

Investigation of Classroom Assessment Literacy of University Teachers of Punjab

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Abstract

The main objective of the study was to investigate the assessment literacy of university teachers. The study was quantitative in nature. A survey was conducted to investigate the assessment literacy of regular teaching faculty of universities. A total of 5755 in public and private sector general universities in Lahore, Pakistan constituted the population of the study. A sample of 500 university teachers was randomly selected. Teachers' Classroom Assessment Literacy test was adapted to collect the data. It was developed by Mertler (2003). It covers seven standards for measuring teachers' competence in educational assessment of students. The test consisted of 35 MCQs type items. It was piloted, and the Cronbach Alpha reliability coefficient value was found to be 0.89. The findings of the study revealed the significant difference between the mean achievement scores of classroom assessment literacy of private and public sector university teacher. It highlighted the need to develop related training sessions and programs to deal with the issue of low level of teachers' classroom assessment literacy.

Keywords: University teachers, classroom assessment literacy, higher education

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Introduction

Due to globalization and revolution in information and communication technology, an educated populace is vital. Higher education has become extremely important and for many people it is perceived as an entry ticket to better jobs and lifestyle. In addition to that, it plays a critical role in increasing social capital of any country and providing social cohesion.

In developing countries like Pakistan, the current phase of educational reform aims at emphasizing the quality in learning to raise it to international standards. Additionally, the quality of learners is found to be hampering the instructional outcomes, in terms of poor academic performance. So, the learning achievement of learners is emphasized to deal with this issue. Even the quality of teaching is linked with the quality of learning process. Generally, the five basic components are related to it, i.e., students, teachers, teaching material, assessment, and context (Yamtim & Wongwanich; 2014). Teacher is the most important component that really makes a difference. The teachers are key persons in decision making about instructional planning and the assessment of learning. As such effective decision making largely depends on assessment. Additionally, university students are being assessed by the teachers through different assessment methods like paper pencil tests, assignments, projects, etc. Teachers' scarce knowledge of assessment can distort the quality of education (Herrera & Macías, 2015). Literature continuously shows limited assessment knowledge on the part of teachers which also impacts on their assessment practices (Xu & Brown, 2016). Fundamentally, the teachers are required to be literate in classroom assessment to meet the demands of 21st century workforce by assessing broader knowledge and students' higher order skills. The teachers having such knowledge and understanding of assessment processes will be able to design or select various assessment tasks for better teaching, as well as students learning and summarization of their learning achievement (Duckor, Draney, & Wilson, 2017).

Assessment literacy is "the knowledge of means for assessing what students know and can do, how to interpret the results from these assessments and how to apply these results to improve student learning and program effectiveness" (Webb, 2002; p.1). Assessment literacy can empower the teachers to use data gathered from various assessment methods, interpret it properly and make their instruction better (Gotch, 2012). It is also important for teachers' own professional development (Lorente-Catalan & Kirk, 2015; Randel, Apthorp, Beesley, Clark, &

Wang, 2016; Huang & He, 2016). Research suggests that teachers are facing assessment literacy related issues in their professional development (Herrera & Macías, 2015; Gavin, Iris, & Kelvin, 2015; DeLuca, LaPointe-McEwan & Luhanga, 2016; Xu & Brown, 2016; Huber & Skedsmo, 2016; Deneen & Brown, 2016; Koh, Burke, Luke & Gong, 2017; Deeley & Bovil, 2017; Looney, Cumming, Kleij & Harris, 2017) especially in higher education institutions which provides a turning point for future lifestyle. Assessment literacy develops competencies in teachers and enables them to deal with assessment related issues of diverse students in higher education classroom settings.

