**Article:**
Pineda-Herrero, P, Quesada Pallares, C, Espona-Barcons, B et al. (1 more author) (2015) How to measure the effectiveness of VET workplace learning: the FET-WL model. Education + Training, 57 (6). pp. 602-622. ISSN 0040-0912

https://doi.org/10.1108/ET-12-2013-0141

# How to measure the effectiveness of VET workplace learning: the FET-WL model

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## 1. Introduction

The experience of Workplace Learning [WL] is a key part of Vocational Education and Training [VET] studies, because it offers the students the opportunity to put into practice the skills they are learning at school; and it allows them to acquire other skills that are closely linked to the organisational context. However, there is little information on the factors that influence the efficacy of VET workplace learning.

This paper focuses on developing an instrument to evaluate the efficacy of WL in companies within VET studies and to identify the factors influencing it. As the research is conducted in Spain, before presenting the theoretical background, the methodology and the findings of the research, we consider it necessary to describe VET studies in our context.

In the Spanish education system, VET is intended to prepare students to work in a professional environment. The VET structure is based on professional qualifications established in the National Catalogue of Professional Qualifications. The Catalogue is divided into various professional branches.

VET is divided into intermediate and advanced training cycles. The intermediate training cycles lead to technical qualifications and form part of upper secondary education (normally starting at 16 years of age). The advanced cycles lead to an advanced technical qualification and form part of higher education. Each training cycle lasts between 1,300 and 2,000 hours and is structured in one or two courses.

WL is part of the VET curriculum in Spain, and consists of developing non-contractual and measurable professional internships in companies. These internships introduce students to the world of work and, in particular, the company where WL is undertaken. They also lead to the completion of technical training and learning to adapt it to a specific profession. Lastly, internships allow students to develop their professional skills and acquire new ones.

WL lasts between 300 and 700 hours, depending on each training cycle. The standard distribution of practical experience is four hours a day, with a maximum of 20 hours a week and it is carried out parallel to the class hours of the relevant studies. However, students also have the possibility of undertaking intensive internships during non-teaching periods.

## 2. Theoretical background

For years, concerns have been expressed in the academic and professional fields about the quality of VET (Azumah, 2012). One important dimension of quality is efficacy, defined as the attainment of the objectives of VET. We define effective VET as the type of regulated upper secondary education that provides students with new professional skills and, through training in the workplace, fosters the acquisition and application of these professional skills. It is demonstrated by effective learning by students, and WL is the perfect place to use the learning and to develop professional skills. The relationship between formal academic knowledge and practice knowledge is very important for an effective VET: the academic knowledge achieved by VET students into classrooms is questioned and rebuilt in their placements. So there is an interaction between both kinds of knowledge, in a process of co-construction (Smith, 2001).

WL provides an ideal space in which to evaluate the efficacy of VET, because students can apply what they have learnt and demonstrate their skills through practical experience in the company. Therefore, we chose to focus our research on measuring the efficacy of WL.

A review of the scientific literature shows us that more instruments need to be developed to measure WL efficacy in the area of VET (Fuller and Unwin 2011; Kammermann, Stalder and Hättich, 2011). However, the evaluation of its efficacy has been developed in other types of vocational education and training, as is the case of continuous training.

In continuing education, effective training refers not only to employee learning but also to applying this knowledge to the workplace, namely training transfer. According to Baldwin and Ford (1988), transfer is the degree to which trainees have applied the knowledge, skills, and attitudes acquired in a context of training for work. Transfer is a key element of training efficacy and therefore it needs to be evaluated. However, a comprehensive process of evaluating transfer would require extensive human and financial resources. For this reason, several authors have suggested the possibility of

evaluating transfer indirectly by measuring the factors that influence the applicability of training to the workplace. Some of the most important models of transfer factors have been developed by Baldwin and Ford (1988), Noe (1986), Rouiller and Goldstein (1993), Thayer and Teachout (1995), Holton (1996, 2005), Burke and Hutchins (2008), Pineda and Quesada (2013), and Pineda-Herrero, Quesada-Pallarès and Ciraso-Calí (2014).

In the context of the WL, the focus on factors that determine the efficacy of training has yet to be addressed. We believe it would be interesting to adopt this focus and contribute with new instruments that can be used to measure the efficacy of WL indirectly. To this end, our study focused on evaluating WL efficacy in VET by using an indirect approach. Following the goals proposed by Weber (2013:2), we believe there is a dual purpose to effective workplace learning in VET:

1. Students implement the learning achieved during their studies in the company.
2. Students have an educational experience in the workplace in a sector related to their field of studies.

Thus, effective WL allows students:

- To complement the skills and knowledge acquired in VET that they have developed within the institution.
- To apply their professional skills to a real work situation.
- To acquire attitudes and skills necessary for employment.

