12-1-2015

The Validation of an Instrument for Evaluating the Effectiveness of Professional Development Program on Teaching Online

Jui-Long Hung
Boise State University

Dazhi Yang
Boise State University

Hung, J. & Yang, D. (2015). The Validation of an Instrument for Evaluating the Effectiveness of Professional Development Program on Teaching Online. *Journal of Educational Technology Development and Exchange*, ***8***(1), 17-38.

The Validation of an Instrument for Evaluating the Effectiveness of Professional Development Program on Teaching Online

Jui-Long Hung
Boise State University

Dazhi Yang
Boise State University

Abstract: *Attending professional development (PD) on teaching online is becoming popular for teachers in today's K-12 online education. Due to the unique characteristics of the online instructional environments, surveys become the most feasible approach to evaluate the effectiveness of PD programs. However, there is no validated, open-access instrument available to satisfy the needs. Purpose of this study is to conduct construct validity, content validity, concurrent validity, and reliability tests on an open-access instrument for K–12 PD for online teaching. With the exception of a few items that have minor issues on content and construct validity, results show that the survey is, in general, a valid and reliable instrument. Suggestions and potential applications of the instrument are also discussed.*

Keywords: K-12 Online Professional Development, Construct Validity, Content Validity, Concurrent Validity, Reliability

1. Background

The effectiveness of online courses depends mostly upon the instructor's effectiveness of teaching online (Rice, 2012). However, knowledge and skills developed to teach in face-to-face settings are not adequate for teaching online courses (Deubel, 2008). Many of today's online instructors still lack necessary skills and knowledge to teach effectively in online settings. Few teacher education programs in the United States offer training in learning theories or teaching pedagogies specifically for online environments (Patrick & Dawley, 2009). According to a recent report on the status of professional development and needs of K–12 online teachers (Dawley, Rice, & Hinck, 2010), approximately 12% of new teachers have had never taught face-to-face and 25% received no training in online teaching pedagogies prior to teaching online. Professional development (PD) programs, including workshops and courses designed for effective online teaching, are the most common way for teachers to obtain the necessary knowledge, skills, and competency for online teaching.

Assessment and evaluation of such PD programs and instructors' competency and performance after receiving PD training are conducted through various means, such as interviews, observations, and surveys. As more and more PD programs are conducted online, survey is often the most practical and adopted approach to evaluate the effectiveness of PD programs.

Currently, teachers' PD in online teaching encounters two major problems. First, the effectiveness of PD should be ideally measured by teachers' long-term performance improvement after their PD training (Loucks-Horsley, Stiles, & Hewson, 1996; Knight, Carrese, & Wright, 2007). However, tracking and assessing teachers' long-term performance improvement, especially when the PD is conducted online and participants are from various school districts and states, is difficult. This is why most online PD programs rely on post PD surveys to measure the effectiveness of PD training. Some post PD surveys only measure participants' satisfaction. However, high satisfaction is not equal to performance improvement after the PD training. Second, although teachers' self-efficacy positively correlates with their practice (Long & Moore, 2008; Woolfolk Hoy, Davis, & Pape, 2006) and student achievement (Martin & Marsh, 2006; Siegle & McCoach, 2007), there is no validated and reliable instrument for measuring teachers' self-efficacy in terms of teaching online. Furthermore, the instrument should be open access so it can be tested for validity and reliability with various populations and methods.

The purpose of this study is to conduct validity and reliability tests on an open-access instrument for K–12 teachers' PD on online teaching, primarily using the Rasch Model analyses. The major research question was whether the Online Educator Self-Efficacy Scale (OESES) had been a valid and reliable instrument for assessing and/or evaluating the effectiveness of online PD programs, including workshops and courses.

2. Literature Review

2.1. Teacher Efficacy and Professional Development

Bandura (1997) defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p.2). Although teacher efficacy is a self-perception, not an objective measure of teaching effectiveness, it represents teachers' expectation that their efforts will bring about student learning. Multiple studies found that teachers with high efficacy beliefs generate stronger student achievement than teachers with lower teacher efficacy (Goddard, Hoy, & Hoy, 2004; Ross & Bruce, 2007; Tschannen-Moran, Hoy, & Hoy, 1998). Self-efficacy can further be classified into two types: general and personal teaching self-efficacy. General teaching self-efficacy refers to "briefs that teachers are able to bring about student learning despite out-of-school constraints" (Bandura, 1997, p.80). Personal teaching self- efficacy refers to "briefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p.2). The effects of teacher efficacy on student achievement can be summarized into the following factors:

- Teachers with higher efficacy adopt challenging goals, try harder to achieve them, persist through obstacles, and develop strategies for managing their emotional states. (Bandura, 1993; 1997).

- Teachers with high efficacy are more likely to try out new teaching ideas, particularly techniques that are difficult to implement and involve risks, such as sharing computer or device control with students. (Haney, Czerniak, & Lumpe, 1996; Ross, 1998).

- Teachers with high efficacy use effective classroom management strategies to stimulate student autonomy by reducing custodial control and keeping students on tasks (Woolfolk, Rosoff, & Hoy, 1990).

- Teachers with high-efficacy can expend their efforts with low ability or achieving students. High-efficacy teachers have positive attitudes toward low achieving students, build friendly relationships with them, and set higher academic standards for this group than do low-efficacy teachers (Ross & Bruce, 2007).

- Teacher efficacy leads to strengthen self-perceptions of students' academic abilities. As student efficacy becomes stronger, students become more enthusiastic about schoolwork and more willing to interact with the teacher. Then the positive cycle reflects directly on achievement (Ashton, Webb, & Doda, 1983; Ashton & Webb, 1986).

Overall, studies have shown that teachers' self-efficacy has high positive correlations with teaching practice (Goddard, 2002; Goddard & Goddard, 2001; Knoblauch & Hoy, 2008; Long & Moore, 2008; Margolis & McCabe, 2006; Milner, 2002; Woolfolk Hoy & Davis, 2006) and student achievement (Martin & Marsh, 2006; Siegle & McCoach, 2007). As a result, teacher's self-efficacy has been adopted as an important indicator to evaluate the effectiveness of PD trainings (Faseyitan, Libii, & Hirschbuhl, 1996; Milbrath & Kinzie, 2000; Overbaugh & Lu, 2008; Ross & Bruce, 2007; Shechtman, Levy, & Leichtentritt, 2005).

