

Running head: ONLINE VALUE AND SELF-EFFICACY SCALE

Development and Initial Validation of the Online  
Learning Value and Self-Efficacy Scale  
Anthony R. Artino Jr. and D. Betsy McCoach  
University of Connecticut

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### Abstract

The objective of this study was to develop a quantitative self-report measure of perceived task value and self-efficacy, and to establish reliability and validity evidence for the instrument. In Study 1 ( $n = 204$ ), 28 survey items were created for the Online Learning Value and Self-Efficacy Scale (OLVSES), and an exploratory factor analysis (EFA) was completed on the items. Results suggested two interpretable factors: Task Value and Self-Efficacy. In Study 2 ( $n = 618$ ), confirmatory factor analysis (CFA) suggested several survey modifications that resulted in a refined, more parsimonious version of the OLVSES. The resulting 11-item, two-factor scale appears to be psychometrically sound, with reasonable factor structure and good internal reliability. Instrument applications and suggestions for future research are discussed.

## Development and Initial Validation of the Online Learning Value and Self-Efficacy Scale

With the rapid expansion of Internet-based technologies, online learning has emerged as a viable alternative to traditional classroom instruction (Moore, 2003; Tallent-Runnels et al., 2006). As a subset of a much larger form of instruction – distance education – online learning has become the format-of-choice for countless institutions eager to provide students with the opportunity and convenience of learning from a distance (Moore & Kearsley, 2005). For example, the Department of Defense, an organization that spends more than \$17 billion annually on military schools for almost three million personnel, recently committed to transforming the majority of its classroom training to computer-supported distance learning (United States General Accounting Office, 2003). Similarly, postsecondary institutions have recognized the utility of online learning. A recent survey of 2,200 U.S. colleges and universities by the Sloan Consortium (2006) found that 96% of large institutions (greater than 15,000 total enrollments) have some online offerings; 62% of Chief Academic Officers rated learning outcomes in online education as the same or superior to traditional, face-to-face instruction; 58% of schools identified online education as a critical long-term strategy; and overall online enrollment increased from 2.4 million in 2004 to 3.2 million in 2005.

The recent growth in online learning has resulted in a major shift in education and training from an instructor-centered to a learner-centered focus (Dillon & Greene, 2003). With this shift has come the suggestion that, in the absence of an ever-present instructor, students learning at a distance must take greater responsibility for the management of their own learning (Hartley & Bendixen, 2001; Moore & Kearsley, 2005). Furthermore, a number of researchers have argued that online students, to an even greater extent than traditional learners, require well-

developed self-regulated learning skills to guide their cognition and behavior (Bandura, 1997; Hill & Hannafin, 1997). Self-regulated learners are generally characterized as active, motivated participants who efficiently control their own learning experiences in many different ways, including organizing and rehearsing information to be learned, and holding positive beliefs about their capabilities and the value of learning (Schunk & Zimmerman, 1994, 1998).

### Purpose of the Study

The purpose of the present study was to develop a quantitative self-report measure of perceived task value and self-efficacy for learning within the context of self-paced, online training, and to establish reliability and validity evidence for the instrument. Investigations of this kind are particularly important because task value and self-efficacy have been shown to be significant predictors of students' use of self-regulated learning strategies and academic achievement in traditional school settings (Pintrich, 1999). Furthermore, numerous experts have suggested that these motivational constructs may be even more critical in predicting student success in online, distance learning situations (Bandura, 1997; Schunk & Zimmerman, 1998).

### Study 1: Item Development and Exploratory Factor Analysis

#### *Item Development*

Based on the results of a literature review, initial items were developed for each of four subscales (see Table 1; Bandura, 1997; Eccles & Wigfield, 1995, 2002). Following initial item development, six content experts were recruited to participate in a content validation (DeVellis, 2003). Each content expert was provided with the 41 draft items and comprehensive instructions for completing the content validation. Results from the content validation yielded a 28-item instrument designed to measure the four hypothesized latent variables. All items employed a 7-point Likert-type agreement scale.

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Insert Table 1 Here  
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### *Participants*

Participants consisted of a convenience sample of 204 military and civilian personnel from the U.S. Navy. The sample included 150 men (74%) and 53 women (26%). The mean age of the participants was 39.0 years (SD = 9.3; range 22-69).