The growing need and importance of teachers' classroom assessment literacy lead to the development of seven Standards on Teachers Competence on Educational Assessment of Students (STCEAS). These standards were collaboratively developed by "American Federation of Teachers (AFT), National Education Association (NEA) and National Council on Measurement in Education (NCME)" in 1990. Many research studies have addressed teachers' classroom assessment literacy using these standards (Plake, 1993; Zhang , 1996; Plake and Impara, 1997; Quilter and Gallini, 2000; Mertler , 2000; Campbell, Murphy, and Holt, 2002; Zhang and Burry-Stock , 2003; Schaff, 2006; Alkharusi, Kazem, and Al-Musawai, 2011; Davidheiser, 2013; Yamtim and Wongwanich, 2014; Beziat and Coleman, 2015; Mohammed, Kamis and Ali, 2016). These standards are taken as an authority in the field of teachers' classroom assessment literacy and are central to this study. They were developed to address the issues of inadequate or lack of training of teachers in educational assessment ("AFT, NCME, & NEA, 1990"). An extensive amount of literature shows the use, adaptation, and extension of the assessment literacy instruments based on STCEAS. Such instruments also operate from a common blueprint. It is a good practice as it provides the opportunity to build a base of knowledge that is consistent.

International researchers like Abell and Siegel (2011), and Tao (2014), Michigan Assessment Consortium (2015), Harding & Kremmel, (2016), Hsieh (2016), Peng and Zheng (2016), focused on teachers' classroom assessment literacy due to its importance. In Pakistan, some research work has been done on examining assessment practices of teachers (Rehmani, 2003; Shah & Afzaal, 2004; Shirazi, 2004; Government of Pakistan, 2007; Khan, 2011; Ahmed & Malik, 2011) but scarcely there is any research on investigating teachers' assessment literacy at higher education level. Fulcher (2012) also stated that "research into assessment literacy is still in its infancy" (p.117) and teachers' classroom assessment literacy at higher education has rarely been the

subject of any study in Pakistan. There is dire need to investigate it. It is also important to explore the phenomenon in the context of other variables like private and public universities.

Objectives of the Study

The objectives of the present study were to:

- Investigate the university teachers' assessment literacy
- Compare public and private sector university teachers' assessment literacy in different standards of classroom assessment literacy

Methodology

The study was quantitative in nature. In order to investigate the teachers' classroom assessment literacy a survey was conducted. The regular teaching faculty i.e. 5755 in public and private sector general universities in Lahore, Pakistan constituted the population of the study.

At first stage, the researchers selected 6 (out of 17) private and 2 (out of 5) public general universities using proportionate sampling technique, i.e. 40% of public and 40% private universities in Lahore, Punjab. The selection of general universities helped to increase generalizability of the findings because of homogeneity. For investigation of teachers' assessment literacy, the researchers used simple random sampling technique to select 500 teachers from the lists of both private and public sector universities' regular teaching faculties.

Instrumentation

Teachers' Classroom Assessment Literacy test was used as a research instrument to collect the data. It was developed by Mertler (2003). It covers the seven standards to measure the assessment competence of teachers. These standards were developed by AFT, NCME, & NEA (1990). The standards were as follows: Choosing Appropriate Assessment Methods (CAAM), Development of Appropriate Assessment Methods (DAAM), Administration, Scoring and Results Interpretation (ASRI), Using Results for Making Decisions (URMD), Using Results of Assessment for Grading (URAG), Communication of Assessment Results (CAR), Recognizing Unethical Methods of Assessment (RUMA). The test was consisted of 35 MCQs type items. The researchers dichotomously scored the items i.e. 0 for incorrect response and 1 for correct response.

The total high scores on the test items represented the high classroom assessment literacy of teachers.

The researchers adapted the instrument (Mertler, 2003) to make it suitable for Pakistani context. The instrument was validated through experts' opinion in the field of educational assessment. After pilot testing the instrument on a sample of 30 teachers (other than the sample) the reliability of the instrument was calculated through Cronbach Alpha. The details of instrument reliability are shown in the Table 01.

Table 1

Statistics of Teachers Assessment Literacy Scale Reliability

| Alpha | Alpha for Standardized Items | Items |
|-------|------------------------------|-------|
| .889 | .887 | 35 |

Table 1 shows that the instrument was reliable to use in Pakistani settings. The Cronbach Alpha reliability coefficient, value was found to be 0.89.

The researchers collected data by personal visits and also with the help of colleagues and friends. The participants selected for research were approached and the test was distributed to the teachers with consent letter. The purpose of the study was clearly written on the test. Response rate was 86 %.