2.2. Validity

An assessment instrument should be valid and reliable in terms of the inferences and scores it produces. Validity refers to the degree to which the evidence supports that the interpretations are correct and the manner in which interpretations are used as appropriate (AERA, APA & NCME, 1999). Traditionally, there are three major validity types related to assessment or instrument validation: construct, content, and criterion-related validities (Crocker & Algina, 1986).

2.2.1. Construct Validity. Construct validity refers to the degree to which an instrument or an assessment assesses the theoretical construct it intends to measure. Responses from instrument participants can be interpreted as reflecting the theoretical construct. The Rasch model (Bond & Fox, 2013), a model based on Item Responses Theory, is one of the most popular approaches for testing construct validity (Comer, Conaghan, & Tennant, 2011; Runnels, 2012). The Rasch model contains two determinants of an item response: the respondent's trait level and the item's difficulty level. A teacher with high level of self-efficacy in facilitating online discussion will be more likely to endorse or agree with an item that measures skills of discussion facilitation than a low self-efficacy teacher in the same skill. A question with higher difficult level will be less likely to be endorsed or agreed to by respondents than one with lower difficult level. The Rasch model estimates responses based on item difficulty level and respondent trait level. When the actual responses are closed to the estimated responses, the instrument has high construct validity (fitting with the model).

2.2.2. Content Validity. Content validity is the degree to which a test or an instrument measures what it is supposed to measure with sufficient coverage (Brown, 1996). Therefore, there are two threats that influence content validity. First, the instrument contains construct-irrelevant items (Furr & Bacharach, 2007), including bad writing questions that can cause misunderstanding. Second, the instrument fails to include the full range of contents that is relevant to the construct (Furr & Bacharach, 2007). In practice, content validity is usually evaluated by subject experts within the construct field. Lynn (1986) and Rubio, Berg-Weger, Tebb, Lee, and Rauch (2003) proposed a systematic procedure to conduct content validity test, including number of experts in the panel, survey design and development, survey investigation, and data analysis. The detailed procedures are discussed later.

2.2.3. Criterion Validity. Criterion validity refers to the results of an assessment correlate with a current or future event. (Furr & Bacharach, 2007). Therefore, criterion validity can be further divided into concurrent validity and predictive validity. Concurrent validity refers to the degree to which the results obtained by the target survey instrument correlate with the results obtained for the same population by another "validated" instrument at the same time. Predictive validity refers to the degree to which measurement scores are correlated with relevant variables that are measured at a future point in time. Because it is difficult to recruit and evaluate the same group of participants at a future point, concurrent validity is more common than predictive validity in the criterion validity test.

Among above validity types, construct validity is more important and broader than the other two validity tests from a more contemporary perspective of assessment and evaluation (Furr & Bacharach, 2007; Messick, 1995). In other words, content and criterion validities should be considered within the context of construct validity. In this study, the target instrument is validated by construct validity, content validity, and concurrent validity.

2.3. Reliability

Reliability refers to the consistency of the assessment outcomes generated at different times. The most popular approach for testing instrument's reliability is internal consistency reliability (Hogan, Benjamin, & Brezinski, 2000) and most common internal consistency measure is Cronbach's alpha test (Cronbach, 1951). The Rasch model provides two reliability measures: Rasch item reliability and Rasch person reliability (Bond & Fox, 2013). A reliable instrument should obtain similar outcomes if the instrument is conducted toward another group of participants with the same traits known as Rasch item reliability (Bond & Fox, 2007). A reliable respondent should give the same or similar responses toward another instrument with the same construct and difficulty level of questions known as Rasch person reliability (Wright & Masters, 1982). This study adopts the following three reliability tests: Cronbach's alpha, Rasch item reliability, and Rasch person reliability.

2.4. Rasch Model

Item responses theory (IRT) is a psychometric approach that emphasizes the fact of responses to any instrument item that is influenced by abilities of the individual respondents and items (Furr & Bacharach, 2007). As one of the most popular model based on IRT, the Rasch model is a one-parameter item response theoretic model (Bond & Fox, 2013) and widely applied in the development and analyses of large-scale achievement assessment. In addition to assessment instrument validation, it is increasingly used in the validity and reliability tests of survey instruments (Bond & Fox, 2013).

The core of the Rasch model is based on a mathematical formula that states the relationships between respondents and the measurement items that operationalize one trait. The Rasch model estimates difficulty or agreeability of individual items (item logits) and ability or attitude of individuals (person logits), where a logit is a translation of the raw responses. In other words, raw responses are nonlinearly transformed into position estimates for items and persons. The model is sensitive to identify intentional or unintentional cheating, guessing, or any other variable(s) that might influence the responses provided. Fit statistics provide the fit indices of the data to the model and the usefulness of the measure. Fit statistics contain the average fit (mean square and standardized) of persons and items, and fit statistics reflecting the appropriateness of rating scale category use. The fit statistics are calculated by differencing each pair of observed and model-expected responses, squaring the differences, summing over all pairs, averaging, and standardizing to approximate a unit-normal (z) distribution. The expected values of the mean square and standardized fit indices are 1.0 and 0.0, respectively, if the data fit the model.

Person fit in the Rasch model is an index of whether individuals are responding to items in a consistent manner. Responses may become inconsistent when respondents are bored and careless to the task, when they are confused, or when an item induces an unusually prominent response. Correspondingly, item fit is an index of whether items function logically and provide a continuum useful for all respondents. An item may become "misfit" when it is too complex or confusing, or when it actually measures a different construct.

At the item level, fit statistics are further divided into "infit" (weighted by the distance between the person position and the item difficulty) and as "outfit" (an unweighted measure). Infit is less sensitive than outfit to extreme responses. Both outfit and infit aim to identify questions with high ratio of unmodeled variance (responses cannot be explained by the model) or questions with too low variance (responses are too predictable). A well-designed survey should use the same language that respondents use and carefully frame items in that language on the survey. Fit statistics allow researchers to test whether survey questions communicate well with respondents.

Rasch model has been widely used in survey instrument validation for educational studies, such as self-efficacy (Lamb, Vallett, & Annetta, 2014), success of instructional intervention (Royal & Tabor, 2008), and perceptions of instructors or students (Kyriakides, Kaloyirou, & Lindsay, 2006). For example, Lamb, Vallett, and Annetta (2014) validated an instrument called SETS-SF aimed to investigate self-efficacy related to scientific reasoning, computer technology, and video gaming on adolescent students. The authors collected survey responses from 651 students in 15 schools. In addition to construct validity and Rasch item/person reliability, the authors also examined construct representativeness (content validity) and external factor validity (validity for making a generalization). The study showed that combining multiple approaches/analysis to complete a multifaceted examination of evidence for the various aspects of validity is common.

