

An Investigation of Secondary School Teachers' Assessment Literacy in Rivers-East Senatorial District, Nigeria: Implication for Classroom Assessment

Hager A E. Amakiri^{1*}, Dorothy C. Inko-Tariah²

^{1,2}Ph.D, Department of Educational Psychology, Guidance Counsellor, Ignatius Ajuru University of Education, Rumuolumeni, Rivers State, Nigeria

DOI: [10.36348/sjhss.2021.v06i07.002](https://doi.org/10.36348/sjhss.2021.v06i07.002)

| Received: 08.06.2021 | Accepted: 03.07.2021 | Published: 07.07.2021

*Corresponding author: Hager A E. Amakiri

Abstract

Formal assessment of students' learning outcomes occurs mainly in the classroom. The psychological and academic well-being of most learners is hinged on the assessment feedback from teachers to the learners, parents and school authorities. The level of teacher assessment literacy, therefore, determines the competence of the teacher in making value judgment on the behaviour, ability and prospects of a learner. The purpose of this study was to investigate the level of secondary school teachers' assessment literacy. The survey design was adopted for the study. Two research questions and two hypotheses were tested at 0.05 level of significance. The population of the study comprised all secondary school teachers in Rivers East Senatorial District, Nigeria. Stratified random sampling technique was used to draw a sample of 500 teachers from 10 secondary schools in Rivers East Senatorial District. The instrument used for data collection was: "Teacher Assessment Literacy Test" adapted from "Teacher Assessment Literacy Questionnaire". The instrument was validated using KR20 and a reliability coefficient of .76 was obtained. Descriptive statistics and ANOVA were used for data analysis. The results revealed that the level of secondary school teachers' assessment literacy is significantly influenced by in-service training and teachers' area of specialization. Secondary school teachers' assessment literacy level was higher among teachers who had been retrained through in-service training. It was recommended among others that more opportunities be given for the retraining of teachers in educational assessment, especially in practical application of assessment processes through workshops and exchange programmes to ensure global best practices among secondary school teachers in Nigeria.

Keywords: Investigation, assessment literacy, teachers, secondary school, classroom assessment.

Copyright © 2021 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

The classroom remains the primary place for the formal assessment of students learning outcomes. The psychological and academic well-being of most learners is hinged on the assessment feedback from teachers to the learners, parents and school authorities. Invariably, the competence of the teacher's value judgement as regards the learner's behaviour, ability and future prospects is based on the level of the teacher's assessment literacy. The concept of assessment literacy is credited to Stiggins (1991), based on a study carried out in the United States. Assessment literacy refers to teachers' scholarship and proficiencies in educational assessment of learners (Volante & Fazio, 2007; Popham, 2006, Mertler & Campbell, 2005). For Paterno (2001), assessment literacy is defined as the possession of knowledge about the basic principles of

sound assessment practices, including terminology, development and use of assessment methodologies and techniques, familiarity with standards of quality in assessment and familiarity with alternative to traditional measurement of learning. There is a misconception amongst most teachers that teaching directs students learning, but this misconception is debunked by Havnes (2004:1), who stated that in practice, assessment directs students learning, because it is the assessment system that defines the value of instruction. In order to cope with global best practices in assessment, teachers must be exposed to effective and impactful professional development in assessment practices especially during pre-service training to boost their literacy in assessment practices. In teacher training programmes in Nigeria, pre-service teachers are exposed to a course in educational test and measurement, though, most teachers have content knowledge in their area of

specialization, this cannot be said concerning their competence in assessment literacy.

In this light, Sadler (1998) aptly depict the attributes of a very capable teacher-assessor as follows:

- Excellent scholarship about subject matter to be learnt;
- Information about students learning and yearning to assist learners evolve, progress and do better;
- Aptitude in selecting and creating assessment tasks;
- Scholarships of criteria and standards relevant to assessment tasks;
- Evaluative skills and proficiency in the analysis and utilization of assessment information;
- Mastery in giving relevant targeted feedback.