### *Exploratory Factor Analysis Results*

A principal axis factor (PAF) analysis with oblique rotation (Oblimin; delta = 0) was carried out on the 28 items using SPSS 13.0 (see recommendations in Preacher & MacCallum, 2003). Oblique rotation methods allow for factors to be correlated, and the assumption was made that the four factors thought to be present in the OLVSES were related.

The number of factors to extract was determined on the basis of several criteria, including parallel analysis, examination of the resulting scree plot, and eigenvalues greater than 1.0 (i.e., the K1 criterion; Hayton, Allen, & Scarpello, 2004). The parallel analysis suggested that two factors should be retained. Inspection of the scree plot, although subjective, seemed to suggest two or three factors, while the K1 criterion suggested four initial factors. Based on these results, it was determined that three factors would be retained – a reasonable compromise considering the dangers of under-extracting and the tendency for the K1 criterion to over-extract (Hayton et al., 2004).

The three initial factors extracted accounted for 57.9% of the total variance in the items. Inspection of the table of communalities revealed that the majority of the items had high extracted communalities (i.e., > 0.40; see Table 2), which indicates that much of the common

variance in the items can be explained by the three extracted factors (Pett, Lackey, & Sullivan, 2003).

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 Insert Table 2 Here  
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Several rules were used to determine the number of factors and individual items to be retained in the final solution: (1) factors needed to contain at least three items; (2) all factor pattern coefficients needed to be  $> |0.50|$  on at least one factor; and (3) items with factor pattern coefficients  $\geq |0.30|$  on more than one factor were dropped (see recommendations in Pett et al., 2003). The factor pattern and structure coefficients from the PAF analysis are displayed in Table 2. The rotated pattern and structure coefficients were judged to have identical factor interpretations.

The first factor (extraction eigenvalue = 11.86) included 16 items: TV-1, TV-3, TV-4, TV-6 to TV-17, and TV-19. Although item TV-2 loaded highly on Factor 1, it also loaded on Factor 3 and was therefore dropped from the final solution. The second factor (extraction eigenvalue = 3.52) included eight items: SE-1 to SE-7 and SE-9. Although item SE-8 loaded highly on Factor 2, it also loaded on Factor 3 and was therefore dropped from the final solution. The third factor (extraction eigenvalue = 0.83) had no items with pattern coefficients  $> |0.50|$ , and, therefore, Factor 3 was dropped from the final solution. The correlation between the two remaining factors was 0.37.

#### *Reliability Analysis*

Based on the results of the PAF, a reliability analysis was run on the 16 items retained in the Task Value subscale. The Cronbach's alpha for these 16 items was 0.96. However, further inspection of the inter-item correlation matrix revealed some considerable redundancy in items

TV-12 and TV-17. Each of these items was highly correlated ( $r > 0.70$ ) with four other items in the subscale. Therefore, these two items were deleted. The Cronbach's alpha for the resulting 14-item Task Value subscale was 0.95 (see Table 3).

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Next, a reliability analysis was run on the eight items retained in the Self-Efficacy subscale. The Cronbach's alpha for these eight items was 0.88. However, further inspection of the inter-item correlation matrix revealed that item SE-2 had low correlations ( $r < 0.40$ ) with four other items in the subscale. Inspection of the item-total correlation for the item confirmed this result. Therefore, item SE-2 was deleted. The Cronbach's alpha for the resulting seven-item Self-Efficacy subscale was 0.89 (see Table 3).

### *Conclusions*

Results from the EFA did not reproduce the conceived survey structure. Instead of four factors, as hypothesized, results suggested only two interpretable factors: Task Value and Self-Efficacy for Learning with Self-Paced, Online Training. The 14 items that make up the Task Value subscale (see Table 4) assess the respondent's belief that a self-paced, online course is valuable. High scores on this subscale indicate the person finds the online course interesting, important, and useful. The seven items that make up the Self-Efficacy subscale (see Table 4) assess the respondent's confidence in his/her ability to learn the material presented in a self-paced, online course. High scores on this subscale indicate the person is completely confident he/she can learn the material presented in a self-paced, online format.