3. Instrument

3.1. The Online Educator Self-Efficacy Scale (OESES)

The Online Teaching Associates (OTA) is an organization that provides PD courses for teachers with the knowledge, skills, and dispositions needed to be effective teachers online (OTA, 2012). The OTA-121 is a fully online professional development course, which was designed to help K-12 educators develop and demonstrate instructional proficiencies and dispositions supporting student performance in blended and fully online learning environments. The course design aims to align with and address applicable professional standards including: (a) iNACOL's National Standards for Quality Online Teachers (NSQOT) (iNACOL, 2011), (b) ISTE's NETS-Standards for Teachers (ISTE, 2008), and (c) the Partnership for 21st Century Skills Framework for 21st Century Learning (Partnership for 21st Century Skills, 2011.)

The Online Educator Self-Efficacy Scale (OESES) aims to measure teacher's self-efficacy on online teaching capabilities after online PD. It is a four-point Likert scale (Strongly Agree, Agree, Disagree, and Strongly Disagree) survey with a total of 59 questions (see Appendix A). The instrument consists of the following parts: (a) 38 self-efficacy questions for investigating online teaching capabilities, (b) 10 General Self-Efficacy (GSE) questions (Schwarzer, & Jerusalem, 1995) for testing concurrent validity and have been adopted and validated by many studies with hundreds of thousands of participants, and (c) 11 questions for investigating participants' satisfaction after the PD training.

The purpose of this study is to test validity and reliability of the 38 self-efficacy questions. These questions were developed to evaluate respondent's self-efficacy based on the iNACOL's National Standards for Online Teaching (http://www.inacol.org/cms/wp-content/uploads/2012/

09/iNACOL_TeachingStandardsv2.pdf) in eleven online teaching capabilities (see below). Each of capabilities consists of three to four survey questions.

- The online teacher knows the primary concepts and structures of effective online instruction and is able to create learning experiences to enable student success.
- The online teacher understands and is able to use a range of technologies, both existing and emerging, that effectively support student learning and engagement in the online environment.
- The online teacher plans, designs, and incorporates strategies to encourage active learning, application, interaction, participation, and collaboration in the online environment.
- The online teacher promotes student success through clear expectations, prompt responses, and regular feedback.
- The online teacher models, guides, and encourages legal, ethical, and safe behavior related to technology use.
- The online teacher is cognizant of the diversity of student academic needs and incorporates accommodations into the online environment.
- The online teacher demonstrates competencies in creating and

implementing assessments in online learning environments in ways that ensure validity and reliability of the instruments and procedures.

- The online teacher develops and delivers assessments, projects, and assignments that meet standards-based learning goals and assesses learning progress by measuring student achievement of the learning goals.
- The online teacher demonstrates competency in using data from assessments and other data sources to modify content and to guide student learning.
- The online teacher interacts in a professional, effective manner with colleagues, parents, and other members of the community to support students' success.
- The online teacher arranges media and content to help students and teachers transfer knowledge most effectively in the online environment.

4. Method

4.1. Data Collection

All data were collected from the participants in an OTA-121 course in 2010 and 2011 cohorts of an American Recovery and Reinvestment Act (ARRA) project, which was funded through the Wisconsin Department of Public Instruction, in collaboration with OTA. The participants were recruited from potential online teachers with the expectation that these initial participants would become a core group of online professional development trainers for their region and/or school districts after completing the PD training. Survey Monkey, an online survey tool, was used to collect participants' responses. In total, 231 teachers participated in the online PD training and completed the OESES survey.

4.2. Analytic Tools

Rasch Model analysis (Alagumalai, Curtis, & Hungi, 2005) was applied for construct validity and reliability tests. An expert panel review was conducted for the content validity (Lynn, 1986; Rubio, et al., 2003). Spearman's correlation was used to test concurrent validity. All statistical tests were conducted by using SPSS 21 and Winsteps 3.74.

5. Results

Data collected from a total of 231 respondents were used for the analysis. All reliability and validity tests focused on 38 self-efficacy questions only. The 10 GSE questions were used to test concurrent validity.

5.1. Reliability Tests

Three reliability tests, Cronbach's Alpha, Rasch person reliability, and Rasch item reliability, were applied to test the reliability of the 38 OESES self-efficacy items. As shown in Table 1, the 38 OESES survey items have high internal reliability (Cronbach's Alpha = 0. 968). In addition, the Cronbach coefficient does not obtain significant improvement by removing any of individual items, which means it is not necessary to remove any items in order to improve the instrument's reliability. As shown in Table 2, the OESES survey yielded high reliabilities on both Rasch person reliability (0.82) and Rasch item reliability (0.94). These values indicate that the survey's scale is able to identify individual differences among respondents and that the items are sufficiently spread out along the scale.

Table 1. Results of Internal Reliability

Cronbach's Alpha	***N of Items***
.968	38

```
 Calculating Fit Statistics
>====================================<
Standardized Residuals N(0,1)  Mean: .02 S.D.: .95
Time for estimation: 0:0:0.571
 Processing Table 0
OTAData_woQuestion.xlsx
-------------------------------------------------------------------------------
| PERSON     231 INPUT     231 MEASURED              INFIT          OUTFIT   |
|          TOTAL      COUNT     MEASURE  REALSE     IMNSQ   ZSTD  OMNSQ   ZSTD|
| MEAN     141.5       38.0        5.01     .77      1.01     .0    .90    -.1|
| S.D.      12.9         .0        2.22     .56       .42    1.6    .51    1.5|
| REAL RMSE    .95 TRUE SD    2.00  SEPARATION  2.10  PERSON RELIABILITY  .82|
|-----------------------------------------------------------------------------|
| ITEM      38 INPUT      38 MEASURED              INFIT          OUTFIT   |
|          TOTAL      COUNT     MEASURE  REALSE     IMNSQ   ZSTD  OMNSQ   ZSTD|
| MEAN     860.0      231.0         .00     .20      1.00    -.1    .90    -.3|
| S.D.      26.6         .0         .83     .03       .36    2.4    .42    1.7|
| REAL RMSE    .20 TRUE SD     .81  SEPARATION  4.01  ITEM    RELIABILITY  .94|
-------------------------------------------------------------------------------
```

5.2. Construct Validity

5.2.1. Rasch Fit Statistics Evaluation.

The purpose of this test aims to examine how closely the data fit the model expectations. The results help address the technical-quality aspect of content evidence for construct validity as outlined by Messick (1989; 1995). Once the parameters of a Rasch model are estimated, they are used to compute expected responses of all participants to every item. Fit statistics are then derived from a comparison of the expected and observed responses using standardized residuals (the difference of what is expected by the Rasch model and what is observed). The expectation values of standardized residuals' mean and standard deviation are 0 and 1 respectively. Table 2 shows results are very closed to the expectation values (mean = 0.02 and standard deviation = 0.95). The results indicate, as a whole, the survey has a good fit to the Rasch Model test.