It is, however, worrisome that these attributes seem to be lacking among teachers as shown in previous research on assessment literacy of teachers. Some researchers have acknowledged that the assessment literacy of teachers was not up to par (Alkharusi et al., 2012; Popham, 2010). The ridiculously low level of teachers' assessment literacy has been ascribed to misalignment of teacher-trainee programmes of being up to standards (Deluca & Bellara, 2013); which indicates a gap between course content and field-based experience (Alkharusi et al., 2011); and inadequate training in assessment (O'Sullivan & Chalnack, 1991). It is expedient, therefore, for teacher educators to ensure teacher trainees exhibit classroom assessment skills with regards to knowledge of assessment purposes, distinct learning targets, learners' ability level and capacity to enhance their advancement towards the targets (Pollock, 2011). An assessment literate teacher is one who is able to outline and conduct assessment beyond summative level to enhance changes in classroom assessment (Sheppard, 2000). The purpose of this study is to determine secondary school teachers' assessment literacy level.

REVIEW OF LITERATURE

Evidence from extensive literature substantiated the low level of assessment literacy among teachers. For instance, Plaiice and Impara (1992) administered Teacher Assessment Literacy Questionnaire to a sample of 555 in-service teachers in the United States. The findings demonstrated that out of 35 items, teachers answered 23 items correctly. This result indicates low assessment literacy among the teachers. Similarly, Campbell, et al (2002) also administered the same instrument to a sample of 220 undergraduates who had been exposed to a course in test and measurement with a mean score 21 out of 35 items procured, showing that teachers' assessment literacy level was inadequate. Furthermore, an Assessment Literacy Inventory developed by Mertler and Campbell (2005) was also administered to a sample of 249 pre-service teachers in the United States. The

mean score obtained by the pre-service teachers out of 35 items was 23.83, an affirmation of the unsatisfactory assessment literacy of pre-service teachers.

In this regard, Stiggins (2001) stated that the low levels of assessment literacy among pre-service teachers and administrators in schools in the United States were unacceptable. Similarly, Popham (2010) corroborated that the abysmally low level of educators' assessment literacy is currently one of the most serious concerns in the educational sector. This position is affirmed by Alkharusi, et al (2012) that regardless of teachers' positive disposition and perceived high capability in assessment, teachers were deficient in assessment literacy. Teachers' areas of deficiency in assessment literacy included performance assessment, interpretation of the standardized test results and grading procedure (Zhang & Burry-Stuck, 2003). In the same vein, Brookhart (2001) noted that teachers are better disposed at classroom application of assessment than at interpreting standardized test. Alkharusi (2009) found that based on area of specialization, pre-service teachers in English Language, Mathematics and Science tended to possess a higher level of assessment knowledge than those specializing in Art and Physical Education. In a study to determine the effect of assessment training on teachers' assessment literacy level, a significant difference in teachers' posttest scores indicated that the workshop positively influenced their assessment literacy level (Mertler, 2009). Other studies have also revealed a relationship between teaching experience and assessment literacy (Alkharusi, 2011; Hoover, 2009 & Mertler, 2004). On the other hand, some scholars have established that there is no significant relationship between teaching experience and assessment literacy (King, 2010; Zhang & Burry-Stock, 2003; & Kershaw, 1993). There are concerns and a demand for revalidation of teacher preparation programmes on classroom assessment.

Statement of the Problem

The interaction with teacher trainees and teachers with this researcher over the years has revealed that there is a general perception that educational test and measurement courses and its attendant statistical concepts are difficult to comprehend. Consequently, most pre-service teachers' have a phobia for courses related to test and measurement, hence, a barrier to assessment literacy of pre-service teachers as well as professional teachers. Some teachers have the pre-conceived idea that assessment training is basically aimed at educating teachers on continuous assessment and preparation of students' results. There is a perceived disconnect between assessment pedagogy in teacher education and practical application of assessment in the classroom. Most secondary school teachers do not relate knowledge of assessment course content taught during their training programme to assessment realities in the classroom. If secondary

school teachers lack requisite skills in the utilisation of assessment in the classroom, this will jeopardise the implementation of appropriate assessment practices. There is also a dearth of literature on assessment literacy of teachers in Nigeria. This study intends to fill this gap. Hence, this study investigated secondary school teachers' assessment literacy in Rivers East Senatorial District, Nigeria.

