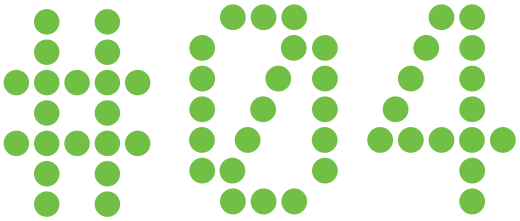

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E-LEARNING, VOCATIONAL TRAINING AND EMPLOYABILITY FOR THE UNEMPLOYED: SURVEY DESIGN AND VALIDATION

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ABSTRACT

The paper analyses the effect of e-learning vocational training on the employability of the unemployed. Through a questionnaire survey of 5,265 people who took part in an e-learning training programme developed in 2009 by the Catalan Employment Service (SOC) and the Open University of Catalonia (UOC) to improve the employability of the unemployed, the study makes two main contributions. First, we describe the design of an 18-item scale. Second, the study analyses the factorial structure and psychometric properties of that scale. Three factors from the exploratory factor analysis, namely *competencies developed* (α_1=0.93), *applicability of training* (α_2=0.92) and *satisfaction with the pedagogical design* (α_3=0.90), explain 71.5% of cumulative variance. The total scale reliability is 0.94. The statistics obtained for the confirmatory factor analysis (CFI=0.94, NNFI=0.94, and RMSEA=0.08) indicate an acceptable fit of the proposed three-factor model (Chi-square=2.416, p=0.000). The coefficients of the estimates, all with values between 0.85 and 1.66, are significant at p<0.001. The study provides new evidence in the specific field of e-learning vocational training specifically for the unemployed, as well as new dimensions such as the structure and the pedagogical design of the programme. The analysis of a new edition of the programme in 2012 reveals the usefulness of e-learning for the unemployed with fewer formal qualifications.

KEYWORDS

e-learning, vocational training, unemployment, employability, satisfaction, psychometric evaluation.

INTRODUCTION

E-learning has become consolidated as a method increasingly used for adults. The use of flexible and innovative distance learning methodologies, the intensive use of information and communication technologies (ICTs), and the acquisition of competencies in a collaborative and active learning environment are some of the factors explaining the considerable growth of e-learning in recent years (Andrews & Haythornthwaite, 2006).

Furthermore, within the context of active labour market policies, governments have, for some time now, allocated a substantial amount of resources to providing training programmes to improve the employability of the unemployed. In this respect, there is abundant literature evaluating the quality and effectiveness of training for employment programmes (Kirkpatrick, 1999; Mato & Cueto, 2008; Cueto & Mato, 2009; Rodríguez-Planas & Benus, 2010; Arellano, 2010). In general, the evidence suggests a medium and long-term positive impact of training for employment on the unemployed's perceptions and probabilities of re-employment, particularly among women.

However, unlike face-to-face training, the models developed to evaluate the factors of teaching quality and effectiveness in virtual learning environments, in particular those associated with online training for employment, are rather scarce. Focusing especially on the learning dimensions, they provide little evidence about the behaviour and outcome dimensions (Piccoli, Ahmad, & Ives, 2001; Ehlers, 2004; Zapata-Ros, 2005; Marcelo, 2005; De Miguel, 2006; Ehlers & Pawlowski, 2006; Casamayor, 2008). In this respect, available evidence suggests that quality in e-learning should take into account three dimensions. Firstly, learning resources: that is to say, support staff, teaching staff, learning materials and learning infrastructure. Secondly, learning processes: in other words, needs assessment, recruitment, learning design, development and evaluation and the learning context. And, thirdly, learning outcomes, that is to say, an analysis of the effect of online training on the employability conditions of the learners.

In this respect, learner satisfaction has also become one of the most commonly used dimensions in evaluating the quality of online training (Wang, 2003; Sun, Tsai, Finger, Chen, & Yeh, 2008; Tejada, Ferrández, Jurado, Navío, & Ruiz, 2008; Marcelo, 2011). In general, the research conducted in this field has identified factors associated with the learning process and methodologies, although it also notes that the results should be supplemented with other qualitative data from an analysis of the design, the internal structure and the outcomes of a training programme. Since the available empirical evidence is still very limited, especially on large samples of the unemployed, in this paper we describe the design, validation and testing of an instrument/questionnaire on the quality of e-learning in training for the employability of the unemployed (Ficapal, Torrent, Boada, & Sánchez-García, 2013).

METHODOLOGY SECTION

The study employs a descriptive and inferential quantitative methodology in order to evaluate the effect of e-learning on a training for employment programme. The study sample comprises 5,265 people who took part in an online training for employment programme developed jointly by the Open University of Catalonia (UOC) and the Catalan Occupation Service (SOC) for the autonomous community of Catalonia in 2009. The training programme was organised into 55 courses, with 8 monthly editions (from May to December). In order to implement the programme, 784 virtual classrooms were created, 987 subjects leading to European Credit Transfer and Accumulation

System (ECTS) credits were taught, and 23,140 training hours were completed, with a total of 27,764 enrolments or non-unique learners participating in the training programme. The programme content was divided into eight competency categories: i) digital competencies; ii) language competencies; iii) job search competencies; iv) information and communication management competencies; v) tourism competencies; vi) logistics and operations competencies; vii) business management competencies, and viii) social activity competencies.