*Table 3.*Results of Item Fit Analysis

ENTRY Number	TOTAL SCORE	TOTAL COUNT	MEA-SURE	MODEL S.E.	INFIT MNSQ	INFIT ZSTD	OUTFIT MNSQ	OUTFIT ZSTD	PT-MEASURE COOR.	PT-MEASURE EXP.	EXACT MATCH OBS%	EXACT MATCH EXP%	ITEM
3	866	231	-.08	.19	2.25	6.9	2.08	3.5	A .42	61	73.1	81.0	Q7*
2	863	231	.02	.18	1.93	5.6	1.59	2.2	B .49	.62	73.1	80.2	Q6*
4	864	231	-.01	.19	1.37	2.5	1.85	2.9	C .50	.62	75.3	80.4	Q8*
11	814	231	1.35	.15	1.74	5.9	1.65	4.4	D .59	.71	58.1	68.7	Q25*
1	875	231	-.42	.20	1.47	2.9	1.43	1.4	E .48	.59	77.4	83.5	Q5*
19	883	231	-.76	.21	.90	-.60	1.33	1.0	F .56	.56	86.6	85.6	Q33
27	829	231	.99	.16	1.16	1.5	1.32	2.1	G .62	.68	72.0	71.5	Q41
17	872	231	-.30	.20	1.22	1.5	1.13	.5	H .56	.60	82.3	82.7	Q31
6	795	231	1.76	.14	1.16	1.6	1.21	1.8	I .66	.73	59.7	66.1	Q13
7	796	231	1.74	.14	1.05	.5	1.18	1.6	J .67	.73	58.6	66.1	Q14
22	791	231	1.84	.14	1.10	1.0	1.15	1.4	K .68	.73	60.2	65.5	Q36
30	872	231	-.30	.20	1.13	.9	.94	-.1	L .60	.60	87.1	82.7	Q44
9	860	231	.12	.18	1.11	.9	.93	-.2	M .62	.63	78.5	79.4	Q23
34	871	231	-.27	.19	.82	-1,3	1.09	.4	N .63	.60	84.9	82.4	Q48
21	840	231	.71	.16	1.01	.2	.88	-.7	O .67	.67	73.7	74.0	Q35
37	852	231	.37	.17	1.00	.1	.76	-1.3	P .67	.64	78.0	77.1	Q51
14	882	231	-.72	.21	.97	-.1	.72	-.8	Q .59	.57	91.9	85.3	Q28
20	832	231	.92	.16	.96	-.3	.85	-1.0	R .68	.68	71.5	72.3	Q34
36	853	231	.34	.17	.96	-.3	.78	-1.1	S .66	.64	74.7	77.4	Q50
13	898	231	-1.57	.25	.95	-.2	.71	-.4	s .50	.49	90.9	88.8	Q27
31	861	231	.09	.18	.78	-1.8	.95	-.2	r .66	.63	82.8	79.6	Q45
10	844	231	.60	.17	.88	-1.0	.94	-.3	q .68	.66	75.3	74.9	Q24
32	868	231	-.15	.19	.92	-.5	.73	-1.1	p .64	.61	83.3	81.6	Q46
16	872	231	-.30	.20	.89	-.8	.84	-.5	o .63	.60	83.9	82.7	Q30
12	871	231	-.27	.19	.87	-.9	.70	-1.2	n .63	.60	86.0	82.4	Q26
15	864	231	-.01	.19	.86	-1.0	.60	-1.9	m .67	.62	87.1	75.3	Q29
35	854	231	,31	.17	.86	-1.1	.71	-1.5	l .68	.64	78.5	77.7	Q49
23	845	231	.57	.17	.81	-1.7	.73	-1.6	k .70	.66	81.7	75.3	Q37
18	881	231	-.67	.21	.75	-1.7	.56	-1.5	j .63	.57	89.2	85.1	Q32
38	848	231	.49	.17	.75	-2.3	.62	-2.3	i .72	.65	79.0	76.0	Q52
28	883	231	-.76	.21	.72	-1.9	.47	-1.8	h .64	.56	89.8	85.6	Q42
29	884	231	-.81	.22	.68	-2.2	.43	-2.0	g .64	.56	90.3	85.8	Q43
24	865	231	-.05	.19	.67	-2.7	.57	-2.0	f .69	.62	84.9	80.7	Q38
26	883	231	-.76	.21	.67	-2.4	.40	-2.1	e .65	.56	88.7	85.6	Q40
8	900	231	-1.70	.26	.66	-2.1	.27	-1.7	d .56	.47	93.0	89.3	Q15
5	891	231	-1.16	.23	.62	-2.7	.45	-1.5	c .62	.53	91.9	87.2	Q12
33	877	231	-.50	.20	.60	-3.1	.39	-2.5	b .68	.58	89.8	84.0	Q47
25	880	231	-.63	.21	.59	-3.1	.37	-2.5	a .68	.57	90.9	84.8	Q39
MEAN	**860.0**	**231.0**	**.00**	**.19**	**1.00**	**-.1**	**.90**	**-.3**			**80.4**	**79.7**	
S.D.	**26.6**	**.0**	**.83**	**.03**	**.36**	**2.4**	**.42**	**1.7**			**9.6**	**6.2**	

5.2.2. Item Fit Analysis.

Table 3 shows results of item fit analysis. Infit MNSQ is an information-weighted mean-square statistic, which is more sensitive to unexpected behavior affecting responses to items near the respondent's measure level. Outfit MNSQ is an outlier-sensitive mean-square fit statistic, more sensitive to unexpected behavior by respondents on items far from the respondent's measure level.

