Understanding Professional Development Program Learners' Perceptions of its Value: The Development of a Valid and Reliable Assessment

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Abstract

The increased costs of traditional degrees within higher education institutions paired with the recent global economic downturn has resulted in many job-seekers embracing alternative academic credentials like non-credit certificates as a potential, low-cost alternative to the traditional academic degree. This quantitative study seeks a valid and reliable assessment for higher education institutions to evaluate in a more sophisticated way how non-credit, adult learners value their professional development activities. The author conducts his exploration within a single non-credit certificate program at the University of Wisconsin-Madison and attempts in that environment to build a tool to answer the question: In what ways do professional development participants perceive the value(s) of online non-certificates programs? A 30-item instrument focused on the five identified factors that emerging research suggests lead to a composite positive or negative perceptions of value. These factors are quality/performance, price, sociability, emotions, and reputation of professional development program. Drawn from the current research literature concerning the perception of value and tested in this study, the statistical measurement of these five factors confirmed the validity and reliability of the created assessment tool. The tool therefore deserves broader application within continuing education and professional development programs.

Keywords: Continuing Education; Value; Professional Development; Online Learning, Distance Education; Assessment; Evaluation

1. Introduction

Higher education is currently undergoing changes that have the potential to influence program delivery, enrollment, and future perceived value dramatically. These changes, rooted in several areas within the higher education industry, relate specifically to applications of new and emerging technologies, increasing tuition costs, and a rising market demand for college graduates. Evolving, cost-efficient technologies are altering the ways that students embrace learning, that content

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experts and institutions deliver it, and that soon-to-be students and employers value it (Daniels, 2011; Carnevale et al., 2012; Carr, 2012). At the same time, accelerating costs of college degrees are forcing students to consider alternatives to the traditional bachelor's degree, such as non-credit continuing and professional training programs, undergraduate and graduate (credit granting) certificate programs, or the completion of a Massive Open Online Course (MOOC) on a specific subject (Carnevale et al, 2012). For the purposes of this article, we define *certificate programs* as condensed and formalized learning programs that focus on the transfer and attainment of specific applied skill-sets. *MOOCs* are large-scale, interactive, open-access courses that anyone with an Internet connection can attend for free. These are alternative educational options for those seeking instruction from knowledge leaders within a specific field. Within the area of post-secondary education, faculty and subject matter experts from an offering institution generally lead such courses. There are, however, for profit institutions that are also implementing MOOCs. According to the Lumina Foundation (2007), today's labor force has "54 million adults who lack a college degree; of those, nearly 34 million have no college experience at all." Alternative credentials address this gap through, for example, certificate programs for which institutions charge tuition and/or fees. In the twenty-first century, these numbers cannot sustain the future workforce and general economy within the United States. Without such alternatives, the future workforce will have insufficient numbers to sustain the general economy of the United States.

There is a correlation between the increases in traditional for-credit tuition costs and the overall increased popularity of both credit and non-credit certificate programs (Carnevale et al., 2012; Sykes, 2012). This growing popularity notwithstanding, we know little about how students perceive value when they consider certificate programs. Such understanding would allow certificate granting institutions to market to prospective students more effectively, retain current students, and document the needs of such students in ways that will translate into more student services and curriculum offerings. It is possible, of course, the lack of published literature is attributable to commercial secrecy within institutions of higher learning that are increasingly competing for student inputs and retention.

Compared with other teaching and learning tactics employed within higher education, internet-based online learning is in an early stage. Even so, the technology's growth rate is rapid. According the U.S. Department of Education's National Center for Educational Statistics' Digest of Educational Statistics (National Center for Educational Statistics, (2012), during the fall of 2009 alone, 539,000 students attended non-degree granting institutions. Assuming further expansion of various types of internet-based distance education and the desirability of pursuing its goals sensitively and efficiently, the importance and timeliness of apprehending students' opinions on the value of such programs is readily apparent. The concept of perceived value is very common within the more traditional areas of business, specifically, within marketing theory and general operations (Sánchez-Fernández and Iniesta-Bonillo, 2007; Gibbs, 2009). In recent years, researchers have extended the concept of value beyond general business for its applicability in areas of higher education (Alves and Raposo, 2007; Artino and McCoach, 2008; Alves and Raposo, 2010). Such research has focused primarily on for-credit programs (Sweeney and Soutar, 2001; Walker and Fraser, 2005; Voss et al., 2007; Alves and Raposo, (2010). It is clear that there is a gap between workforce needs and those able to fill the employment ranks in a shifting economy. In addition, filling this gap will require strong, well organized alternatives to degree programs for a variety of reasons, including those already suggested. Based on the clear and present need to understand

better how learners view the overall value of professional development programs, this paper establishes a valid and reliable tool that can help organizations measure learner's overall perception of value regarding professional development programs.