Results

The data were analyzed using descriptive (mean and standard deviation) and inferential statistics (t-test). The details of data analysis and interpretations are given below.

Table 2

Total Score of University Teachers on CALT Items

| Total Score | N | Mean | Std. Deviation |
|-------------|-----|-------|----------------|
| | 430 | 13.64 | 1.79 |

Table 2 shows the level of classroom assessment literacy of 430 (usable responses) university teachers. It includes the scores of both private (N=220) and public (N=210) university teachers. The mean value

of scores ($M=13.64$) achieved by university teachers on test items showed low level of classroom assessment literacy in university teachers.

Mean score differences (between private and public university teachers) on Choosing Appropriate Assessment Methods (CAAM), Development of Appropriate Assessment Methods (DAAM), Administration, Scoring and Results Interpretation (ASRI), Use Results for Making Decisions (URMD), Use Results of Assessment for Giving Grades (URAG), Communication of Assessment Results (CAR), Recognizing Unethical Methods of Assessment (RUMA) were calculated. Each Standard was measured on 5 items with one score for every correct item. The details are given in table 3, 4, 5, 6, 7, 8, 9, and 10.

Table 3

Comparison of Private and Public University Teachers' in seven standards of Teachers' Classroom Assessment Literacy

| Type of University | N | \bar{X} | SD | df | T | Sig. |
|--------------------|-----|-----------|------|-----|-------|------|
| Private | 220 | 2.07 | 0.27 | 428 | -4.12 | .000 |
| Public | 210 | 2.20 | 0.43 | | | |
| Private | 220 | 1.64 | 0.49 | 428 | -3.78 | .000 |
| Public | 210 | 1.83 | 0.64 | | | |
| Private | 220 | 2.00 | 0.69 | 428 | -2.83 | .000 |
| Public | 210 | 2.18 | 0.69 | | | |
| Private | 220 | 1.92 | 0.50 | 428 | 1.93 | .040 |
| Public | 210 | 1.82 | 0.56 | | | |
| Private | 220 | 2.08 | 0.33 | 428 | -2.38 | .020 |
| Public | 210 | 2.17 | 0.48 | | | |
| Private | 220 | 2.17 | 0.51 | 428 | 6.74 | .000 |
| Public | 210 | 1.81 | 0.48 | | | |
| Private | 220 | 1.64 | 0.48 | 428 | -2.96 | .000 |
| Public | 210 | 1.76 | 0.43 | | | |

$p=.05$, (N=430)

Table 3 (first part) shows the difference between the mean achievement scores of private and public university teachers in choosing

appropriate assessment methods. The value of $t_{428} = -4.12$, $p = .000$ was significant at 5% alpha. The null hypothesis, H_{01} , stating no significant difference between achievement scores of private and public sector university teachers in the ability of choosing appropriate assessment methods, was rejected. The mean achievement scores of private and public sector university teachers, i.e., 2.07 and 2.20, on choosing appropriate assessment methods, showed that the public sector university teachers performed better than the private university teachers.

The second part of the table 3 shows the difference between the mean achievement scores of private and public sector university teachers in developing appropriate assessment methods. The value of $t_{428} = -3.78$, $p = .000$ was significant at 5% alpha. The null hypothesis, H_{02} , stating no significant difference between achievement scores of private and public university teachers in the ability of developing appropriate assessment methods, was rejected. The mean achievement scores of private and public sector university teachers, i.e., 1.64 and 1.83, on developing appropriate assessment methods, showed that the public university teachers performed better than the private university teachers.

The third part of the above table shows the difference between the mean achievement scores of private and public university teachers in administering, scoring and interpretation of assessment. The value of $t_{428} = -2.83$, $p = .000$ was significant at 5% alpha. The null hypothesis, H_{03} , stating no significant difference between achievement scores of private and public university teachers in the ability of administering, scoring and interpretation of assessment, was rejected. The mean achievement scores of private and public university teachers, i.e. 2.00 and 2.18 on “administering, scoring, and interpretation of assessment”, showed that the public university teachers performed better than the private university teachers.