Research Questions

The study was guided by two research questions and corresponding hypotheses

1. What is the assessment literacy level of teachers in terms of knowledge of assessment concepts/principles, application of assessment concepts/principles and ethical issues?
2. Is there any difference in the assessment literacy level of teachers in terms of years of experience, in-service training and area of specialisation?

Hypotheses

1. Teachers' assessment literacy level not differ significantly in terms of knowledge of assessment concepts/principles, application of assessment concepts/principles and ethical issues.
2. Teachers assessment literacy level do not differ significantly in terms of years of experience, in-service training and area of specialisation.

Theoretical Framework

The study is accentuated on Piaget's theory of constructivism. The theory posits that learners construct knowledge and meaning from their experiences. Constructivism is a learning theory that proposes that learners create their own new understandings based upon the interaction of what they already know and believe and the phenomena or ideas with which they come into contact (Richardson, 1997). For Billett (1996:43-58), constructivism is a process in which learners become active participants, drawing upon their personal experiences and their interaction with others to construct new understanding and knowledge. Disposition determine whether an individual values a particular form of knowledge enough to be willing to participate in the effortful activity required to secure and utilize knowledge.

The foundation of assessment literacy of pre-service and professional teachers is established on courses in educational test and measurement during their training programme. Pre-service and professional teachers gain experiences and knowledge of classroom assessment from their interaction with their lecturers based on the course content. The knowledge obtained by pre-service and professional teachers is applied during their teaching career to new constructs in classroom assessment realities and practices. Hence, new information from classroom assessment exercises and interaction with the students they teach would

enable them make appropriate adjustments based on prior knowledge from their experiences.

METHODOLOGY

The survey design was adopted for the study. The population comprised all teachers in private and public secondary schools in Rivers East Senatorial District, Nigeria. The stratified random sampling technique was used to draw a sample of 500 teachers from 10 schools in 8 Local Government Areas (Emohua, Etche, Ikwerre, Obio-Akpor, Ogu-Bolo, Okrika, Omuma and Port Harcourt) that make up Rivers East Senatorial District. Two research questions and corresponding hypotheses were postulated to guide the study. A 37 multiple choice item instrument titled: "Teacher Assessment Literacy Test" (TALT) adapted from "Teacher Assessment Literacy Questionnaire" (TALQ), a 35 item instrument developed by Plake, 1993 and Plake, et al (1993), was used for data collection.

The instrument was modified by the researcher into three categories: (i) knowledge of assessment concepts/principles - this consist of 17 items (1, 2, 3, 4, 5, 16, 18, 20, 22, 23, 25, 26, 27, 28, 29, 30 and 32) on types of assessment, grading of students, consistency in grading process, characteristics of standardized test, appropriate use of standardized test, how to improve grading procedures, determine quality of multiple choice test, determine students prerequisite knowledge and types of assessment; secondly, application of assessment concepts/principles consist of 14 items (6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 19, 24, 31, and 33) on interpretation of students' scores, utilization of assessment information, use of appropriate assessment strategies, validity of test scores, appropriate use of scores and enhancing performance through assessment; and thirdly, ethical issues consist of 6 items (14, 21, 34, 35, 36 and 37) on ethical/unethical assessment practices by teachers. The instrument was validated by four experts in educational measurement and evaluation to suit the target population. The instrument was trial-tested on 40 teachers outside the study area and a reliability coefficient of .76 was obtained via KR20. The instrument was administered to the respondents directly by the researcher and eight research assistants to ensure total retrieval of the instrument. Descriptive statistics, one-way repeated ANOVA and three-way ANOVA were used for data analysis. The analysis of data was executed using SPSS.

RESULT

The results of research questions and null hypotheses are presented as follows:

Research Question One

What is the assessment literacy level of teachers in terms of knowledge of assessment

concepts/principles, application of assessment concepts/principles and ethical issues?