2. Literature Review

Higher education is witness a period of aggressive growth. At the start of the twentieth century, an estimated 500,000 students worldwide were enrolled in some level of higher education, which represented roughly one percent of those college-aged (Schofer and Meyer, 2005). In the beginning of the twenty-first century, approximately 100 million, representing 20% of the college-aged population, are enrolled in higher education of some sort (UNESCO, 2004). Specifically, within the U.S., rates of enrollment have increased by 38% between 1999 and 2009, from 14.8 million to 20.4 million (Hanover, 2012). In addition, a 2012 Hanover Research Report (2012) projects that by the end of the decade that enrollment will increase by an additional 13% with an overall female student population increase of 16% along with an 8% increase of males (Hanover, 2012). More importantly, when considering adult learners, or those over the age of 25, research suggested that enrollment for students ages 25 to 35 will see an increase of 21%, and for ages 35 and older a 16% increase.

Today's students enjoy such connection with the digital universe that they are subject to intense and continuous marketing featuring greater choices in the hyper-competitive marketplace for educational products. In this context, the traditional-aged college/university student is more powerful than ever due to recent technological developments. Carpenter (2013) suggests, "[The recent] digital revolution has empowered these same consumers, through access to information and to one another—anywhere, anytime." Because of this new technology and ability to enroll in any number of programs, these empowered consumers feel that the money they are spending should result in some type of engagement, or solution, that satisfactory to them.

Many institutions of higher education (public and private) are grappling with cash flow shortages. One factor that contributes to revenue shortfalls is that many continuing and professional development providers continue to employ twenty-first century marketing and communication tactics to identify and reach targeted populations—methods such as direct mail, call centers, and online advertising, social media, and billboards (Kirp, 2003; Touzeau, 2005). Another factor arises from the fact that potential consumers of credit and non-credit educational options are so bombarded by promotion of these options that the variety itself may be result in a lack of separation between their perceptions of themselves as consumers versus as students.

Current research in consumers' perception of value as a component of their buying habits is substantial, especially within the general areas of marketing, consumer psychology, customer service, management, and general commerce, and specific industries (Parasuraman et al., 1998; Holbrook, 1999: Bowman and Ambrosini, 2000; Cronin et al., 2000; Artino and McCoach, 2008; Cummings, 2015). Until recently studies of value perception have been limited to the context of products and services within the more traditionally recognized areas of consumer-centric businesses. Within education, however, the measurement of value perception among students is relatively new focus of interest in the science of the consumer (Alvez and Raposo, 2010). Scholarly inquiry pertaining to non-credit programs and students' perceptions of value is virtually non-existent.

The literature suggests multiple definitions for *consumer value* (Parasuraman, 1998; Holbrook, 1999; Cronin et al., 2000; Sweeney and Soutar, 2001; Sánchez-Fernández and Iniesta-Bonillo, 2007; Alvez and Raposo, 2010). These definitions address whether the consumer value is simplistic (unidimensional) or unique (multi-dimensional). Zeithml (1988) suggested that value is unidimensional and, further, "[The] consumer's overall assessment of the utility of a product is based on perceptions of what is received and what is given." This unidimensional approach primarily looks at cost vs rewards from a more limited basis of cost by asking the question: Is the product worth its financial cost from an investment perspective?

In contrast, many researchers (Cronin et al., 2000; Sweeney and Soutar, 2001; Alvez and Raposo, 2007) suggest that perceived value is a multi-dimensioned view that is dependent upon multiple lenses of the consumer, each related to unique constructs like quality/performance, price, social components of learning, emotional equity, and reputation. The literature is fairly consistent in suggesting that perceived value is not as simple as a cost and reward equation, but is something more complex than just a simple equation around return on investment.

The academic study of consumer value appears to be moving away from the assumed simplicity of uniformly measuring value as a simple equation related to costs (Sánchez-Fernández and Iniesta-Bonillo, 2007). The recent research of Vargo and Lusch (2004) suggests, "Value is always uniquely and phenomenologically determined by the beneficiary." While value may indeed be determined by the individual, the literature suggests also that constant, individual factors lead to mental constructs that consistently comprise an individual's larger perception of value. The multi-dimensional research suggests that, while costs are an obvious factor, there is more to the concept of value; such research suggests that quality/performance, social ability, emotion, and reputation should also be taken into consideration when seeking to understand the individual consumer's composite perception of value.

The composite perception of a product's and/or service's value is unique to the consumer using the product and/or service. This uniqueness of perception has led to the creation of multiple assessments around the measurement of value, each focusing on different areas, such as the measurement of value in a more contextual manner, as in actual experience or as in the VALCONEX Assessment (Cronin et al., 2000). Parasuraman and colleagues focused on the measurement of service quality in their SERQUAL assessment, and Sweeney and Soutar (2001) focused on the basic measurement of perceived consumer value from the stand-point of return on investment. Again, we do not observe research directed to students' (or potential students') multi-dimensional perception of value, notably as related to non-credit certificate programs.