The total number of unique learners (several voluntary enrolments per learner were permitted) participating in the training programme formed a population of 17,520. Through non-probability sampling, 5,265 people voluntarily responded to a confidential, non-anonymous, self-administered online questionnaire. The sample-to-population ratio was 30%, which, at a 95.5% confidence level in a case of maximum indetermination (p=q=50) and for the reference population, represents a sample error of +1.4%.

In order to capture the effect of e-learning on training for employment, an evaluation scale was designed. We based the design on earlier studies into e-learning, among which are the inventories of e-learning course evaluation by learners (Marcelo, 2005; 2011), and on our own experience (Boada-Grau, 2009; 2011;

Table 1. Dimensions of the effect of e-learning on training for employment scale

DIMENSIONS	DESCRIPTION	ITEMS	VARIABLES AND VALUES
Competencies developed (COM)	Acquisition of generic competencies - instrumental, interpersonal and systemic - through the training process	1. Teamwork	Categorical (1 to 5)
		2. Leadership	Categorical (1 to 5)
		3. Time and task management	Categorical (1 to 5)
		4. Problem solving	Categorical (1 to 5)
		5. Decision making	Categorical (1 to 5)
		6. Creativity	Categorical (1 to 5)
		7. Analytical thinking	Categorical (1 to 5)
		8. Critical thinking	Categorical (1 to 5)
Applicability of training (AP)	Applicability of the training programme for improving employability	9. Change job/sector	Categorical (1 to 5)
		10. Look for a job	Categorical (1 to 5)
		11. Find a job	Categorical (1 to 5)
		12. Change profession	Categorical (1 to 5)
		13. Get better pay	Categorical (1 to 5)
Satisfaction with the pedagogical design (SAT)	Learners' level of satisfaction with the teaching/ learning process	14. Teaching materials	Categorical (1 to 5)
		15. Teaching staff	Categorical (1 to 5)
		16. Teaching/Learning methodology	Categorical (1 to 5)
		17. Virtual campus	Categorical (1 to 5)
		18. Secretariat	Categorical (1 to 5)

Source: self-created.

Boada, De Diego, De Llanos, & Vigil, 2011). The inventory is internally divided into three dimensions that aim to respond to the question about the training programme participants', and especially the unemployed's, level of satisfaction with the training actions carried out: *competencies developed* (COM), *applicability of training* (AP), and *satisfaction with the pedagogical design* (SAT). Table 1 summarises and describes the scale dimensions, as well as the items used and their values. In order to build the exploratory factor analysis structure and the reliability coefficients, the SPSS 17.0 program was used. For the confirmatory factor analysis, which allows the scale's parameters to be validated by the maximum likelihood method, the LISREL 8.8 program was used (Jöreskog & Sörbom, 2004).

RESULTS

The results obtained from the exploratory factor analysis suggested the existence of three evaluative factors of the effect of e-learning on training for employment (see Table 2). These three factors explained 71.5% of cumulative variance, with a satisfactory Kaiser-Meyer-Olkin index (KMO=0.73) and good results for Bartlett's sphericity test (Chi-square= 32,675.69 and p=0.000).

The first factor, which we have called *competencies developed*, obtains evidence about the skills that the learners acquired from the training programme. Thus, evidence is obtained about generic competencies of an instrumental nature (time and task management, problem solving, decision making and analytical thinking), of an interpersonal nature (teamwork and critical thinking) and of a systemic nature (leadership and creativity). The second factor is about the applicability, for employment, of the online training programme. We have called it *applicability of training*, and it refers to the opportunities created for the learners on the programme to change job/sector, look for a job, find a job, change profession and obtain better pay. Finally, the third factor found is about the learners' level of satisfaction with the teaching/learning process. We have called it *satisfaction with the pedagogical design*, and it refers to the level of satisfaction with teaching materials, teaching staff, teaching/learning methodology, the virtual campus and the secretariat of the online training programme.

The reliability coefficients obtained for the three factors were high: α=0.93 for the first factor, α=0.92 for the second factor and α=0.90 for the third factor. The reliability of the scale as a whole was 0.94. All of the sub-scales therefore had very acceptable levels of reliability, thus indicating the adequacy of an 18-item questionnaire for the proposed inventory.

The statistics obtained for the confirmatory factor analysis of the e-learning and employability scale (CFI=0.94; NNFI=0.94; RMSEA=0.08) indicated that the proposed three-factor model's goodness of fit was acceptable (Chi-square=2.416, p=0.000). The coefficients of the estimations made, all of which had values between 0.85 and 1.66, were significant at p<0.001.