Hypothesis One

Teachers’ assessment literacy level do not differ significantly in terms of knowledge of assessment concept/principles, application of assessment concepts/principles and ethical issues.

Table-1: Mean and standard deviation on teachers’ assessment literacy level in terms of knowledge of assessment concepts/principles, application of assessment concepts/principles and ethical issues

Variables	(\bar{X})	Sd	n
Knowledge of assessment concept/principles (KACP)	11.74	1.807	500
Application of assessment concepts/principles (AACP)	7.98	1.539	500
Ethical issues (EI)	4.12	.706	500
Total	23.84	4.052	500

Table-1 reveals that teachers’ assessment literacy level based on mean scores on items answered correctly in terms of knowledge of assessment concepts/principles (M = 11.74, SD = 1.807) and application of assessment concepts /principles (M =

7.98, SD = 1.539) are very low out of 17 and 14 items respectively; on ethical issues teachers correct responses on 6 items (M = 4.12, SD = .706) is high. The total mean score of items answered correctly out of 37 items (M = 23.84, SD = 4.052) is very low.

Table-2: Pairwise Comparisons of assessment literacy level of teachers based on knowledge of assessment concepts/principles, application of assessment concepts /principles and ethical issues

Variables	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
				Lower Bound	Upper Bound
KACP AACP	3.756*	.095	.000	3.569	3.943
EI	7.620*	.074	.000	7.475	7.765
AACP KACP	-3.756*	.095	.000	-3.943	-3.569
EI	3.864*	.078	.000	3.710	4.018
EI KACP	-7.620*	.074	.000	-7.765	-7.475
AACP	-3.864*	.078	.000	-4.018	-3.710

The pairwise comparison in Table-2 reveal where the significant difference in the assessment literacy level of teachers in the three categories (knowledge of assessment concepts/principles,

application of assessment concepts/principles and ethical issues) lie. There is a significant difference in assessment literacy of teachers in the three categories.

Table-3: Difference in assessment literacy level of teachers based on knowledge of assessment concepts/principles, application of assessment concepts/principles and ethical issues

Source		Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Square
Factor 1	Sphericity Assumed	14517.072	2	7258.53	4.224E3	.000	.894
Error (factor	Sphericity Assumed	1714.928	998	1.718			

Table-3 reveal a significant difference in assessment literacy of teachers on knowledge of assessment concepts principles, application of assessment concepts/principles and ethical issues F (2,998) = 4.224, p = 001. The null hypothesis is therefore rejected and the alternate accepted.

Research Question Two

Is there any difference in the assessment literacy level of teachers in terms of years of experience, in-service training and area of specialization?

Hypothesis Two

Teachers assessment literacy level do not differ significantly in terms of years of experience, in-service training and area of specialisation.

Table-4: Mean and standard deviation on teachers' assessment literacy level based on years of experience, in-service training and area of specialisaion

Assessment training	Area of Specialization	Years of service	(\bar{X})	Sd	n
In-service training	Science	0-6yrs	26.61	1.204	54
		7-13yrs	26.25	1.434	59
		14-20yrs	26.67	1.313	49
		21yrs-above	27.12	1.092	25
		Total	26.58	1.315	187
	Arts	0-6yrs	24.46	1.330	13
		7-13yrs	23.73	1.104	11
		14-20yrs	23.50	1.966	16
		Total	23.88	1.588	40
	Total	0-6yrs	26.19	1.489	67
		7-13yrs	25.86	1.662	70
		14-20yrs	25.89	2.024	65
		21yrs-above	27.12	1.092	25
		Total	26.11	1.711	227
	No in-service training	Science	0-6yrs	27.00	.6325
7-13yrs			26.00	.	1
14-20yrs			26.00	.6325	6
Total			26.46	.7763	13
Arts		0-6yrs	21.68	1.783	22
		7-13yrs	21.63	2.157	78
		14-20yrs	22.55	1.961	40
		Total	21.90	2.075	140
Vocational		7-11yrs	21.23	1.501	30
		14-20yrs	21.60	1.620	90
		Total	21.51	1.593	120
Total		0-6yrs	22.82	2.736	28
		7-13yrs	21.56	2.034	109
		14-20yrs	22.14	1.938	136
		Total	21.95	2.097	273
Science		0-6yrs	26.65	1.162	60
		7-13yrs	26.25	1.422	60
		14-20yrs	26.60	1.271	55
		21yrs-above	27.12	1.092	25
		Total	26.58	1.286	200
Arts		0-6yrs	22.71	2.108	35
		7-13yrs	21.88	2.166	89
		14-20yrs	22.82	1.991	56
		Total	22.34	2.138	180
Vocational		7-13yrs	21.23	1.501	30
		14-20yrs	21.60	1.620	90
		Total	21.51	1.593	120
Total	0-6yrs	25.20	2.469	95	
	7-13yrs	23.24	2.829	179	
	14-20yrs	23.31	2.656	201	
	21yrs-above	27.12	1.092	25	
	Total	23.83	2.832	500	