The impetus for the present research is U.S. higher education's need to meet the desires and expectations of current and prospective students relative to technological innovation and to attract new students (therefore revenue and, hopefully, profit) through a variety of targeted educational credentialing options that, in many cases, may be additional to or an alternative to a traditional bachelor's degree. Understandable though the desire may be to create new revenue through non-credit and professional development programs, it is apparent that efforts to achieve such a goal must meet the challenge of multiple educational objectives, their scope, the financial and other capacities of the organization, and the constraints of general funding models. However, in considering health sciences, we cannot ignore our need to understand the perception of value for

non-credit continuing and professional development programs. According the Bureau of Labor Statistics and Cummings (2014), available positions within hospital settings increased from 42,000 total jobs in 2014 to 172,200 positions in 2015—an increase of 306%. Overall, the healthcare sector reported 474,700 new jobs created in 2015. This represents a 53% increase over the 309,000 healthcare jobs created in 2014. The growth of healthcare in the U.S. is unmistakable as is a commensurate increase in the number of positions that require staff that is motivated, educated, and well trained. Of course, many of these positions will not require continuing education, state licensure, or board certification. We must assume, however, that many individuals seeking employment in these positions will require the unique and specialized non-credit continuing and professional development opportunities that our institutions purveyors of knowledge and skill must provide. The link between individuals and such specialized and varied professional training is the perception of value of these individuals as they survey the array of educational opportunity from tradition-based to technology-based delivery. Hence, the identification and measurement of such values becomes a prime target for immediate research to facilitate health profession training organizations (a) to serve the needs of the next generations and (b) to survive in a complex, competitive, and constantly changing academic environment.

 Based on historical U.S. growth in the number of awarded certificates from 300,000 in 1994 to 1 million in 2010 (Carnevale et al., 2012; Sykes, 2012), it appears that the usefulness of the certificate as a credential is being accepted within the current population looking for continuing education. This growth is stimulating institutions to address the needs associated with this expanding population. Estimations suggest that the monetary value of the field of professional development (overall) is worth $140 billion annually; Carnevale and colleagues (2012) suggest that roughly 40% of these dollars is spent in higher education programs and, therefore, certificate programs are increasing meaningful both to students and to academic institutions. The time to complete a certificate program can range from less than one academic year to more than two years. Certificates typically cost less than traditional degree programs and may allow for more immediate employment (Sykes, 2012). For schools, certificate programs add a profitable revenue stream providing that faculty and infrastructure are already in place (Carnevale et al., 2012).

According to a recent New York Times (January 7, 2011) article, certificate programs are a valuable offering for some higher education institutions as many school governing bodies are realizing the potential economic value of continuing education and professional development programs. For this reason, the present research may stimulate a variety of quantitative, qualitative, and mixed-method research on the perspectives of students, prospective students, employers, and other stakeholders who value the potential benefits of electronic means for the delivery of education and training.

3. Purpose of This Study

The purpose of this research was to create a valid and reliable assessment tool that can be used to measure students' perceptions of the value in professional development education programs. Such research outcomes will make it possible to communicate more effectively with prospective students and to provide better guidance for students currently positioned on educational tracks within organization. The professions can use this data to place students in the position of "knowledgeable consumers" and, at the same time, to improve understanding of the thoughts of this evolving population and the educational opportunities that it values.

4. Methodology

The population used to develop this valid and reliable tool consisted of current online certificate students enrolled in a University of Wisconsin-Madison professional development certificate program. Participation within this self-paced, asynchronous certificate program was open to a national, and potentially, an international audience. This certificate and the unique tracks within it were specifically designed by the author for professionals who wanted to be in, or were already in, a role of online teaching or online course design. While this population had the potential to be geographically diverse, each learner shared similar characteristics. Each was interested in educational certificate offerings and each was an online learner interested in continuing his or her education. This population consisted of both male and female students and spanned an age range from 18 to over 45.

The sample consisted of a total of two main groups of students who were completing a professional development certificate program in the 2013-2014 academic year at the University of Wisconsin-Madison. Participants self-identified as having a career path in education or training and development within industry. Based on the topics of the certificate program (contextual factors of online education, essential teaching and learning principles for online environments, effects of technology on education at a distance, writing learning objectives, creating online activities, and designing online assessments), it is clear that these are applicable to a wide variety of roles across industries, including continuing education and professional development leaders within healthcare. Each group represented similar programs, yet two distinct curriculum tracks existed within the certificate: instruction (IN) and instructional design (ID). This development process also sought information from an additional two sub-groups: those that were employed within general industry and those employed in higher education.

The study employed a purposive sampling methodology, that is, a nonrandom sample selected based on the target population's prior knowledge or experience (Fraenkel et al., 2011). This sampling methodology was utilized because of the specific non-credit certificate population that was necessary to complete the study and the sponsoring University granted access to this population. To be valid and reliable, this study needed to assess confirmed certificate participants and the use of purposive sampling ensured that participants were, in fact, enrolled in the certificate program.

The author provided the Value Assessment of Non-Credit Programming (PEVA) via email to students nearing the end of their certificate courses; volunteers self-selected based on their personal motivation to take part in the study. The email also contained informed consent information and instructed participants as to when and how to complete the informed consent. The sample size for this study was 60 out of a possible 73 enrolled students (82% response rate).