The value of the mean-square statistics shows the size of the randomness (i.e., the amount of distortion of the measurement system). These statistics have an expected value of 1. Values less than 1 indicate observations that are overly predictable, possibly due to redundancy or some type of response set. Values greater than 1.0 indicate excessive unexpected variability, possibly due to a violation of unidimensionality. The criterion value for goodness-of-fit for these analyses is between 0.6 and 1.4. Items that fall outside of this range for the Infit MNSQ are marked with asterisk in Table 4. Results show MNSQ of questions 5, 6, 7, 8, and 25 are larger than 1.4 that indicates a violation of unidimensionality. The results of Outfit are similar to results of Infit tests.

5.2.3. Principle Components Analysis (Construct Validity).

As shown below (Table 4), the underlying measurement system accounts for the majority of the variance in the observations (70.8%) that indicates a strong unidimensional scale. The unexplained variance, which is considered random noise in the Rasch measurement system, is 3.3%. These results indicate that overall, the OESES is a strong, unidimensional scale despite the low variance in teachers' responses.

5.3. Content Validity

Three content experts were invited to participate in the content validity test. These experts were higher education faculty members in the field of educational technology and each of them had at least four years of experience in training K-12 online

Table 4. Standardized Residual Variance (in Eigenvalue units)

	Empirical	***Modeled***
Total raw variance in observations = 70.8		100%
Raw variance explained by measures = 32.8	46.3%	47.9%
Raw variance explained by persons = 21.9	30.9%	32.0%
Raw Variance explained by items = 10.9	15.3%	15.9%
Raw unexplained variance (total) = 38.0	53.7%	52.1%
Unexplained variance in 1st contrast = 3.3	4.7%	8.8%

teachers and teaching fully online courses. A survey was developed for the content validity test. The procedures of the expert review followed the steps suggested by Lynn (1986) and Rubio, et al., (2003). Specifically four criteria were used to evaluate the OESES: (1) representativeness of the content domain, (2) clarity of the item, (3) factor structure, and (4) comprehensiveness (Rubio, et al., 2003). Each item was rated on a scale from 1 to 4 for representativeness and clarity. First, experts were asked to evaluate individual items' ability to represent the content domain as described in the theoretical definition (representativeness). Second, experts were asked to evaluate how clearly an item was worded (clarity). Factor structure was used to measure whether all factors related to the construct have been covered by instrument. Finally, the experts were asked to address the comprehensiveness of the measure as a whole, based on results of representativeness, clarity, and factor structure. The experts then made suggestions on specific items (comprehensiveness).

The content validity index (CVI) served as the indicator of item's representativeness and clarity based on experts' ratings. The calculation was equal to the number of experts who rated an item as three or four dividing the total number of experts (Rubio, et al., 2003). Davis (1992) suggested a CVI value of 0.8 as the threshold. Based on the results, six questions have CVI values lower than 0.8 on representativeness (listed in Table 6) and all questions have CVI values higher than 0.8 on clarity.

Table 4 shows the instrument can explain up to 70.8% of total variances. The results indicated the survey contained most factors related to the construct. Therefore, additional factor structure tests were skipped here (Rubio, et al., 2003). Suggestions based on content validity results are discussed in the discussion section.

Table 6. Questions with CVI values lower than 0.8

Question ID	***Question Description***	***CVI***
Q13	After completing OTA's course for teachers, I feel comfortable discussing the history of contemporary online education.	100%
Q14	After completing OTA's course for teachers, I am able to knowledgeably discuss national and state online teaching standards and the credentialing of online teachers.	47.9%
Q40	After completing OTA's course for teachers, I can describe and discuss common factors contributing to heavy demands on teachers' time (24/7) from fully online and blended teaching assignments.	32.0%
Q41	After completing OTA's course for teachers, I am confident I can successfully manage workload demands from an online or blended teaching assignment.	15.9%
Q48	After completing OTA's course for teachers, I can identify and discuss contrasting ways online education can contribute to either narrowing or widening the "Digital Divide."	8.8%

5.4. Concurrent Validity

Concurrent validity aims to test whether an instrument correlates well with a measure that has previously been validated. The GSE survey (Schwarzer & Jerusalem, 1995) was selected as the validated instrument for our study for two reasons. First, the GSE survey measured similar constructs (self-efficacy), and second, the GSE survey had been translated into 31 languages and validated by hundreds of studies (Schwarzer, n.d.).

As a measure of concurrent validity, correlation of individuals' total scores on 10 GSE and the 38 self-efficacy questions were calculated using Spearman's rho Correlation. The correlation coefficient (0.725), showing in Table 7, indicated a strong positive correlation between the two measures.

Table 7. Correlations of Individuals' total Scores on GSE and the OESES Questions

			OESES_Items	***GSE_Items***
Spearman's rho	OESES_ Items	Correlation Coefficient	1.000	.725**
		Sig. (2-tailed)	.	.000
		N	231	231
	GSE_ Items	Correlation Coefficient	.725**	1.000
		Sig. (2-tailed)	.000	.
		N	231	231

6. Discussion

Based on the results of the construct validity analysis, questions 5, 6, 7, 8, and 25 might need revisions due to the excessive unexpected variability. These items simply performed in a manner counterintuitive to the measurement model. Rather than removing these items, it may be useful to evaluate them with content experts and make empirical judgments on them qualitatively rather than statistically.

Questions 5, 6, 7, 8, and 25 simply asked participants whether they could use built-in communication or wiki tools on Moodle. Because the survey was developed to measure teacher's self-efficacy in teaching online courses on Moodle, many questions specifically focused on LMS built-in functions and activities. The specificity might result in larger variances because teachers are already using alternative tools. For example, instead of using platform built-in communication tools, school districts might have their own synchronous or asynchronous tools for instructional communications. Therefore, the researchers suggest revising some survey questions to be more general.

For example, Question 6 can be revised to, "After the professional development training, I can send documents as email attachments." Poor course design or instruction could be another factor resulting in unidimensionality violation on these questions. However, more studies are required to confirm this inference.

