappearing in the foreseeable future. The following features characterize this dogma of assessment: emphasis on summative assessment, modeling school assessments on high stakes state tests, paper and pencil format, a focus on lower level thinking processes, and lack of student involvement in assessment.

Only with consistent, principled, and steady efforts in fostering assessment literacy is it possible to turn the status quo around. The prevailing assessment condition has acquired the status of an educational ideology which is difficult to overcome. In the first step, stakeholders in particular teachers should be made aware of the status quo and how it could possibly be different. Afterwards, their perspectives should be broadened as to the importance of assessment as well as of the range of options they have at their disposal to distance themselves from practices rooted in the educational traditions of the country. Finally, assessment literacy programs have to be localized so that teachers can see the relevance and meaning of assessment to their own conditions. Such localization is not only about taking into account the characteristics of the settings in which assessment takes place but also the specifics of the subject matter. We believe that assessing math has its own unique features that distinguish it from assessing language for example. While there are some core issues underlying all educational assessments, there are still subject specific considerations that should not be ignored. One piece of evidence supporting this field specific nature of assessment literacy is Brindley's (2001) reasons for accounting the low assessment literacy of language teachers. Among such reasons one was a phobia of numbers and statistics associated with testing and assessment for language teachers, who are often not huge fans of numbers and figures. Yet, such a justification does not hold for math teachers as they have a robust background in arithmetic and statistics. Therefore, not only are reasons for assessment illiteracy might vary across different contexts; they also differ across content areas. Thus, the current practice in the designing syllabi for assessment literacy courses, where the same content is offered across tangent fields should change in the direction of more localization and fragmentation. At the end of the day, teachers must be made conscious of the fact that what is tested, becomes what is valued, which becomes what is taught.

Nekoufar, M. (2024). **Teachers' assessment literacy: the case of iranian k-12 math teachers.**  
*International Journal of Quality in Education*

## References

Bachman, L. F. (2004). *Statistical analyses for language assessment*. Ernst Klett Sprachen.

Brindley, G. (2001). Outcomes-based assessment in practice: Some examples and emerging insights. *Language Testing*, 18(4), 393-407.

Davies, A. (2008). Textbook trends in teaching language testing. *Language Testing*, 25(3), 327-347.

DeLuca, C., Chavez, T., Bellara, A., & Cao, C (2013). Pedagogies for Preservice Assessment Education: Supporting Teacher Candidates' Assessment Literacy Development, *The Teacher Educator*, 48:2, 128-142, DOI: [10.1080/08878730.2012.760024](https://doi.org/10.1080/08878730.2012.760024)

Plake, B. S., Impara, J. C., & Fager, J. J. (1993). Assessment competencies of teachers: A national survey. *Educational Measurement: Issues and Practice*, 12(4), 10-12.

Popham, W. J. (2009). Assessment literacy for teachers: Faddish or fundamental?. *Theory into practice*, 48(1), 4-11.

Stiggins, R. J. (1991). Assessment Literacy. *Phi Delta Kappan*, 72(7), 534-39.