The measurement instrument was the Professional Education Value Assessment (PEVA), which the author designed and piloted for online administration and delivery only. The PEVA is a 30-item instrument that collects data on students' perceptions of value within a non-credit online educational setting. Comprising the PEVA are five constructs: (a) Certificate Content Quality/General Performance, (b) Certificate Price, (c) Social Components of the Learnings, (d) Emotional Equity from Purchase, and (e) Reputation of School.

Certificate Quality/Performance is a measure of a student's perception of the how well the certificate met their overall needs. The Certificate Quality/Performance construct is measured by six questions in the PEVA assessment. Each of the items of the Certificate Quality/Performance construct is scored on a 7-point Likert scale from 1 = strongly disagree to 7 = strongly agree. Several of the items use reverse coding to correct for negatively worded questions. Average scores of the Certificate Quality/Performance construct for this study's sample ranged from 16 to 42, with higher scores indicative of a perception of higher value.

Certificate Price is a measure of a student's value perception of the price of the online certificate program. The PEVA measure the Certificate Price construct with six questions. Each of the items is scored on a 7-point Likert scale from 1 = strongly disagree to 7 = strongly agree. Average scores of the Certificate Price construct for the study's sample ranged from 19 – 42, with higher scores indicative of a perception of higher value.

The Social Components of the Learnings construct measures a student's perception of how well the program allows for social and collaborative interactions within the learning process of the online certificate program. The PEVA measures the Social Components of the Learnings construct through six assessment questions. Average scores of the Social Components of the Learnings construct for the sample ranged from 15 – 40, with higher scores indicative of a perception of higher social components of the learnings of the online certificate program.

The Emotional Equity from Purchase construct is a measure of a student's perception of the how they felt after they completed the online certificate program. The PEVA measured Emotional Equity from Purchase using six items. Average scores of the Emotional Equity from Purchase construct ranged from 21 to 42, with higher scores indicative of a perception of higher emotional equity from the purchase of the online certificate program.

The PEVA measured the Reputation of School construct using six questions in the assessment instrument. Average scores of the Reputation of School construct for the sample ranged from 6 to 42, with higher scores indicative of a perception of higher reputation of the online certificate program.

5. Findings

Table 1 evidences the reliability of the PEVA assessment with the measures of central tendency for the mean scores and Cronbach's alpha coefficients of internal consistency for each of the variable constructs. A Cronbach's coefficient alpha value of .70 or greater indicates good reliability for an instrument. The PEVA instrument proved reliable with all the data collected for this study.

Table 1 Measures of central tendency of the five PEVA variable constructs of the study (N=60)

Variable Construct	*M*	*SD*	*Mdn*	Sample Range	Cronbach's α
Certificate Quality/Performance	32.75	6.66	35.5	16 - 42	0.861
Certificate Price	31.98	5.62	32	19 - 42	0.833
Social Components of the Learnings	28.75	6.32	29	15 - 40	0.863
Emotional Equity from Purchase	34.8	5.2	36	21 - 42	0.835
Reputation of School	30.95	7.01	32		0.876
TOTALS	159.23	23.48	162	101 - 204	0.93

Note. M = Mean; *SD* = Standard Deviation; *Mdn* = Median

6. Instrument Validity

The author performed a series of inferential analyses to address the original intent of the of creating a valid and reliable assessment to measure perceptions of value within non-credit professional development programs. He employed confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) to perform construct validity tests of the five latent variable constructs of (a) certificate quality/performance, (b) certificate price, (c) social components of the learnings, (d) emotional equity from purchase, and (e) reputation of school. He also performed a multivariate analysis of variance (MANOVA) to compare the mean differences of the five latent variable constructs' scores among demographic factors.

6.1 Assumptions

CFA assumes the measured variables (latent variable constructs) are continuous. Each of the five latent variable constructs of (a) certificate quality/performance, (b) certificate price, (c) social components of the learnings, (d) emotional equity from purchase, and (e) reputation of school were derived from Likert-scaled items that were ordinal in scale. However, computing the average of all items to obtain a score allowed the derived construct to be considered continuous in scale. Therefore, the measurement protocol met the assumption of a continuous scale of measurement for the five latent variable constructs.