Table-4 indicate that science teachers who had in-service training with years of teaching experience: 0-6; 7-13; 14-20 and 21 years above demonstrated higher total mean score (M = 26.58, SD = 1.314) than the art teachers with years of teaching experience: 0-6, 7-14, and 14-20 (M = .88, SD 1.588) while the total mean score of science teachers who had no in-service training

with years of teaching experience: 0-6, 7- 13 and 14-20 is higher (M = 26.46, SD = .632) than art teachers with years of teaching experience: 0-6, 7-13 and 14-20 (M = 21, SD = 2.075) vocational teachers with years of experience: 7-13 and 14-20 years scored the lowest total mean (M = 21 .50, SD = 1.593).

Table-5: Three-way ANOVA on influence of area of specialization, in-service training and years of experience on teacher's assessment literacy level Dependent Variable: assessment literacy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2726.517 ^a	14	194.751	73.983	.000	.681
Intercept	106862.256	1	106862.256	4.060E4	.000	.988
Assessment training	23.811	1	23.811	9.046	.003	.018
Area of specialization	277.007	2	138.504	52.615	.000	.178
Years of experience	12.302	3	4.101	1.558	.199	.010
Assessment training * area of specialization	16.434	1	16.434	6.243	.013	.013
Assessment training * years of teaching experience	1.118	2	.559	.212	.809	.001
Area of specialization * years of teaching experience	1.422	3	.474	.180	.910	.001
Assessment training * area of specialization * years of teaching experience	14.401	2	7.200	2.735	.066	.011
Error						
Total	1276.705	485	2.632			
Corrected Total	288033.000	500				
	4003 .222	499				

a. R Squared = .681 (Adjusted R Squared = .672)

Table 5 indicate that on the three main effects, only two demonstrates significant differences: in-service training, $F(1,485) = 9.046$, $p = .003$ and area of specialisation $F(2,485) = 52.615$, $P = .001$. There is no significant difference in assessment literacy of teachers based on years of experience $F(3,485) = 1.558$, $p = .199$. The table also show that there is no significant interaction effect among the groups.

DISCUSSION OF FINDINGS

The result from research question one and subsequent hypothesis revealed that, teachers' assessment literacy level is higher in knowledge of assessment concepts principles which involves: types of assessment, grading of students, consistency in grading process, characteristics of standardized test, appropriate use of standardized test, how to improve grading procedures, determine quality of multiple choice test, determine students' prerequisite knowledge, and types of assessment. However, teacher' assessment literacy is very low on application of assessment concepts and principles which involves: interpretation of students' scores, utilization of assessment information, use of appropriate assessment strategies, validity of test scores, appropriate use of scores and enhancing performance through assessment. The result reveal that teachers are highly skilled on identifying ethical issues. The total mean score of items answered correctly ($M=23.84$) out of 37 items reveal very low assessment literacy level among teachers. The result is in line with the findings of (Mertler & Campbell, 2005; Campbell Murphy & Holt, 2002; Plake & Impara, 1992). There is

a significant difference in secondary school teachers' assessment literacy level, based on knowledge of assessment concepts/principles, application of assessment concept/principles and ethical issues. These findings reveal that teachers are deficient in application of assessment concepts and principles in the classroom. This result is in line with the findings of Zhang and Burry-stuck (2003) that teachers' deficiency in assessment literacy was found in performance assessment, interpretation of the standardized test results and grading procedure.