The results of content validity show questions 13, 14, 40, 41, and 48 have lower scores of Content Validity Index (CVI) than the recommended threshold (0.8) (Davis, 1992). This means that these five questions cannot represent content within the target domain (effective online instruction) (Lawshe, 1975). After further examining CVI values and experts' comments, the researchers suggest deleting questions 40 and 41 because both questions ask about online teaching workload, rather than online teaching practice that could explain why their CVI values are zero. In addition, question 48 should also be deleted (Digital Divide, CVI=33.33%), because it is not closely related to knowledge and skills for effective online teaching. Finally, the researchers suggest keeping both questions 13 and 14 because such knowledge is helpful for being a good instructor (CVI=66.67%). In addition, if the review panel increases to five experts, these two questions might be able to pass the recommended threshold.

7. Summary and Conclusion

The results of this study show that the OESES is in general a valid and reliable instrument. It can be used to assess the effectiveness of online PD programs and subsequent online instructors' knowledge and skills to teach online after receiving specific PD training for teaching online. This study not only informs the online learning community the availability of a valid and reliable assessment instrument (OESES), but also showcases how aspects of validity and reliability of an assessment instrument are determined.

There are different possible applications for the OESES including: (a) assessing the effectiveness of online PD programs, including workshops, courses, etc.; (b) assessing online instructor's subsequent performance of teaching online after completing a PD training; (c) screening and selecting the best applicants for online teaching positions; (d) supporting evidence-based online program evaluations; and (e) supporting effective "data-driven" decision-making for online program administrators.

The study has limitations. First, a selection bias in terms of the purposeful selection of survey participants may have contributed to the high coefficients of both the validity and reliability of the OESES survey. Therefore, more studies, with different approaches (such as Structural Equation Modeling) and participants, are necessary to further validate the instrument.

References

Alagumalai, S., Curtis, D.D., & Hungi, N. (2005). Applied Rasch measurement: A book of exemplars. Dordrecht, NL: Springer-Kluwer.

AERA, APA, & NCME (1999). Standards for educational and psychological testing. Washington, DC: American Educational Research Association.

Ashton, P. T., & Webb, R. B. (1986). Making a difference: Teachers' sense of efficacy and student achievement. New York: Longman.

Ashton, P. T., Webb, R. B., & Doda, N. (1983). A study of teacher's sense of efficacy. Final report to the National Institute of Education. Gainesville, FL: Florida University.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. Educational Psychologist, 28(2), 117-148.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York, NY: Freeman.

Bond, T. G., & Fox, C. M. (2007). Applying the Rasch model: Fundamental measurement in the human sciences. Mahwah, N.J: Lawrence Erlbaum Associates Publishers.

Bond, T. G., & Fox, C. M. (2013). Applying the Rasch model: Fundamental measurement in the human sciences (2nd ed.). Hoboken, NJ: Taylor and Francis.

Brown, J. D. (1996). Testing in language programs. Upper Saddle River, NJ: Prentice Hall Regents.

Comer, C. M., Conaghan, P. G., & Tennant, A. (2011). Internal construct validity of the Swiss spinal stenosis questionnaire: Rasch analysis of a disease-specific outcome measure for lumbar spinal stenosis. Spine, 36(23), 1969-1976.

Crocker, L., & Algina, J. (1986) Introduction to classical and modern test theory, New York: Holt, Rinehart, and Winston.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika. 16, 297-334.

Davis, L. (1992). Instrument review: Getting the most from your panel of experts. Applied Nursing Research, 5, 194–197

Dawley, L., Rice, K., & Hinck, G. (2010). Going virtual! 2010: The status of professional development and unique needs of K–12 online teachers. White paper prepared for the North American Council for Online Learning. Washington, D.C. Retrieved from: http://www.inacol.org/research/docs/goingvirtual.pdf

Deubel, P. (2008). K-12 online teaching endorsements: Are they needed? T.H.E. Journal Smart Classroom. Retrieved from: http://www.thejournal.com/articles/21804

Faseyitan, S., Libii, J. N., & Hirschbuhl, J. (1996). An inservice model for enhancing faculty computer self-efficacy. British Journal of Educational Technology, 27(3), 214-226.

Furr, R. M., & Bacharach, V. R. (2007). Psychometrics: An introduction. Thousand Oaks, CA: Sage Publications.

Goddard, R. (2002). A theoretical and empirical analysis of the measurement of collective efficacy: The development of a short form. Educational and Psychological Measurement, 62(1), 97-110.

Goddard, R. D., & Goddard, Y. L. (2001). A multilevel analysis of the relationship between teacher and collective efficacy in urban schools. Teaching and Teacher Education, 17, 807–818

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2004). Collective efficacy beliefs: Theoretical developments, empirical evidence, and future directions. Educational Researcher, 33(3), 3-13.

Haney, J. J., Czerniak, C. M., & Lumpe, A. T. (1996). Teacher beliefs and intentions regarding the implementation of science education reform strands. Journal of Research in Science Teaching, 33(9), 971-993.

Hogan, T. P., Benjamin, A., & Brezinski, K. L. (2000). Reliability methods: A note on the frequency of use of various types. Educational and Psychological Measurement, 60(4), 523-531.

Knight, A. M., Carrese, J. A., & Wright, S. M. (2007). Qualitative assessment of the long term impact of a faculty development programme in teaching skills. Medical Education, 41(6), 592-600.

Knoblauch, D., & Hoy, A. W. (2008). “Maybe I can teach those kids.” the influence of contextual factors on student teachers’ efficacy beliefs. Teaching & Teacher Education, 24(1), 166-179.

ISTE. (2008). NETS for Teachers. Retrieved from http://www.iste.org/standards/standards-for-teachers/nets-for-teachers-2008

iNACOL (2011). National standards for quality online teaching. Retrieved from http://www.inacol.org/research/nationalstandards/iNACOL_TeachingStandardsv2.pdf

Kyriakides, L., Kaloyirou, C., & Lindsay, G. (2006). An analysis of the revised olweus bully/victim questionnaire using the Rasch measurement model. British Journal of Educational Psychology, 76(4), 781-801.

Lamb, R. L., Vallett, D., & Annetta, L. (2014). Development of a short-form measure of science and technology self-efficacy using Rasch analysis. Journal of Science Education and Technology, 23(5), 641-657.

Lawshe, C.H. (1975). A quantitative approach to content validity. Personnel Psychology, 28(4), 563–575.

Long, J. E. & Moore, R. (2008). Motivating content: How interest and self-efficacy respond to subject matter taught in an alternative teacher education program. Catholic Education: A Journal of Inquiry and Practice, 11(4), 442-464.