Additional assumptions for CFA, EFA, and the analysis of variance (ANOVA) included the absence of outliers, normality, linearity, homoscedasticity, and absence of multicollinearity. Outliers have the

potential to distort the results of an inferential analysis. Boxplots can be used as a quick visual test for outliers. The author created boxplots for the five variable constructs used during inferential analysis to inspect for outliers visually. Univariate outliers were present for the independent variable of gender across the four variable constructs of certificate price (two potential outliers, 3.3% of cases), social components of the learnings (1 potential outlier, 1.7% of cases), emotional equity from purchase (1 potential outlier, 1.7% of cases), and reputation of school (2 potential outliers, 3.3% of cases). Univariate outliers were present for the independent variable of Age across the three variable constructs of certificate price (1 potential outlier, 1.7% of cases), emotional equity from purchase (2 potential outliers, 3.3% of cases), and reputation of school (2 potential outliers, 3.3% of cases). Univariate outliers were present for the independent variable of level of education across the three variable constructs of social components of the learnings (1 potential outlier, 1.7% of cases), emotional equity from purchase (2 potential outliers, 3.3% of cases), and reputation of school (2 potential outliers, 3.3% of cases). The values of the five variables were standardized to check for the presence of extreme outliers (z-score of +/- 3.3) 1 outlier was found for the variable construct of reputation of school (Shiffler, 1988). Further investigation of the outliers indicated that all outlying values were within possible ranges of each variable (between the values of 1 to 7). Additionally, means and medians for each of the five latent variable constructs were close in value, further indicating that outliers were not negatively influencing the data distributions of the variables.

The author evaluated normality for the scores of the five variable constructs using the Kolmogorov-Smirnov (K-S) test for normality, which indicated that two of the variable constructs were normal for the three independent variables of gender, age, and education level ($p < .01$). However, the K-S test is sensitive to larger sample sizes (> 50) and will return a significant value when, in fact, the data is normally distributed (Tabachnick & Fidell, 2001; 2007). A visual check of histograms for most of the five variable constructs did not indicate skew, but the histograms for the variables of certificate quality/performance and reputation of school did indicate a slight left skew. The normal Q-Q plots indicated normality or near-normality for all five variable constructs. The tests used for inference in this study are robust to deviations from normality when most of the other assumptions are met. Therefore, the author decided that the parametric tests did not seriously violate the assumption of normality and, thus, used these tests on all five of the continuous variables during inferential analysis. Transformation of the data was not required.

Multivariate normality for the scores of the five variable constructs was investigated by Mahalanobis distances, which are the distances of a particular case from the centroid of the remaining cases, where the centroid is the point created by the means of all the variables (Tabachnick & Fidell, 2001; 2007). The Mahalanobis Distance Test for multivariate normality indicated that none of the cases had a score greater than 20.52. Only one record had a score that exceeded the critical value. This record was only slightly greater than the critical value, and the author determined that the record would be retained for analysis. Therefore, the assumption of multivariate normality was met.

Assumptions of linearity between study variables and homoscedasticity, which are requirements for correlational and multiple regression analysis, were checked with scatterplots of the data. These confirmed that assumptions of linearity and homoscedasticity. Levene's Test of Equality of Variances was performed to investigate violations of the equal variance assumption for the

multivariate analysis of variance (MANOVA) tests. The assumption of equal variances was not violated for the MANOVA analysis involving the independent variables of gender and age on the five dependent variables of certificate quality/performance, certificate price, social components of the learnings, emotional equity from purchase, and reputation of school. No statistical significance was found, therefore allowing the conclusion that the assumption of equality of variances was met.

The author performed multicollinearity diagnostics for the CFA and EFA analyses using SPSS. He noted no violations, supporting the assumption of absence of multicollinearity. None of the five latent variable constructs investigated in this study were missing data; therefore, there was no violation of the assumption.

6.2 Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was performed to test whether five latent variable constructs developed by the author were indicative of the five aspects of perceived value of online non-credit certificate participants.

Mplus (Muthén and Muthén, 2016) version 7 was used to run the full hypothesized CFA model. The full model converged. The chi square (χ^2) test of model fit was statistically significant ($p < .0005$), indicating a poor fit of the model with the participant data. For models with about 75 to 200 cases, the chi square test is a reasonable measure of fit. It is possible that the sample size of n = 60 was too restrictive to achieve enough power for a good model fit (Jackson et al., 2005); Jackson, 2009). Chi square is also affected by the size of the correlations in the model, (e.g., the larger the correlations between variables, the poorer the fit). For these reasons alternative measures of fit were also assessed. The relative χ^2 value, also referred to and the normed χ^2 value, was computed by dividing the χ^2 index value of the fitted model by the model degrees of freedom (854.53/395 = 2.16). A value of 5 or less is considered a good model fit. However other fit indices were not good. The root mean square error of approximation (RMSEA) value of .14 was higher than the desired cut-off value of .05. The confirmatory fit index (CFI) of the model was .66. A CFI value of .90 or larger is desirable for indication of good fit. The values of the Akaike information criteria (AIC = 5,429.99) and the Bayesian information criteria (BIC = 5,639.42) were both quite large. However, the AIC and BIC are used for comparisons between models and are not of much use in assessing the fit of a single model.

Mplus provides a listing of model modification indices that can be used to modify the model in order to encourage a better fit. However, one must be careful not to over-fit the model to the data set of study. Also the Cronbach's alpha values of all five constructs indicated good reliability of the constructs. The principal components analysis was attempted to further investigate factor loadings, while also keeping in mind that theory supersedes model adjustments of a computer program.