DISCUSSION AND CONCLUSIONS

In conclusion, the psychometric properties and structure of the constructed scale's factors were shown to be suitable for identifying and evaluating the effect of e-learning on training for employment, particularly for the unemployed. The three dimensions found –*competencies developed*, *applicability of training* and *satisfaction with the pedagogical design*– are in keeping with classic evidence that evaluates the effect of training and with studies conducted in the field of training

Table 2. Exploratory factor analysis (saturation matrix) and confirmatory factor analysis (estimation matrix)

ITEMS	EXPLORATORY FACTOR ANALYSIS			CONFIRMATORY FACTOR ANALYSIS		
	F1	F2	F3	F1	F2	F3
1. Teamwork is the competency acquired	0.61			1.00***		
2. Leadership is the competency acquired	0.65			1.13***		
3. Time and task management is the competency acquired	0.75			1.05***		
4. Problem solving is the competency acquired	0.77			1.08***		
5. Decision making is the competency acquired	0.82			1.21***		
6. Creativity is the competency acquired	0.78			1.13***		
7. Analytical thinking is the competency acquired	0.82			1.15***		
8. Critical thinking is the competency acquired	0.81			1.14***		
9. The training will allow me to change job/sector		0.75			1.00***	
10. The training will allow me to look for a job		0.80			1.61***	
11. The training will help me find a job		0.84			1.63***	
12. The training will help me change profession		0.85			1.66***	
13. The training will help me get better pay		0.83			1.66***	
14. Level of satisfaction with the teaching materials			0.75			1.00***
15. Level of satisfaction with the teaching staff			0.76			0.94***
16. Level of satisfaction with the teaching/learning methodology			0.76			1.03***
17. Level of satisfaction with the virtual campus			0.79			0.87***
18. Level of satisfaction with the secretariat			0.76			0.85***
Statistics						
Total variance (%)	51.9	10.9	8.7			
Reliability coefficients (Cronbach's alpha)	0.93	0.92	0.90			
NNFI					0.94	
RFI					0.93	
IFI					0.94	
TLI					0.93	
CFI					0.94	
RMSEA					0.08	

Notes
F1: Competencies developed; F2: Applicability of training; F3: Satisfaction with the pedagogical design.
Confirmatory factor analysis: (***) = p<0.001

Source: self-created.

for employment. In addition, new evidence is provided in the specific field of online training for employment, mainly for the unemployed, as are new dimensions such as the structure and pedagogical design of the programme.

The limitations of the proposed scale will be the starting point for research that we intend to conduct in the future. Firstly, it will be necessary to check the validity of the findings obtained against other important dimensions in the field of evaluating training for employment delivered in e-learning mode. In particular, variance will be analysed to verify the association and statistical differences between the dimensions of the scale obtained and the learners' sociodemographic and personality characteristics, academic performance, and changes effectively made in the level of the learners' employability. Secondly, and in this respect, the availability of similar information for 2012 will allow us to dynamically evaluate the structure of the scale and the results obtained, in particular the restrictions and opportunities of e-learning in training for employment at times of economic crisis. Thirdly and finally, the importance of having a psychometrically validated instrument to evaluate active public policies in support of employment should not be overlooked. Based on the three factors obtained, it will therefore be possible to perform evaluations, which to date are scarce, of the performance of public policies on online training for employment.

Table 3. **Online training for employability scale and learners' sociodemographic characteristics. 2012 (*mean values of the scale and its factors*)**

		COMPETENCIES DEVELOPED (F1)	APPLICABILITY OF TRAINING (F2)	SATISFACTION WITH THE PEDAGOGICAL DESIGN (F3)	SCALE
Gender	Male	2.93	2.48	3.67	3.03
	Female	3.04	2.48	3.81	3.11
Age	30 years or under	3.00	2.48	3.75	3.08
	31 to 40 years	2.96	2.47	3.73	3.06
	41 to 50 years	3.08	2.54	3.82	3.14
	51 years or over	2.96	2.36	3.78	3.03
Place of birth	Spain	2.98	2.44	3.76	3.06
	Outside Spain	3.17	2.80	3.80	3.25
Level of education	None	3.17	2.86	4.06	3.37
	Primary education	3.19	2.70	3.87	3.25
	Secondary education	3.12	2.60	3.85	3.19
	Vocational training	3.09	2.56	3.81	3.15
	University education (1st and 2nd cycles)	2.92	2.40	3.71	3.01
	University education (3rd cycle)	2.77	2.23	3.61	2.87

Source: self-created.

In fact, an initial analysis of the relationship between the factors obtained on the scale and some of the learners' sociodemographic characteristics for a new edition of the training programme in 2012 (representative sample of 7,680 learners) indicates higher perceived ratings of the programme among women, learners in the middle age range (41 to 50 year olds), and those born outside Spain having lower levels of education, which would suggest the usefulness of e-learning in training for employment to those with fewer formal qualifications (Table 3).

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