The fourth part of the table shows the difference between the mean achievement scores of private and public university teachers in using assessment for decision making. The value of $t_{428} = 1.93$, $p = .040$ was significant at 5% alpha. The null hypothesis, H_{04} , stating no significant difference between achievement scores of private and public university teachers in the ability of using assessment for decision making, was rejected. The mean achievement scores of private and public university teachers, i.e. 1.92 and 1.82 on using assessment for decision making, showed that the private university teachers performed better than the public university teachers.

The fifth part of the table shows the difference between the mean achievement scores of private and public university teachers in using

assessment for grading. The value of $t_{428} = -2.38$, $p = .020$ was significant at 5% alpha. The null hypothesis, H_{05} , stating no significant difference between achievement scores of private and public university teachers in the ability of using assessment for grading, was rejected. The mean achievement scores of private and public university teachers, i.e. 2.08 and 2.17 on using assessment for grading, showed that the public university teachers performed better than the private university teachers.

The sixth part of the table shows the difference between the mean achievement scores of private and public university teachers in communication of assessment results. The value of $t_{428} = 6.74$, $p = .000$ was significant at 5% alpha. The null hypothesis, H_{06} , stating no significant difference between achievement scores of private and public university teachers in the ability of communication of assessment results, was rejected. The mean achievement scores of private and public university teachers, i.e. 2.17 and 1.81 on communication of assessment results, showed that the private university teachers performed better than the public university teachers.

The seventh part of table 3 shows the difference between the mean achievement scores of private and public university teachers in recognizing unethical, illegal and inappropriate methods of assessment. The value of $t_{428} = -2.96$, $p = .000$ was significant at 5% alpha. The null hypothesis, H_{07} , stating no significant difference between achievement scores of private and public university teachers in the ability of recognizing unethical methods of assessment, was rejected. The mean achievement scores of private and public university teachers, i.e., 1.64 and 1.76, on recognizing unethical and inappropriate methods of assessment, showed that the public university teachers performed better than the private university teachers.

Table 4

Comparison of Private and Public Sector University Teachers' Mean Scores in Classroom Assessment Literacy

| Type of University | N | \bar{X} | SD | Df | T | Sig. |
|--------------------|-----|-----------|------|-----|-------|------|
| Private | 220 | 13.46 | 1.66 | 428 | -2.18 | .030 |
| Public | 210 | 13.81 | 1.90 | | | |

$p = .05$, (N=430)

Table 4 shows the difference between the mean achievement scores of private and public university teachers in classroom assessment literacy.

The value of $t_{428} = -2.18$, $p = .030$ was significant at 5% alpha. The null hypothesis, H_{08} , stating no significant difference between achievement scores of private and public university teachers' in classroom assessment literacy, was rejected. The mean achievement scores of private and public university teachers, i.e. 13.46 and 13.81 in classroom assessment literacy showed that the public sector university teachers performed better than the private sector university teachers. The graphical picture of the mean achievement scores is given in figure 1.