The findings from the study further indicate that teachers' area of specialization and in-service training has a significant influence on the assessment literacy level of secondary school teachers in Rivers State Senatorial District. Science teachers demonstrated higher level of assessment literacy over their arts and vocational counterparts. It could be inferred that the high level of assessment literacy shown by science teachers over their arts and vocational counterpart is due to their exposure to in-service training prior to the assessment test administered on them. The finding is in tandem with the study of Alkharusi (2009) that pre-service teachers specializing in English language, Mathematics and Science tend to possess a higher level of assessment knowledge than their counterparts in art and physical education. It is also in agreement with the study of Mertler (2009) who found a significant difference in the post test scores of teachers exposed to assessment workshop. However, teachers' assessment literacy is not significantly influenced by years of

teaching experience. This agrees with the findings of King (2010); Zhang and Burry-Stock (2003) and Kershew, (1994) that there is no significant relationship between teaching experience and assessment literacy. On the contrary, Aiharusi (2011); Hoover (2009) and Mertler (2004) found a significant relationship between teaching experience and assessment literacy.

CONCLUSION

The findings evidently denote that assessment literacy of teachers is remarkably low, notably in the application of assessment concepts and principles which involves interpretation of students' scores and utilization of assessment information. In-service training and teachers area of specialization has been found to positively influence assessment literacy level of secondary school teachers in Rivers East Senatorial District, Nigeria. Though it is glaring from the study that science teachers had the highest assessment literacy mean score, as well as the highest number of in-service training participants, the assessment literacy level of science teachers who had not been exposed to in-service training is higher than that of their art and vocational counterparts who had not also been exposed to in-service training.

Most of the vocational teachers do not have access to in-service training. It could be inferred that though in-service training would revamp assessment literacy level of teachers, area of specialization is also key to teachers' assessment literacy level. However, teachers' years of teaching experience did not influence their assessment literacy.

Implication for Classroom Assessment

The findings of the study imply that to meticulously resolve misconceptions and incompetence in assessment, teachers' assessment literacy needs to be strengthened to advance assessment practices in interpretation of students' scores, utilization of assessment information, use of appropriate assessment strategies and enhancing performance of students through assessment. Consequently, ineptitude of teachers in assessment would result in inaccurate appraisal of students learning and feedback to stakeholders.

RECOMMENDATIONS

The following recommendations were made:

- Teacher educators should direct assessment course content towards practical application of assessment concepts and principles.
- Courses in educational test and measurement should be extended to cover the duration of teacher training programme due to the broad nature of the content to facilitate in-depth teaching and learning.
- Teacher educators should use teachers' classroom assessment experiences to redirect misconceptions

concerning assessment practices and eliminate phobia among teacher trainees.

- More emphasis should be directed towards regular retraining of teachers on best practices and knowledge of practical utilization of assessment.

REFERENCES

- Alkharusi, H. (2009). Correlates of teacher education students' academic performance in an educational measurement course. *International Journal of Learning*, 16, 1-15.
- Alkharusi, H. (2011a). Psychometric properties of the teacher assessment literacy questionnaire for preservice teachers in Oman. *Procedia - Social and Behavioral Sciences*, 29, 1614-1624.
- Alkharusi, H. (2011b). A logistic regression model predicting assessment literacy among in-service teachers. *Journal of Theory and Practice in Education*, 7, 280-291.
- Alkharusi, H., Aldhafri, S., Alnabhani, h., & Alkabani, M. (2012). Educational Assessment Attitudes, Competence, Knowledge, and Practices: An Exploratory Study of Muscat Teachers in the Sultanate of Oman. *Journal of Education and Learning*, 1(2), 217.
- 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.
- Billett, S. (1996). Towards a model of workplace learning: The learning curriculum. *Studies in Continuing Education*, 18(1), 43-58.
- 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.
- DeLuca, C., & Bellara, A. (2013). The current state of assessment education: Aligning policy, standards, and teacher education curriculum. *Journal of Teacher Education*, 64(4), 356-372.
- Havnes, A. (2004). Examination and Learning: An activity theoretical analysis of the relationship between assessment and educational practice. *Assessment and Evaluation in Higher Education*, 29(2), 159-176.
- Hill, M., Cowie, B., Gilmore, A., & Smith, L. F. (2010). Preparing assessment-capable teachers: What should preservice teachers know and be able to do? *Assessment Matters*, 2, 43.
- Hills, J. R. (1991). Apathy concerning grading and testing. *Phi Delta Kappa*, 72(7), 540-545.