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### Study 2: Confirmatory Factor Analysis

In Study 2, CFA was used to test the two-factor solution identified in Study 1.

#### *Participants*

Participants for this study consisted of a convenience sample of 646 military personnel from the U.S. Navy. The sample included 514 men (80%) and 113 women (18%). The mean age of the participants was 20.4 years (SD = 1.0; range 18-24).

#### *Confirmatory Factor Analysis Results*

Using AMOS 4.0, correlations among the 21 OLVSES items were calculated. Listwise deletion of cases with missing data was used. There were 618 cases with no missing values on the 21 items. The two latent variables were the two factors identified by the previous EFA. The 21 observed variables were the actual OLVSES items. Parameters led to each item from the factor hypothesized to represent that item. Additionally, a parameter connected the two factors.

The second column of Table 5 provides a summary of the resulting goodness-of-fit indices for the two-factor model. Chi-square was statistically significant; Chi-square/degrees of freedom ratio was  $> 2.0$ ; Tucker Lewis index (TLI) and comparative fit index (CFI) were  $< 0.9$ ; and root mean square error of approximation (RMSEA) was  $> 0.08$ ; all indicating that the model did not fit the data well (see recommendations in Hu & Bentler, 1999). Table 6 provides parameter estimates for the original two-factor model. Overall, the pattern coefficients were consistent with the hypothesized model. Except for SE-4, which had a pattern coefficient of -0.36, all factor pattern coefficients were moderate ( $> |0.55|$ ) to high ( $> |0.75|$ ) on their corresponding factor.

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In an attempt to improve model fit, standardized residuals and modification indices (MIs) were examined. Standardized residuals represent differences between the implied covariance matrix and the observed covariance matrix and reflect possible sources of model misfit (Netemeyer et al., 2003). Standardized residuals greater than +2.57 are considered statistically significant (Netemeyer et al., 2003), and a number of items had standardized residuals greater than +2.57. Inspection of the MIs also revealed that these same items had large correlated errors ( $MI > 40.0$ ) with other items. Based on these results, items TV-1, TV-4, TV-9, TV-14, and SE-4 were deleted and the CFA was run again.

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Insert Table 6 Here  
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The third column of Table 5 provides a summary of the resulting goodness-of-fit indices for this revised model. All fit indices improved as a result of this change, approaching recommended standards. Examination of the MIs again revealed a number of items with large correlated errors ( $MI > 20.0$ ). Based on these results, items TV-2, TV-5, TV-6, TV-11, and SE-1 were deleted and the CFA was run a final time.

The fourth column of Table 5 provides a summary of the resulting goodness-of-fit indices for this revised model. Once more, all fit indices improved as a result of this change. Using the recommended standards of Hu and Bentler (1999), overall model fit was deemed adequate. The Chi-square/*df* ratio (3.15) approached the recommended level of 2.0, TLI (0.96) and CFI (0.97) were  $> 0.95$ , and RMSEA (0.06) was  $< 0.08$ .

*Reliability Analysis*

Based on the results of the CFA, reliability analyses were run on the six items retained in the Task Value subscale and the five items retained in the Self-Efficacy subscale; Cronbach's alphas for the two subscales were 0.85 and 0.87, respectively (see Table 7).

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*Conclusions*

Results from the CFA suggested several survey modifications that resulted in a refined, more parsimonious version of the OLVSES. The resulting 11-item, two-factor scale appears to be psychometrically sound, with reasonable factor structure and good internal reliability. Table 8 provides a summary of the psychometrics for the two subscales that make up the OLVSES.

Table 9 presents the final items retained in each subscale.

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#### Relating the Present Study to Past Research

In their previous work on expectancy-value theory, Eccles and Wigfield (1995, 2002) found that attainment, interest, and utility value were separable in both EFA and CFA. Results from the present study did not support this conclusion. Instead, these findings suggest that participants did not differentiate between the three theoretically distinct components of task value. That being said, results of the present study are consistent with much earlier research by Parsons (1980), who conducted an EFA and also found no empirical distinctions between the three positive components of task value.