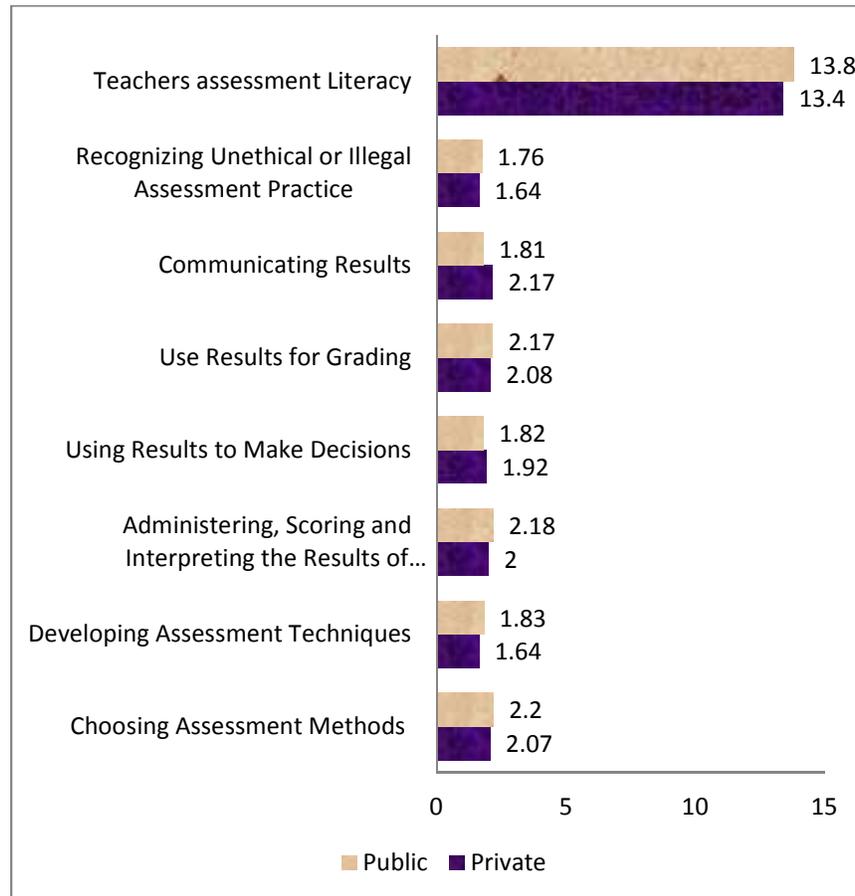


Figure 1: Comparison of Public and Private University Teachers Assessment Literacy

Discussion

The findings of the present study supported the literature by showing that teachers have inadequate classroom assessment literacy skills (Stiggins, Conklin & Bridgeford, 1986; O'Sullivan & Chalnack, 1991; Daniel & King, 1998; Marso & Pigge, 1988; McDonald, 2002; Quilter & Gallini, 2000; Zhang & Burry-Stock, 2003; Volante & Fazio, 2007; Iqbal, Azam, & Aboidullah, 2009; Alkharusi, 2011; Yamtim & Wongwanich, 2014; Beziat & Coleman, 2015; Mohammed, Kamis & Ali, 2016; Plake & Impara, 1997; Alkharusi, Kazem, & Al-Musawai, 2011). The literature showed mix results in standard wise analysis of CAL test therefore a clear line between teachers' lowest performance on any of the Standards for Teacher Competence in Educational Assessment of Students (STCEAS by NCME, AFT & NEA, 1990) and highest performance on any of the STCEAS (NCME, AFT & NEA, 1990) is very difficult to draw. Campbell, Murphy and Holt (2002) found high performance on Choosing Appropriate Assessment Methods (CAAM, Standard 1) while Schaff (2006) found it most difficult for teachers to respond it. Quilter and Gallinu (2000); Brookhart (2001); Iqbal, Azam and Aboidullah (2009); Alkharusi (2011); Davidheiser (2013) found lower performance on Development of Appropriate Assessment Methods (DAAM, Standard 2). Brookhart (2001) found low performance on Administration, Scoring and Results Interpretation (ASRI, Standard 3) while Plake (1991) and Plake (1993) found that teachers had some knowledge on it. Zhang (1996) found low score on Use Results for Making Decisions (URMD, Standard 4) while Schaff (2006) found highest score on it. Plake (1993), Brookhart (2001), Mertler (2003), Schaff (2006) & Yamtim and Wongwanich (2014) found low score on Use Results of Assessment for Giving Grades (URAG, Standard 5) while Quilter and Gallinu (2000) found highest score on this Standard. Plake (1991); Campbell, Murphy and Holt (2002); Plake and Impara (1997); & Alkharusi (2011) found low performance on Communication of Assessment Results (CAR, Standard 6). Plake (1993) found low performance on Recognizing Unethical Methods of Assessment (RUMA, Standard 7) while Schaff (2006) found highest on this standard. The findings of the present study are also aligned with the previous literature in terms of low score on one or the other of the STCEAS (NCME, AFT & NEA, 1990). Also that, the teachers performed lowest on DAAM (Standard 2) and RUMA (Standard 7). All the discussed findings highlight the need of further research in this direction and also context specific studies to reach better conclusions. In addition to that it was found that there is dire need of enhancing assessment literacy of university

teachers. It will consequently improve students' learning. Students can use the feedback of their teachers to know where they are now and where they ought to be. This awareness is central to achievement of unbeatable success. The teachers' use of sound principals in classroom assessment can make the students to demonstrate in standardized assessments, the unprecedented gains in scores (Chappuis & Stiggins, 2002). Such types of surveys are the first step towards bringing improvements in existing classroom assessment knowledge of teachers. The information obtained from the results of such surveys can give feedback to teachers about their weak areas in the whole process of assessment.