- Hoover, N.R. (2009). A descriptive study of teachers' instructional use of students' assessment data (Dissertation). Virginia Commonwealth University, Richmond, VA.
- Kershaw, I. (1993). Ohio vocational education teachers' perceived use of student assessment information in educational decision making (Dissertation). The Ohio State University, Columbus OH.
- King, J. D. (2010). Criterion-referenced assessment literacy of educators (Dissertation) University of Southern Mississippi, Hattiesburg, MS.
- Mertler, C. A. (2003). Pre-service versus in-service teachers' assessment literacy: Does classroom experience work a difference? Paper presented at the Annual Meeting of the Mid-Western Educational Research Association, Columbus, OH.
- Mertler, C. A. (2004). Secondary teachers' assessment literacy: Does classroom experience make a difference? *American Secondary Education*, 33, 49-64.
- Mertler, C. A. (2009). Teachers' assessment knowledge and their perceptions of the impact of classroom assessment professional development. *Improving schools*, 12, 101-113.
- Mertler, C, A., & Campbell, C. (2005). Measuring teachers' knowledge and application of classroom assessment concepts: Development of the assessment literacy inventory. Paper presented at the meeting of the American Educational Research Association, Montreal, Quebec, Canada. 33, 49-64.
- O'Sullivan, R. G., & Chalnick, M. K. (1991). Measurement-Related coursework requirements for teacher certification and recertification. *Educational Measurement: Issues and Practices*, 10(1), 17-19
- Plake, B.S., & Impara, J.C. (1992). Teachers competencies questionnaire description. University of Nebraska.
- Popham, W.J. (2004). Why assessment illiteracy is professional suicide. *Educational Leadership*, 62(1), 82-83.
- Popham, W. I. (2006). Needed: A dose of assessment literacy. *Educational Leadership*, 63(1), 84-85.
- Quilter, S. M., & Gallini, J.K. (2002). Teachers' assessment literacy and attitudes. *The Teacher Educator*, 36, 115-131.
- Richardson, V. (1997). *Constructivism Teacher Education: Building a World of New Understanding*, Famlar Press.
- Sadler, D.R. (1998). Formative assessment: revisiting the territory. *Assessment in Education*, 5, 77-84.
- Shepard, L. A. (2000). The role of assessment in a learning culture. *Educational Researcher*, 29, 4-14.
- Stiggins, R. J. (1991). Assessment literacy. *Phi Delta Kappan*, 72, 534-539.
- Stiggins, R. J. (1995). Assessment literacy for the 21st century. *Phi Delta Kappan*, 77(3), 23 8-245.
- Volante, L., & Fazio, X. (2007). Exploring teacher candidates' assessment literacy: Implications for teacher education reform and professional development. *Canadian Journal of Education*, 30, 749-770.
- Zhang, Z., & Burry-Stock, J. A. (1995). A Multivariate analysis of teachers' perceived assessment competency as a function of measurement and years of teaching. Paper presented at the Annual Meeting of the Mid-South Education Research Association, Biloxi, MS.
- Zhang, Z., & Burry-Stock, J. A. (2003). Classroom assessment practice and teachers' self perceived assessment skills. *Applied Measurement in Education*, 16(4), 323-342.