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Insert Table 9 Here  
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### Educational Implications and Future Directions

Although factor analysis failed to confirm the hypothesized four-factor model, the resulting two-factor scale appears to have reasonable factor structure and good internal reliability (see reliability guidelines in Gable & Wolfe, 1993). Therefore, the ultimate goal of the present study was achieved; namely, to produce a psychometrically sound survey for measuring respondents' perceived task value and self-efficacy with respect to self-paced, online learning. Using the OLVSES, researchers have another tool for exploring the relations between online learners' motivational beliefs, as measured by perceived task value and self-efficacy, and other dependent variables of interest.

Future validation of the OLVSES should include replication of the current study on a more diverse population. Additionally, future research should examine other forms of validity evidence, such as convergent, discriminant, and predictive validity, which could ultimately improve the functioning of the instrument.

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## Tables

**Table 1***Construct Categories and Conceptual Definitions for Each of the Four Subscales*

<b>Construct Category</b>	<b>Conceptual Definition</b>
I. Attainment Value/Importance	Attainment value (or, more simply, importance) is defined as the importance of doing well on a task in terms of one's self-schema and core personal values.
II. Intrinsic Interest Value	Intrinsic interest value is defined as the inherent enjoyment or pleasure one gets from engaging in an activity, or simply a person's subjective interest in the content of a task.
III. Extrinsic Utility Value	Extrinsic utility value is defined as the usefulness of a task in terms of one's short- and long-term goals, including academic and career goals.
IV. Self-Efficacy for Learning with Self-Paced, Online Training	Self-Efficacy for Learning with Self-Paced, Online Training is defined as an individual's confidence in his or her ability to successfully learn the material presented in a self-paced, online learning format.

**Table 2**  
*Results from the Exploratory Factor Analysis with Oblique Rotation (Oblimin; delta = 0)*

Item	Communality	Factor		
		1	2	3
TV-10 I was very interested in the content of this course.	.768	<b>.91 (.87)</b>	-.13 (.21)	.00 (.00)
TV-17 I enjoyed learning the material presented in this online course.	.788	<b>.85 (.88)</b>	.00 (.39)	-.12 (-.13)
TV-12 The material presented in this course is useful for me to know.	.782	<b>.85 (.85)</b>	.00 (.29)	.26 (.25)
TV-15 It was important for me to learn the material in this course.	.744	<b>.84 (.83)</b>	.00 (.27)	.23 (.23)
TV-11 I felt that doing well in this self-paced, online course was imperative for me.	.640	<b>.79 (.79)</b>	.00 (.29)	-.14 (-.15)
TV-16 The knowledge I gained by taking this course can be applied in many different situations.	.566	<b>.78 (.75)</b>	.00 (.21)	.00 (.00)
TV-3 I will be able to use what I learned in this course in my job.	.669	<b>.78 (.79)</b>	.00 (.31)	.22 (.21)
TV-6 In the long run, I will be able to use what I learned in this course.	.715	<b>.77 (.82)</b>	.13 (.40)	.19 (.817)
TV-7 I really enjoyed completing this self-paced, online course.	.704	<b>.75 (.80)</b>	.13 (.42)	-.22 (-.24)
TV-4 It was personally important for me to perform well in this course.	.554	<b>.73 (.74)</b>	.00 (.30)	.00 (.00)
TV-2 Understanding the material in this course was important to me.	.662	.73 (.75)	.00 (.29)	.33 (.32)
TV-13 Completing this course moved me closer to attaining my career goals.	.501	<b>.72 (.70)</b>	.00 (.22)	.00 (.00)
TV-9 This course provided a great deal of practical information.	.523	<b>.71 (.72)</b>	.00 (.30)	.00 (.00)
TV-19 Finishing this online course gave me a sense of accomplishment.	.596	<b>.69 (.74)</b>	.13 (.39)	-.17 (-.19)
TV-8 Performing well in this course made me feel good about myself.	.631	<b>.68 (.74)</b>	.16 (.42)	-.25 (-.26)
TV-14 This self-paced, online course included many interesting activities.	.568	<b>.67 (.71)</b>	.00 (.35)	-.24 (-.25)
TV-1 I liked the subject matter of this course.	.443	<b>.65 (.66)</b>	.00 (.26)	.00 (.00)
TV-18 The information I learned in this course has very little use in my daily life. (REV)	.221	.50 (.46)	-.12 (.00)	.00 (.00)
TV-5 This online course was very boring. (REV)	.321	.37 (.45)	.20 (.35)	-.28 (-.30)
SE-6 I am confident I can do an outstanding job on the activities in a self-paced, online course.	.683	.00 (.36)	<b>.80 (.82)</b>	.00 (.00)
SE-4 I am confident I can learn without the presence of an instructor to assist me.	.593	.00 (.24)	<b>.79 (.77)</b>	.00 (.00)
SE-7 I am certain I can understand the most difficult material presented in a self-paced, online course.	.630	.00 (.30)	<b>.78 (.79)</b>	.00 (-.12)
SE-3 Even in the face of technical difficulties, I am certain I can learn the material presented in an online course.	.564	.00 (.24)	<b>.77 (.75)</b>	.00 (.00)
SE-1 I can perform well in a self-paced, online course.	.566	.00 (.21)	<b>.77 (.75)</b>	.00 (-.13)
SE-9 Even with distractions, I am confident I can learn material presented online.	.558	.00 (.35)	<b>.68 (.73)</b>	-.15 (-.20)
SE-8 I am confident I can successfully navigate through a self-paced, online course.	.532	.00 (.30)	.64 (.64)	.35 (.30)
SE-5 I find it difficult to comprehend information presented in a self-paced, online learning format. (REV)	.328	.00 (.16)	<b>.57 (.56)</b>	-.11 (-.16)
SE-2 I am confident I can successfully log in to an online course management system.	.365	.12 (.31)	<b>.54 (.56)</b>	.19 (.15)