Our point of departure was the efficacy variables used in continuing education, which we supplemented with other sources of information, such as a review of the literature and 10 interviews with experts in WL in VET; for more information on the qualitative phases of this study, see the complete report (Pineda et al., 2011). No specific studies measuring efficacy factors in WL in VET have been found, but there is literature on the variables that may have a bearing, and the experts interviewed confirm this. Therefore, with the information from the literature review and the variables confirmed by experts, we developed a model that integrates the different theories on training transfer adapted to WL in VET (see Mas, Espona, Quesada & Garcia, 2013). First, we considered the three dimensions of transfer factors proposed by Baldwin and Ford (1988) and adapted them to WL: student, training design and company. The student dimension includes his or her attitudes and motivation towards WL, his or her prior knowledge, satisfaction with WL, and reasons for carrying out the WL (Abdala 2000; Aarkrog 2003; Lawy, 2010). The training design dimension included the activities plan and the student duties

during the WL (Aarkrog 2003; CEDEFOP, 2010), as well as the relationship between the agents involved. Likewise, cooperation between the tutors of both institutions may increase WL efficacy (Peris, 2006; Virtanen and Tynjälä, 2008). The company dimension focuses on the role of the tutor and the work environment during WL (Peris, 2006; Grollman and Kämäräinen, 2008; Smith & Kemmis, 2010). We also included the VET school dimension because effective WL requires good coherence between the training at the school and the activity carried out in the company, (Abdala, 2000; Suárez and Ledezma, 2005; CEDEFOP, 2010). The variables related to WL efficacy that make up these dimensions are outlined below.

a) **Student**: as Virtanen and Tynjälä (2008), and Williams (2010) indicate, control over one's workplace learning and self-regulation are characteristics that influence the application of a student's workplace learning and, thus, the efficacy of WL. The attitude of the student also has significant weight on the efficacy of WL: a motivated student willing to learn, responsible, with initiative and oriented to goals will be more effective than one who lacks these attitudes (Robertson 1998; Abdala 2000; Aarkrog, 2003; Ümarik, Loogma and Hinno 2010).

b) **Educational facility or school**: there are several variables that have an influence on the efficacy of WL, such as coherence between labour market needs, the company's activity and the training offered by the VET school (Abdala, 2000; Hermosilla, 2003; CEDEFOP, 2010), the availability of appropriate learning resources (Robertson, 1998; Suárez and Ledezma, 2005), rigorous assessment of WL (Robertson, 1998; Spouse, 2001; Kuczera et al., 2008), and the qualifications, profile and skills of the teaching staff (Consell de la Formació Professional de Barcelona, 2005; Suárez and Ledezma, 2005; Fundació BCN FP, 2010; VVAA, 2010). An up-to-date curriculum and technology of the educational facility are also variables that influence the efficacy of WL (Hermosilla, 2003; ConForCat, 2010; Fundació BCN FP, 2010; VVAA, 2010); according to these studies, an educational facility with these characteristics will offer a more effective WL.

c) **Company**: the characteristics of the company and the attention given to the student have an immense influence on WL efficacy. The role of the company tutor is pivotal; their availability, involvement, profile, level of training and motivation are important

variables that have a bearing on the efficacy of WL (Robertson, 1998; Peris, 2006; Grollman and Kämäräinen, 2008; Virtanen and Tynjälä, 2008; Pineda, 2010). Other aspects that influence efficacy are the time the company dedicates to WL (Ashton et al., 2008), the support the student receives from the supervisor and from other workers, and the student's relationship with them (Virtanen and Tynjälä, 2008; Chiaburu et al., 2010).

d) **Training design**: the orientation of the training cycle in actual practice, along with the applicability of the content and the coherence between the skills developed in the educational facility and in WL, are variables that have a decisive significance on the efficacy of WL (Ümarik, Loogma and Hinno, 2010). One other key variable is the planning and monitoring of tasks students must carry out during the WL (Robertson, 1998; Spouse, 2001; Aarkrog, 2003; Cambra de Comerç de Barcelona, 2005; Consell de la Formació Professional de Barcelona, 2005; Suárez and Ledezma, 2005; Peris, 2006; Virtanen and Tynjälä, 2008; CEDEFOP 2010). Therefore, well-designed WL, with good planning of skills coherent with the reality of the company will be effective.
Cooperation between the company and the educational establishment is essential for effective WL; this is where the relationships between both tutors play an important part: that of the VET school and that of the company, in addition to the relationships that students establish with each other (Robertson, 1998; Spouse, 2001; Cambra de Comerç de Barcelona, 2005; Consell de la Formació Professional de Barcelona, 2005; Peris, 2006; Virtanen and Tynjälä, 2008; CEDEFOP, 2010; Fundació BCN FP, 2010; Pineda, 2010). Studies suggest that the relations between the various agents should be positive and fluid in order to ensure effective WL.

The model that we created groups together the variables explained above, and is called FET-WL, Factors to Evaluate Transfer in Workplace Learning (see Figure 1).