Loucks-Horsley, S., Stiles, K., & Hewson, P. (1996). Principles of effective professional development for Mathematics and Science education: A synthesis of standards. ERIC Clearinghouse. Retrieved from http://wcer.wisc.edu/archive/nise/Publications/Briefs/NISE_Brief_Vol_1_No_1.pdf

Lynn, M. (1986). Determination and quantification of content validity. Nursing Research, 35, 382–385.

Margolis, H., & McCabe, P. P. (2006). Improving self-efficacy and motivation: What to do, what to say. Intervention in School and Clinic, 41(4), 218-227.

Martin, A. J., & Marsh, H. W. (2006). Academic resilience and its psychological and educational correlates: A construct validity approach. Psychology in the Schools, 43(3), 267-281.

Messick, S. (1989). Validity. In R. L. Linn (Ed.), Educational measurement (3rd ed.) (pp. 13–104). New York, NY: American Council on Education, National Council on Measurement in Education.

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons’ responses and performances as scientific inquiry into score meaning. American Psychologist, 50(9), 741–749.

Milbrath, Y. C. L., & Kinzie, M. (2000). Computer technology training for prospective teachers: Computer attitudes and perceived self-efficacy. Journal of Technology and Teacher Education, 8(4), 373-396.

Milner, H. (2002). A case study of an experienced teacher’s self-efficacy and persistence through crisis situations: Theoretical and practical considerations. The High School Journal, 86(1), 28-35.

Overbaugh, R., & Lu, R. (2008). The impact of a NCLB-EETT funded professional development program on teacher self-efficacy and resultant implementation.

Journal of Research on Technology in Education, 41(1), 43-61.
Partnership for 21st Century Skills. (2011). Framework for 21st century learning. Retrieved from http://www.p21.org/overview/skills-framework
Patrick, S., & Dawley, L. (2009). Redefining teacher education: K-12 online-blended learning and virtual schools. The summit on redefining teacher education for digital age learners, Austin, TX: The University of Texas. Retrieved from http://redefineteachered.org/sites/default/files/SummitBriefPatrick.pdf
Rice, K. (2012). Making the move to K-12 online teaching: Research-based strategies and practices. Saddle River, NJ: Pearson Education.
Ross, J. A. (1998). The antecedents and consequences of teacher efficacy. In J. Brophy (Ed.), Research on Teaching. Vol. 7. (pp. 49-74). Greenwich, CT: JAI Press.
Ross, J., & Bruce, C. (2007). Professional development effects on teacher efficacy: Results of a randomized field trial. The Journal of Educational Research, 101(1), 50–60.
Royal, K. D., & Tabor, A. J. (2008). Theories of student success: Evaluating the effectiveness of an intervention strategy. Retrieved from http://eric.ed.gov/?id=ED506514
Rubio, D. M., Berg-Weger, M., Tebb, S. S., Lee, E. S., & Rauch, S. (2003). Objectifying content validity: conducting a content validity study in social work research. Social Work Research, 27(2), 94-104.
Runnels, J. (2012). Using the Rasch model to validate a multiple choice English achievement test. International Journal of Language Studies, 6(4), 141-153
Schwarzer, R. (n.d.). The general self-efficacy scale. Retrieved from http://userpage.fu-berlin.de/~health/engscal.htm
Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), Measures in Health Psychology: A user's portfolio. (pp. 35-37). Windsor, UK: Nfer-Nelson.
Shechtman, Z., Levy, M., & Leichtentritt, J. (2005). Impact of life skills training on teachers' perceived environment and self-efficacy. The Journal of Education Research, 98(3), 144-154.
Siegle, D., & McCoach, D. B. (2007). Increasing student Mathematics self-efficacy through teacher training. Journal of Advanced Academics, 18(2), 278-312.
Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. Review of Educational Research, 68(2), 202-248.
Woolfolk Hoy, A., & Davis, H. A. (2006). Teacher self-efficacy and its influence on the achievement of adolescents. In F. Pajares & T. Urdan (Eds.), Self-efficacy of adolescents (pp. 117–137). Greenwich, Connecticut: Information Age Publishing.
Woolfolk Hoy, A., Davis, H., & Pape, S. J. (2006). Teacher knowledge and beliefs. Handbook of Educational Psychology, 2, 715-738.
Woolfolk, A. E., Rosoff, B., & Hoy, W. K. (1990). Teachers' sense of efficacy and their beliefs about managing students. Teaching and Teacher Education, 6(2), 137-148.
Wright, B. D., & Masters, G. N. (1982). Rating scale analysis. Rasch measurement. Chicago, IL: MESA Press.

Contact the Author

Jui-Long Hung
Department of Educational Technology, Boise State University
1910 University Drive, Boise, Idaho 83725, USA
Tel:1-208-426-5542, Fax: 1-208-426-1451
Email:andyhung@boisestate.edu

Dazhi Yang
Department of Educational Technology, Boise State University
1910 University Drive, Boise, Idaho 83725, USA
Tel:1-208-426-3212, Fax: 1-208-426-1451,
Email:dazhiyang@boisestate.edu

Appendix: OESES Survey Questions

Number	Question Type	Question
Q1-1	Satisfaction	Pre-course notification and communication
Q1-2	Satisfaction	Relevance of course's goals to my own teaching practice
Q1-3	Satisfaction	Ability of presenters to tailor instructions to my needs.
Q1-4	Satisfaction	Workshop organization (clarity, agenda, logistics)
Q1-5	Satisfaction	Amount of time devoted to facilitation practice
Q1-6	Satisfaction	Knowledge of instructors
Q1-7	Satisfaction	Approachability of instructors
Q1-8	Satisfaction	Usefulness of the content
Q2	Satisfaction	Please rate the contribution of OTA-121 to supporting you to become an effective online educator. (1=low satisfaction and 4=high satisfaction)
Q3	Satisfaction	After completion of this course, I believe online educational systems (Moodle and other LMS's, Wikis, Blogs and other Web 2.0 educational environments) will be useful for supporting my ongoing work as an educator.
Q4	Satisfaction	Rate the online Teaching Associates course you participated in regarding your overall satisfaction after completion.
Q5	OESES	After completing OTA's course for teachers, I feel comfortable using Moodle's discussion forums.
Q6	OESES	After completing OTA's course for teachers, I can send e-mail from inside a Moodle course
Q7	OESES	After completing OTA's course for teachers, I can send documents as e-mail attachments from inside a Moodle course.
Q8	OESES	After completing OTA's course for teachers, I feel comfortable using Wimba's (or other) synchronous, online classroom.