Note. *N* = 204. Pattern coefficients are presented first, followed by structure coefficients in parentheses. Entries in bold indicate pattern coefficients >|.50| on at least one factor and pattern coefficients ≥|.30| on only one factor.

**Table 3**  
*Reliability Statistics for Each Subscale in the Final Solution for Study 1*

Subscale	# Items	Cronbach's Alpha	95% Confidence Interval		Mean Inter-Item Correlations	SD of Inter-Item Correlations
			Lower	Upper		
Task Value	14	.95	.94	.96	.58	.08
Self-Efficacy	7	.89	.86	.91	.54	.09

**Table 4**  
*Items Retained in Each Subscale Based on Results of Study 1*

<b>Task Value (TV)</b>	
TV-1	I liked the subject matter of this course.
TV-3	I will be able to use what I learned in this course in my job.
TV-4	It was personally important for me to perform well in this course.
TV-6	In the long run, I will be able to use what I learned in this course.
TV-7	I really enjoyed completing this self-paced, online course.
TV-8	Performing well in this course made me feel good about myself.
TV-9	This course provided a great deal of practical information.
TV-10	I was very interested in the content of this course.
TV-11	I felt that doing well in this self-paced, online course was imperative for me.
TV-13	Completing this course moved me closer to attaining my career goals.
TV-14	This self-paced, online course included many interesting activities.
TV-15	It was important for me to learn the material in this course.
TV-16	The knowledge I gained by taking this course can be applied in many different situations.
TV-19	Finishing this online course gave me a sense of accomplishment
<b>Self-Efficacy for Learning with Self-Paced, Online Training (SE)</b>	
SE-1	I can perform well in a self-paced, online course.
SE-3	Even in the face of technical difficulties, I am certain I can learn the material presented in an online course.
SE-4	I am confident I can learn without the presence of an instructor to assist me.
SE-5	I find it difficult to comprehend information presented in a self-paced, online learning format. (Reverse Coded)
SE-6	I am confident I can do an outstanding job on the activities in a self-paced, online course.
SE-7	I am certain I can understand the most difficult material presented in a self-paced, online course.
SE-9	Even with distractions, I am confident I can learn material presented online.