6.3 Principal Factor Analysis (PCA)

Table 2 Summary of principal components factor analysis loadings for varimax five-factor solution

Factor 1 Variable/Statement		*M*	*SD*	Range	Factor/ Loading	α
Factor 1 – Certificate Quality/Performance		32.75	6.66	16 - 42		0.861
Q2	The certificate program is not well designed.	2.93	1.75	1 - 6	0.785	
Q3	The content within this program has met my expected level of quality.	5.07	1.63	1 – 7	0.828	
Q5	The knowledge presented within this certificate program is of consistent quality.	5.07	1.47	2 - 7	0.685	
Q6	Overall, I feel that this certificate program is well designed.	4.93	1.7	1 - 7	0.788	
Q9[a]	I will not be able to apply the information I am learning within this certificate program to my current job.	1.67	0.97	3 - 7	0.375	
Q25	The quality of materials within this certificate program is important to me.	6.28	0.9	2 - 7	0.442	

Note. M = Mean; SD = Standard Deviation

[a] Negative response questions were inverted for reliability correlations.

 An exploratory factor analysis using principal components analysis (PCA) was performed in order to further investigate loadings of the PEVA items on latent variable constructs. Prior to performing PCA the suitability of the data for factor analysis was assessed. Inspection of the correlation matrix on the 30 Likert-scaled items of the PEVA survey revealed the presence of many coefficients of 0.3 and greater. The Kaiser-Meyer-Oklin (KMO) value was 0.729, exceeding the recommended value of 0.6 and thus establishing adequacy of fit. Bartlett's Test of Sphericity was performed on the 30 item matrix and returned a significant value ($p < .0005$) supporting the factorability of the correlation matrix.

Principal Components Analysis (PCA) revealed the presence of seven components with eigenvalues of 1 or greater, explaining 75% of the variance. A visual inspection of the scree plot revealed a leveling after the third component. A Monte Carlo simulation using 30 items with 100 respondents (the minimum required by the simulation program) and 100 repetitions supported the use of a four factor solution.

A seven factor rotation was investigated to help identify the underlying relationships between the variables being studies as a way "to help researchers clarify and simplify the results of a factor analysis." Of the 30 items included in the factor rotation, eight items loaded strongly on the first component, seven items loaded strongly on the second component, six items loaded on the third component, four items loaded on the fourth component, nine items loaded on the fifth component, three items loaded on the sixth component, and three items loaded on the seventh component. Since the sixth and seventh components did not contain very many items, they were removed. To aid in the interpretation of the five components, an Oblimin rotation was performed. The five component solution explained a total variance of 44.36. The five factor rotated solution revealed the presence of simple structure, with the five components showing a number of strong loadings and explained 67% of the variance in the model. It was decided that this 30-item, five-component solution was the best model, since it returned strong component loadings and fit the hypothesized five factors of the survey instrumentation used in the study.

Table 2 through Table 6 present the 30 survey statements and their associated factor loadings for the five component solution. The factor loadings, also called component loadings in PCA, are the correlation coefficients between the survey items (rows) and factors (columns). Analogous to Pearson's correlation coefficient, the squared factor loading is the percent of variance in a particular survey item explained by the factor (component).

Table 3 Summary of principal components factor analysis loadings for varimax five-factor solution

	Variable/Statement	*M*	*SD*	Range	Factor/ Loading	α
	Factor 2 Certtificate Price	31.98	5.62	19 - 42		0.833
Q13[a]	This certificate program is overpriced for what I get.	2.72	1.28	1.5	0.363	
Q16	The time spent on this certificate is well worth it.	5.47	1.41	1 - 7	0.326	
Q17	This certificate is a good investment.	5.57	1.21	1 - 7	0.393	
Q18	The overall cost of this certificate program is important to me.	5.02	1.27	2 - 7	---	
Q19	This certificate program is reasonably priced.	5.22	1.2	2 - 7	---	
Q22	The personal sacrifices I make while completing this program are well worth it.	5.43	1.24	1 - 7	0.378	

Note. M = Mean; SD = Standard Deviation

[a] Negative response questions were inverted for reliability correlations.

Table 4 Summary of principal components factor analysis loadings for varimax five-factor solution

	Variable/Statement	M	SD	Range	Factor/Loading	α
Factor 3	Social Components of the Learnings	28.75	6.32	15 - 40		0.863
Q14	I feel that this program helps me learn through peer-to-peer interaction.	4.55	1.49	2 - 7	-0.308	
Q15	Getting to know the other learners within this certificate program is important to me.	4.55	1.52	1 - 7	---	
Q20	The certificate program actively encourages learning through group activities.	4.5	1.58	1- 7	-0.329	
Q24	By completing this certificate program, I will be perceived more favorably by my supervisor.	5.3	1.41	2 - 7	---	
Q26[a]	I do not feel that the peer-to-peer interaction within this program is helpful to my learning.	2.9	1.62	1 - 6	---	
Q29	I am learning from others in this program.	4.75	1.45	2 - 7	-0.422	

Note. M = Mean; SD = Standard Deviation

[a] Negative response questions were inverted for reliability correlations.