Q9	OESES	After completing OTA's course for teachers, I can always manage to solve difficult problems if I try hard enough.
Q10	OESES	After completing OTA's course for teachers, if someone opposes me, I can find the means and ways to get what I want.
Q11	OESES	After completing the OTA's course for teachers, it is easy for me to stick to my aims and accomplish my goals.
Q12	OESES	After completing OTA's course for teachers, I feel comfortable discussing ways online teaching and learning compares with teaching and learning in traditional educational environments.
Q13	OESES	After completing OTA's course for teachers, I feel comfortable discussing the history of contemporary online education.
Q14	OESES	After completing OTA's course for teachers, I am able to knowledgeably discuss national and state online teaching standards and the credentialing of online teachers.
Q15	OESES	After completing OTA's course for teachers, I can compare and discuss similarities and differences between synchronous and asynchronous online instructional environments (i.e. the Wimba Classroom and Moodle Forum, respectively).
Q16	OESES	After completing OTA's course for teachers, I am confident that I could deal efficiently with unexpected events.
Q17	OESES	After completing OTA's course for teachers, thanks to my resourcefulness, I know how to handle unforeseen situations.
Q18	OESES	After completing OTA's course for teachers, I can solve most problems if I invest the necessary effort.
Q19	OESES	After completing OTA's course for teachers, I can remain calm when facing difficulties because I can rely on my coping abilities.
Q20	OESES	After completing OTA's course for teachers, when I am confronted with a problem, I can usually find several solutions.
Q21	OESES	After completing the OTA's course for teachers, if I am in trouble, I can usually think of a solution.
Q22	OESES	After completing the OTA's course for teachers, I can usually handle whatever comes my way.

Q23	OESES	After completing OTA's course for teachers, I can find suitable, high quality, discipline-based instructional content by searching on the worldwide web.
Q24	OESES	After completing OTA's course for teachers, I am able to support my students to be more selective about selecting and screening internet resources for use as sources for research projects for writing assignments required in my class.
Q25	OESES	After completing OTA's course for teachers, I would consider using a Wiki for supporting a discipline-based online educational activity with one or more of my classes.
Q26	OESES	After completing OTA's course for teachers, I feel comfortable using web-based resources for supporting my discipline-based teaching.
Q27	OESES	After completing OTA's course for teachers, I am able to explain and discuss why prompt instructor feedback is important for effective teaching and online learning.
Q28	OESES	After completing OTA's course for teachers, I can discuss facilitation techniques that support student interaction in asynchronous discussion forums, like Moodle's discussion forums.
Q29	OESES	After completing OTA's course for teachers, I can discuss facilitation strategies that support student interaction in synchronous online discussions, like in the Wimba Classroom and similar real-time forums.
Q30	OESES	After completing OTA's course for teachers, I feel comfortable facilitating assignments online requiring students to submit posting and responses in Moodle discussion forms.
Q31	OESES	After completing OTA's course for teachers, I feel comfortable facilitating synchronous real-time discussions in online educational environments like the Wimba Classroom.
Q32	OESES	After completing OTA's course for teachers, I can defend and discuss the following statement: "Instructional collaboration and classes organized as learning communities contribute to improved teaching and learning in both traditional and online learning environments."
Q33	OESES	After completing OTA's course for teachers, I can describe and discuss traits or characteristics shared by many successful online learners.
Q34	OESES	After completing OTA's course for teachers, I can describe and discuss accessibility issues (ADA Sections 504/508) as they relate to online educational practice.

Q35	OESES	After completing OTA's course for teachers, I feel comfortable including "exceptional" students in online or blended learning activities in my classes.
Q36	OESES	After completing OTA's course for teachers, I am prepared to personally assure all the instructional materials and activities used in my classes comply with Federal regulations requiring all online educational environments to be full "accessible" by students with disabilities (i.e. ADA Sections 504/508).
Q37	OESES	After completing OTA's course for teachers, I can describe and discuss assessment strategies suitable for assuring academic accountability in online learning environments.
Q38	OESES	After completing OTA's course for teachers, I can identify and plan for typical instructional problems affecting online and blended learning environments.
Q39	OESES	After completing OTA's course for teachers, I can describe and discuss facilitation strategies and techniques useful for maintaining productive and efficient online and blended learning environments.
Q40	OESES	After completing OTA's course for teachers, I can describe and discuss common factors contributing to heavy demands on teachers' time (24/7) from fully online and blended teaching assignments.
Q41	OESES	After completing OTA's course for teachers, I am confident I can successfully manage workload demands from an online or blended teaching assignment.
Q42	OESES	After completing OTA's course for teachers, I can describe and discuss ways online instruction can effectively contribute to enriching and expanding learning opportunities for students in traditional classroom.
Q43	OESES	After completing OTA's course for teachers, I can explain to other online educators ways online instruction can be used to support students' academic performance in traditional classroom setting.
Q44	OESES	After completing OTA's course for teachers, I feel prepared to begin integrating online learning activities for supporting and enriching instruction in my traditional, face-to-face classes.
Q45	OESES	After completing OTA's course for teachers, I can identify and discuss a variety of online "threats" that potentially put my students "at risk."
Q46	OESES	After completing OTA's course for teachers, I understand and can discuss the issues covered under our district's "acceptable use policy" or AUP.

Q47	OESES	After completing OTA's course for teachers, I am able to identify and discuss a variety of socio-cultural issues relevant to participation in online education.
Q48	OESES	After completing OTA's course for teachers, I can identify and discuss contrasting ways online education can contribute to either narrowing or widening the "Digital Divide."
Q49	OESES	After completing OTA's course for teachers, I can identify and discuss issues related to digital copyright, licensing and intellectual property.
Q50	OESES	After completing OTA's course for teachers, I am prepared to inform my students about digital copyright and intellectual property laws and will require their full, lawful compliance with these statutes while they participate in my classes.
Q51	OESES	After completing OTA's course for teachers, I can identify and discuss cultural and linquistic diversity issues related to online education.
Q52	OESES	After completing OTA's course for teachers, I feel prepared to implement online educational activities that will address and support cultural diversity.