**Table 5**  
*Fit Indices for Confirmatory Factor Analysis Models Tested in Study 2*

Index	CFA Model		
	Original 2-Factor Model	2-Factor Model, TV-1, TV-4, TV-9, TV-14, & SE-4 Deleted	2-Factor Model, TV-2, TV-5, TV-6, TV-11, & SE-1 Deleted
Chi-square	1292.52	563.43	135.32
<i>df</i>	188	103	43
Probability	.000	.000	.000
Chi-sq/ <i>df</i> ratio	6.875	5.470	3.147
TLI	.811	.882	.960
CFI	.831	.899	.969
RMSEA	.098	.085	.059
Chi-sq $\Delta$	-	729.09	428.11

**Table 6**  
*Standardized Factor Pattern Coefficients for the Original 21-Item, Two-Factor Model*

Observed Variables (Items)	Factor	
	Task Value	Self-Efficacy
TV-1: I liked the subject matter of this course.	.565	-
TV-2: I will be able to use what I learned in this course in my job.	.558	-
TV-3: It was personally important for me to perform well in this course.	.699	-
TV-4: In the long run, I will be able to use what I learned in this course.	.678	-
TV-5: I really enjoyed completing this self-paced, online course.	.583	-
TV-6: Performing well in this course made me feel good about myself.	.660	-
TV-7: This course provided a great deal of practical information.	.655	-
TV-8: I was very interested in the content of this course.	.726	-
TV-9: I felt that doing well in this self-paced, online course was imperative for me.	.708	-
TV-10: Completing this course moved me closer to attaining my career goals.	.708	-
TV-11: This self-paced, online course included many interesting activities.	.655	-
TV-12: It was important for me to learn the material in this course.	.743	-
TV-13: The knowledge I gained by taking this course can be applied in many different situations.	.683	-
TV-14: Finishing this online course gave me a sense of accomplishment.	.658	-
SE-1: I can perform well in a self-paced, online course.	-	.713
SE-2: Even in the face of technical difficulties, I am certain I can learn the material presented in an online course.	-	.713
SE-3: I am confident I can learn without the presence of an instructor to assist me.	-	.760
SE-4: I find it difficult to comprehend information presented in a self-paced, online learning format. (Reverse Coded)	-	-.360
SE-5: I am confident I can do an outstanding job on the activities in a self-paced, online course.	-	.806
SE-6: I am certain I can understand the most difficult material presented in a self-paced, online course.	-	.742
SE-7: Even with distractions, I am confident I can learn material presented online.	-	.769

Note. Parameter estimates “fixed” to be zero are reported as dashes (-).

**Table 7**  
*Reliability Statistics for Each Subscale in the Final Solution for Study 2*

Subscale	# Items	Cronbach's Alpha	95% Confidence Interval		Mean Inter-Item Correlations	SD of Inter-Item Correlations
			Lower	Upper		
Task Value	6	.85	.84	.87	.50	.06
Self-Efficacy	5	.87	.85	.89	.57	.06

**Table 8**  
*Subscale Summary Statistics Based on Participant Scores from Study 2*

<b>Subscale Name</b>	<b># Items</b>	<b>Cronbach's Alpha</b>	<b>M</b>	<b>SD</b>	<b>Subscale Correlation</b>
Task Value	6	.85	5.25	0.99	.289*
Self-Efficacy	5	.87	5.16	1.04	

Note.  $N = 638$ . \* $p < .01$ .

**Table 9**  
*Items Retained in Each Subscale Based on Results of Studies 1 and 2*

<b>Task Value</b>	
TV-3	It was personally important for me to perform well in this course.
TV-7	This course provided a great deal of practical information.
TV-8	I was very interested in the content of this course.
TV-10	Completing this course moved me closer to attaining my career goals.
TV-12	It was important for me to learn the material in this course.
TV-13	The knowledge I gained by taking this course can be applied in many different situations.
<b>Self-Efficacy for Learning with Self-Paced, Online Training</b>	
SE-2	Even in the face of technical difficulties, I am certain I can learn the material presented in an online course.
SE-3	I am confident I can learn without the presence of an instructor to assist me.
SE-5	I am confident I can do an outstanding job on the activities in a self-paced, online course.
SE-6	I am certain I can understand the most difficult material presented in a self-paced, online course.
SE-7	Even with distractions, I am confident I can learn material presented online.