Table 5 Summary of principal components factor analysis loadings for varimax five-factor solution

	Variable/Statement	M	SD	Range	Factor/Loading	α
Factor 4	Emotional Equity from Purchase	34.8	5.2	21 - 42		0.835
Q1	I feel good about myself for taking part in this certificate program.	5.8	1.23	1 - 7	---	
Q7	I enjoy using the information and skills I am gaining from this certificate program at work.	5.78	1.09	2 - 7	---	
Q8[a]	I am not confident using what I am learning in this certificate program.	2.23	1.33	1 - 7	0.599	
Q10	I would recommend this certificate program to a friend.	5.65	1.15	2 - 7	---	
Q27[a]	I feel I have made a poor decision to enroll in this certificate program.	1.93	1.15	1 - 5	0.309	
Q28	I feel confident when using the skills that I am gaining from this certificate program at work.	5.73	1.06	2 - 7	0.449	

Note. M = Mean; SD = Standard Deviation

[a] Negative response questions were inverted for reliability correlations.

Table 6 Summary of principal components factor analysis loadings for varimax five-factor solution

	Variable/Statement	*M*	*SD*	Range	Factor/ Loading	α
Factor 4	Emotional Equity from Purchase	34.8	5.2	21 - 42		0.835
Q1	I feel good about myself for taking part in this certificate program.	5.8	1.23	1 - 7	---	
Q7	I enjoy using the information and skills I am gaining from this certificate program at work.	5.78	1.09	2 - 7	---	
Q8[a]	I am not confident using what I am learning in this certificate program.	2.23	1.33	1 - 7	0.599	
Q10	I would recommend this certificate program to a friend.	5.65	1.15	2 - 7	---	
Q27[a]	I feel I have made a poor decision to enroll in this certificate program.	1.93	1.15	1 - 5	0.309	
Q28	I feel confident when using the skills that I am gaining from this certificate program at work.	5.73	1.06	2 - 7	0.449	

Note. M = Mean; SD = Standard Deviation

[a] Negative response questions were inverted for reliability correlations.

7. Limitations of PEVA

The principle limitation of this study is size relatively small sample size (n = 60). Factor analysis is a procedure that is best performed on datasets with hundreds of records. Thus, the factor loadings could have been affected by the reduced power of the models due to the small sample. As noted previously, the Cronbach's alpha coefficients were more than sufficient for good reliability of all five factors (Table 1). Therefore, all inferential tests were performed with the variable constructs. The response rate of 80% with this study provides evidence that these results are valid and reliable to the student population that is being studied. This study focused only on one non-credit certificate population and, while this population is credible, the results presented within this paper should be viewed as preliminary pending confirmatory research.

Additionally, from the variable breakdown within this population, it is evident that a larger population would be needed in the future so that age diversity could be analyzed. The current age breakdown resulted in a fairly even split between those below 44 years of age (n=28) and those 45 years of age and older (n=32). Limiting the age groups to three sub-groups resulted in a design flaw within in the survey that became apparent after the results were reviewed.

8. Discussion

This research contributes to a context of clear demand for online professional development, the sources of this demand, and how the increased costs of traditional degree programs are affecting demand. Research data strongly suggest that the costs associated with education are only going to increase and, by virtue of such increases, some of this demand will channel into the search for alternative credentials, such as professional development certificates. This paper describes a value construct that is much richer than a simple cost-benefit analysis. Value is a recipe that obviously includes cost, but also other components as components as well, notably, performance/Quality, social/community, emotional equity, and program reputation. This tool allows researchers to conceptualize the interaction of these components when adult learners are making career-related decisions about educational alternatives—such as related continuing education and professional development—and about the optimal use of their time and resources.

Educational leaders have not been accustomed to thinking of students as simultaneously learners and consumers. It is not clear, in fact, how far students have come in consciously seeing themselves in this dyadic relationship. However, with the fiscal stress on institutions that comes from the need to make responsible decisions regarding programs and methods of instructional delivery with a minimum of errors in all areas of post-secondary learning, it is inescapable that we as leaders and educators must be able to know and understand the metrics by which learners as consumers value the educational programs that we produce. Avoiding the somewhat tired slogan of addressing students' *needs*, in the present and coming age in post-secondary education, we can posit with confidence that institutional survival will depend on being able to understand students' *values.*

The PEVA tool is a timely innovative in that it addresses student perspectives that have not formally been addressed previously, with the possible exception of longitudinal studies that focus on income and retrospective perceptions. The PEVA assessment is reliable based on the Cronbach's alpha coefficient alpha values, each scoring above the .70 threshold. A check on validity was executed through an expert panel review establishing content validity prior to soliciting the population sample. The PEVA tool will help us to contemplate how to produce institutional innovations that we can know in advance will be responsive to the values of the students whom we hope to attract and to serve.