Suggestions and Recommendations

Few suggestions and recommendations were put forward on the basis of findings. It was found that teachers of public and private sector universities have low assessment literacy skills. Therefore, there is need to develop assessment literacy training program/module to train teachers in classroom assessment literacy. The training program/module may have more focus on developing assessment techniques and illegal assessment practices as university teachers have very low classroom assessment literacy in these aspects. The present study was quantitative in nature. Further research may be qualitative in nature that may include focus group discussions, observations, and in-depth interviews to assess the teachers' assessment literacy at higher education. In this study a demographic variable "University type" was used. Future studies on TCAL may include other variable like gender, qualification, location, and experience to investigate the TCAL at higher education in Pakistan.

References

- Abell, S. K., & Siegel, M. A. (2011). Assessment literacy: What science teachers need to know and be able to do. In D. Corrigan, J. Dillon, & R. Gunstone (Eds.), *The professional knowledge base of science teaching*, (pp. 205-221). The Netherlands: Springer.
- Ahmed, S. & Malik, S. (2011). Examination scheme at secondary school level in Pakistan: Composite vs Split, *Canadian Social Science*, 7(1), 130-139.
- Alkharusi, H. (2011). Teachers' classroom assessment skills: Influence of gender, subject area, grade level, teaching experience and in-service assessment training. *Journal of Turkish Science Education*, 8(2), 39-48.
- Alkharusi, H., Kazem, A. M., & Al-Musawai, A. (2011). Knowledge, skills, and attitudes of pre-service and in-service teachers in educational measurement. *Asia-Pacific Journal of Teacher Education*, 39(2), 113-123. <http://dx.doi.org/10.1080/1359866X.2011.560649>
- American Federation of Teachers, National Council on Measurement in Education, & National Education Association (AFT, NCME, & NEA) (1990). The standards for teacher competence in the educational assessment of students. *Educational Measurement: Issues and Practice*, 9(4), 30-32. <http://dx.doi.org/10.1111/j.17453992.1990.tb00391.x>
- Beziat, T. L. R., & Coleman, B. K. (2015). Classroom assessment literacy: Evaluating pre-service teachers. *The Researcher*, 27(1), 25-30.
- Brookhart, S. M. (2001). *The Standards and classroom assessment research*. Paper presented at the annual meeting of the American Association of Colleges for Teacher Education, Dallas, TX.
- Campbell, C., Murphy, J. A., & Holt, J. K. (2002). *Psychometric analysis of an assessment literacy instrument: Applicability to preservice teachers*. Paper presented at the meeting of the Mid-Western Educational Research Association, Columbus, OH.
- Daniel, L., G., & King, D., A. (1998). Knowledge and use of testing and measurement literacy of elementary and secondary teachers. *Journal of Educational Research*, 91(6), 331-344.
- Davidheiser, S. A. (2013). *Identifying areas for high school teacher development: A study of assessment literacy in the Central Bucks School District* (Unpublished PhD dissertation). The Drexel University.
- Deeley, S. J., & Bovill, C. (2017). Staff student partnership in assessment: enhancing assessment literacy through democratic practices,

Assessment & Evaluation in Higher Education, 42(3), 463-477, DOI: 10.1080/02602938.2015.1126551.

- DeLuca, C., LaPointe-McEwan, D. & Luhanga, U. (2016). Teacher assessment literacy: a review of international standards and measures. *Educational Assessment, Evaluation and Accountability*, 28(3), 251-272. DOI:10.1007/s11092-015-9233-6
- Deneen, C. C. & Brown, G. (2016). The impact of conceptions of assessment on assessment literacy in a teacher education program. *Cogent Education*, 3(1). 1-14. <http://dx.doi.org/10.1080/2331186X.2016.1225380>
- Duckor, B., Draney, K., & Wilson, M. (2017). Assessing assessment literacy: An item response modeling approach for teacher educators. *Pensamiento Educativo. Revista de Investigación Educativa Latinoamericana*, 54(2), 1-25.
- Fulcher, G. (2012). Assessment literacy for the language classroom. *Language Assessment Quarterly*, 9(2), 113-132.
- Gavin, W. F., Iris, C. H. L., & Kelvin, H.K.T. (2015). Multi-level model of contextual factors and teachers' assessment practices: an integrative review of research, *Assessment in Education: Principles, Policy & Practice*, 22(4), 475-494, doi: 10.1080/0969594X.2015.1017445
- Government of Pakistan. (2007). *A Report on Pakistan Examination System*. Islamabad: Ministry of Education.
- Gotch, C. M. (2012). *An investigation of teacher educational measurement literacy* (PhD dissertation). Washington State University, Department of Educational Leadership and Counseling Psychology.
- Harding, L., & Kremmel, B. (2016). Teacher assessment literacy and professional development. In D. Tsagari, & J. Banerjee (Eds.), *Handbook of second language assessment*, (pp. 413-428). Berlin & New York: Mouton de Gruyter.
- Herrera, L. & Macías, D. (2015). A call for language assessment literacy in the education and development of teachers of English as a foreign language. *Colomb. Appl. Linguist. J.*, 17(2), 302-312.
- Hsieh, C. (2016). Examining content representativeness of a young learner language assessment: EFL teachers' perspectives. In M. Nikolov (Ed.), *Assessing young learners of English: Global and local perspectives*. New York: Springer.

- Huang, J., & He, Z. H. (2016). Exploring Assessment Literacy. *Higher Education of Social Science*, 11(2), 18-27. doi: <http://dx.doi.org/10.3968/8727>
- Huber, S. G., & Skedsmo, G. (2016). Assessment in education—from early childhood to higher education. *Educational Assessment, Evaluation and Accountability*, 28(3), 201–203. doi:10.1007/s11092-016-9245-x
- Iqbal, H. M., Azam, & Abiodullah, M. (2009). Using assessment for improving student learning: an analysis of University Teachers' Practices. *Bulletin of Education and Research*, 31(1), 47-59.
- Khan, I. (2011). Reading assessment techniques among selected secondary school teachers in Pakistan: Current trends and practices, *International Journal on New Trends in Education and their Implications*, 2(2), 58-75.
- Koh, K., Burke, L.E.C., Luke, A., Gong, W., & Tan, C. (2017). Developing the assessment literacy of teachers in Chinese language classrooms: A focus on assessment task design. *Language Teaching Research*, 22(3), 264-288. doi: <https://doi.org/10.1177/1362168816684366>
- Looney, A., Cumming, J., Kleij, F.D., & Harris, K. (2017). Reconceptualising the role of teachers as assessors: teacher assessment identity. *Assessment in Education: Principles, Policy & Practice*, 25(5), 442-467. doi: 10.1080/0969594X.2016.1268090
- Lorente-Catalán, E., & Kirk, D. (2015). Student teachers' understanding and application of assessment for learning during a physical education teacher education course. *European Physical Education Review*, 22(1), 65 – 81. ISSN 10.1177/1356336X15590352
- Marso, R.N. & Pigge, F.L. (1987). *A State-Wide Assessment of the Testing and Evaluation Needs and Proficiencies of Beginning Teachers: Implications for Staff Development*. Paper presented at the Annual Meeting of the Association of Supervision and Curriculum Development, New Orleans: LA.
- McDonald, M. (2002). The perceived role of diploma examinations in Alberta, Canada. *Journal of Educational Research*, 96, 21–36. Available on Google scholar.
- Mertler, C. A. (2000). Teacher-centered fallacies of classroom assessment reliability and validity. *Mid-Western Educational Researcher*, 13(4), 29-35.