9. Recommendations for Future Research

Several recommendations are suggested by this study's findings. The most apparent is to the utility of the PEVA tool in the broader context of continuing education and professional development programs. As important, the deployment of qualitative methodologies should parallel the PEVA methodology. Regardless of the results that quantitative methodology can obtain, there can be little doubt that qualitative research should be able to identify deeper and more unique aspects of individuals' perceptions regarding value when selecting a course involving post-secondary education. Quite possibly, there are nuances of the value construct that simply cannot be ascertained using quantitative surveys. In addition, qualitative methodology holds out the prospect of discovering diversity attributes within our learning population, which would allow further refinement of our knowledge of perceptions of value.

Finally, it is essential to study students' perceptions of value over time. No professional in the field of education can be unaware of the acceleration of change. Institutions must accept that future promotion of the values of educational opportunity will be mediated by social media that will link generations to an extent only dimly perceived at present. How will perceptions of value change not merely for the next generation of students but for the prior generation whose perceptions of value at the time of having made educational pathway decisions will have changed by virtue of experience in the future real world? How will the prior generation communicate with the next generation as to the values of advanced education, and what can we who must understand these values glean from such connections? Students' experiences over time may have an effect on the perceived value of a certain educational credential. It is accepted that training opportunities have a way of losing value (and applicability) over the long term due to changing business practices, technology, populations, and changes in general knowledge. However, longitudinal studies can monitor changes in the perception of educational value and become applicable to the decisions that we as educators and designers of education will have to make in the future.

10. Lessons for Practice

It is clear that the perception of value is a recipe that obviously includes cost, but also other components as well, notably, performance/quality, social/community, emotional equity, and program reputation. This tools allows others to realize and confidently measure the interaction of these components when adult learners are making career-related decisions about educational alternatives—such as related continuing education and professional development—and about the optimal use of their time and resources.

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APPENDIX

Preliminary Data Collection Instrument

Dear Student:

Thank you for taking the time to share your opinions. Your thoughtful and candid responses to this survey are very important to the University of Wisconsin-Madison. Your responses will give program leadership insights about how this professional development opportunity can be improved through a better understanding of how you perceive the overall value of the non-credit online certificate program in which you are currently enrolled.

INSTRUCTIONS:

• Please rate how much you agree with the following statements and indicate your response to each item.
• When answering each question, please consider your perception of the certificate program's overall value to you, the student.
• Be sure to complete the survey in one sitting (if you exit and return to the survey, your original responses may be lost).

Please note:

You will need approximately 10-15 minutes to complete the survey. To view as much of the survey as possible, you may want to maximize your browser window.

Thank you for your participation!

All questions utilized a 7-point Likert Scale:

　　Strongly Disagree (1)
　　Disagree (2)
　　Somewhat Disagree (3)
　　Neither Agree nor Disagree (4)
　　Somewhat Agree (5)
　　Agree (6)
　　Strongly Agree (7)

Q1: I feel good about myself for taking part in this certificate program.

Q2: The certificate program is not well designed.

Q3: The content within this program has met my expected level of quality.

Q4: Institutional reputation was a significant factor in my choosing this online certificate program.

Q5: The knowledge presented within this certificate program is of consistent quality.

Q6: Overall, I feel that this certificate program is well designed.

Q7: I enjoy using the information and skills I am gaining from this certificate program at work.

Q8: I am not confident using what I am learning in this certificate program.

Q9: I will not be able to apply the information I am learning within this certificate program to my current job.

Q10: I would recommend this certificate program to a friend.

Q11: The reputation of this school is not important to me.

Q12: I am very proud of the certificate I am about to obtain from this specific institution.

Q13: This certificate program is overpriced for what I get.

Q14: I feel that this program helps me learn through peer-to-peer interaction.

Q15: Getting to know the other learners within this certificate program is important to me.

Q16: The time spent on this certificate is well worth it.

Q17: This certificate is a good investment.

Q18: The overall cost of this certificate program is important to me.

Q19: This certificate program is reasonably priced.

Q20: This certificate program actively encourages learning through group activities.

Q21: Overall, it is important to me that people know that I completed a certificate from this institution.

Q22: The personal sacrifices I make while completing this program are well worth it.

Q23: The reputation of this school is important to me.

Q24: By completing this certificate program, I will be perceived more favorably by my supervisor.

Q25: The quality of the materials within this certificate program is important to me.

Q26: I do not feel that the peer-to-peer interaction within this program is helpful to my learning.

Q27: I feel I have made a poor decision to enroll in this certificate program.

Q28: I feel confident when using the skills that I am gaining from this certificate program at work.

Q29: I am learning from others in this program.

Q30: I believe that employers are interested in hiring certificate students (completers) from this institution.

Q31: Please indicate your gender.
   Male (1)
   Female (2)

Q32: Please indicate the age range that is most appropriate to you
   18-24 (1)
   25-44 (2)
   45+ (3)

Q33: What is your highest level of education completed?
   High School (1)
   Some College (2)
   Bachelors Degree (3)
   Graduate Degree (4)

Q34: When you enrolled you were required to select track. Please indicate which track you selected.
   Instructional Design (ID) (1)
   Online Instruction (IN) (2)

[SUBMIT]