- Mertler, C. A. (2003). *Preservice Versus Inservice Teachers' Assessment Literacy: Does Classroom Experience Make a Difference?* Paper presented at the annual meeting of the Mid-Western Educational Research Association, Columbus, Ohio.
- Michigan Assessment Consortium. (2015). *Assessment Literacy Standards – A National imperative*. Lansing, MI: Author.
- Mohamed, S., Kamis, A., & Ali, N. (2016). Gauging the assessment literacy of Malaysia's home economics teachers: An empirical study. *Malaysian Journal of Society and Space*, 12(3), 130 - 138.
- O'Sullivan, R. G., & Chalnack, M. K. (1991). Measurement-Related course work requirements for teacher certification and recertification. *Educational Measurement: Issues and Practices*, 10(1), 17–19.
- Peng, J., & Zheng, S. (2016). A longitudinal study of a school's assessment project in Chongqing, China. In M. Nikolov (Ed.), *Assessing young learners of English: Global and local perspectives*. New York: Springer.
- Plake, B. S. (1993). Teacher assessment literacy: Teachers' competencies in the educational assessment of students. *Mid-Western Educational Researcher*, 6(1), 21-27.
- Plake, B. S., & Impara, J. C. (1997). Teacher assessment literacy: What do teachers know about assessment? In G. D. Phye (Ed.), *Handbook of classroom assessment* (pp. 53-68). New York: Academic Press.
- Quilter, S. M., & Gallini, J. K. (2000). Teachers' assessment literacy and attitudes. *The Teacher Educator*, 36(2), 115-131.
- Randel, B., Apthorp, H., Beesley, A. D., Clark, T. F. & Wang, X. (2016). Impacts of professional development in classroom assessment on teacher and student outcomes. *The Journal of Educational Research*, 109(5). 491-502.
- Rehmani, A. (2003). Impact of Public Examination System on Teaching and Learning in Pakistan *International Biannual Newsletter ANTRIEP*, 8(2), 3-7.
- Schaff, C. S. (2006). *A Rasch model analysis of the standards for teacher competence in educational assessment of students using the Classroom Assessment Practices Inventory* (Unpublished PhD dissertation). Northern Illinois University.

- Shah, D. & Afzaal, M. (2004). *The examination Board as Educational Change Agent: The Influence of Question choice on selective study*. Paper presented at 30th annual IAEA Conference. Philadelphia, United States of America.
- Shirazi, M. (2004). *Analysis of Examination System at University Level in Pakistan*, (unpublished dissertation). Rawalpindi: University of Arid Agriculture.
- Stiggins, R. J., & Conklin, N.F. (1991). In teachers' hands: Investigating the practice of classroom assessment. Albany, NY: SUNY Press.
- Tao, N. (2014). *Development and Validation of Classroom Assessment Literacy Scales: English as a Foreign Language (EFL) Instructors in a Cambodian Higher Education Setting (PhD dissertation)*. College of Education Victoria University Melbourne, Australia.
- Volante, L., & Fazio, X. (2007). Exploring Teacher Candidates' Assessment Literacy: Implications for Teacher Education Reform and Professional Development. *Canadian Journal of Education*, 30(3), 749-770.
- Webb, N. L. (2002). Assessment literacy in a standards-based urban education setting. Retrieved from <http://www.wcer.wisc.edu/archive/mps/AERA2002/Assessment%20literacy%20NLW%20Final%2032602.pdf>
- Xu, Y., & Brown, G.T.L. (2016). Teacher assessment literacy in practice: A reconceptualization. *Teaching and Teacher Education*, 58(1), 149-162.
- Yamtim, V., & Wongwanich, S. (2014). A study of classroom assessment literacy of primary school teachers. *Procedia - Social and Behavioral Sciences*, 116(1), 2998 – 3004. doi: 10.1016/j.sbspro.2014.01.696.
- Zhang, Z. (1996, April 8-12). *Teacher assessment competency: A Rasch model analysis*. Paper presented at the Annual Meeting of the American Educational Research Association, New York. doi: <https://files.eric.ed.gov/fulltext/ED400322.pdf>
- Zhang, Z., & Burry-Stock, J. A. (2003). Classroom assessment practices and teachers' self perceived assessment skills. *Applied Measurement in Education*, 16(4), 323-342.

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