FIGURE 1: The FET-WL theoretical model

The aims of this paper are: 1) to test the theoretical model developed to evaluate the efficacy of workplace learning in VET; and 2) to assess the predictive level of the variables that make up the FET-WL model on the WL efficacy variable. Concerning the

second goal, we considered one hypothesis: H1. The FET-WL model has a high level of predictability of WL efficacy, as shown in Figure 1.

## 3. Methodology

The study was carried out through a mixed methodology: firstly, we conducted a qualitative phase to design the FET-WL model (see Mas et al., 2013); secondly, we carried out a quantitative phase to test our hypothesized model. In this paper, we will only examine the second phase.

### 3.1. Sample

We selected a sample of 1,026 VET students in the Barcelona area, with a margin of error of 2.52% ($Z^2_a$=1.96). Given that we wanted to conduct a specific analysis by the type of professional area associated with the degree of professional training, we conducted a stratified probability sampling with five professional areas: administration and management (n=144), electricity and electronics (n=230), machine manufacturing (n=108), socio-cultural and community services (n=404), and hotel business and tourism (n=140). Students participating in the study were enrolled in WL, or had already undertaken WL during that academic year (2010-2011).

Table 1 shows the distribution of the surveyed students according to various profile variables.

TABLE 1: Profile of the students in the study

Just over half (58.2%) of the students in the sample were enrolled at the time of the WL; one fifth (20.8%) had changed companies during that training cycle; 19.8% had carried out WL in a training cycle different from the current one, and 3.8% had repeated WL in that same cycle. Sixty percent of students in the sample considered that there was little or no coordination between the secondary school tutors and those of the company during WL.

Furthermore, rather than choosing their placement, 51.1% of students were assigned to a host company. Those students who did choose a host company in which to carry out their WL did so for reasons of proximity (17.5%). Regarding the academic profile of the students, 71% had not failed any subject during the training cycle. 63.6% of students were academically above average in their class, specifically 41.1% of students had an

average grade of "C" on their transcripts (in the Spanish system, an average of "C" is equivalent to a passing grade of 5.50/10) and 48.7% had an average grade of "B".

### 3.2. Measures

Three different types of measures were used in the study according to the intended goal of these measures, which were always applied from the standpoint of the student in VET; that is, using self-report. These measures were administered consecutively and separately from each other.

a) **Student attitudes**: 12 adjectives were shown to gauge the attitudes and/or opinions of the students during WL. These adjectives were constructed using Osgood's semantic differential scale (1957; as cited in Iglesias 1990), whose bipolar scope is anchored at either end with contrasting adjectives, with a 5-point rating continuum. Examples of the attitudes and opinion items included, "During my workplace learning, I felt adapted to the workplace / I did not feel adapted to the workplace" or "During my workplace learning, I felt responsible for my assigned duties / I did not feel responsible for my assigned duties".

b) **Dimensions related to the success of WL**: in order to determine the factors that influence the success and efficacy of WL, eight dimensions were constructed to gather the most relevant aspects highlighted in the theory and scientific literature in the related fields (see theoretical background). The following dimensions were measured using a 5-point Likert scale (1: strongly disagree, 5: strongly agree):

- Company tutors: this dimension is represented by seven items related to the role exercised by the company tutor over the student. For example, "My Company's tutor was available to meet me".
- Duties: dimension related to the relevance of the assignment of the students' duties in the company with their studies. This is represented by four items. An example of an item is "The duties I have carried out during WL are related to the course I am taking".
- Secondary school tutors: related to the training role of the high school's tutor. This comprises eight items, such as, "The time the secondary school's tutor gives over to students carrying out WL is satisfactory".

- Plan of activities: related to specification of a plan of activities drawn up between the two tutors (educational facility tutor and the host company tutor) in order to agree on the development of the various duties that the student will have to carry out during WL. This dimension is composed of three items; for example, "I knew what the activities plan was for my workplace learning".
- Prior knowledge: dimension made up of three items referring to knowledge previously acquired by the students in the rest of the subjects of the training cycle before undertaking WL. For example, "The training cycle has provided me with the minimum appropriate knowledge to carry out workplace learning".
- Reasons for carrying out WL: although undertaking and passing WL is a requisite of VET, the object of this dimension is to ascertain if there are any additional motivational aspects intervening in carrying out the internship. This comprises five items, such as "I was interested in doing workplace learning in order to apply what I have learnt in my studies to real situations".
- Satisfaction with the WL: made up of six items referring to the degree of student satisfaction with the WL carried out, as well as with the various actions associated with the context of the internship. An example of this is "I am satisfied with the job placement opportunities of the company in which I have undertaken workplace learning".
- Work environment: takes into account aspects linked to the students' working environment during their internship, regarding both the physical space and the relationship with their co-workers. Five items have been defined, such as "I respected the rules of the company where I carried out workplace learning".

c) **WL Efficacy**: this dimension aims to evaluate the degree of efficacy of the work placement as a dependent variable, from the standpoint of the student, by means of four items for assessment with a 5-point Likert scale (1: strongly disagree, 5: strongly agree). The items are: "Workplace learning has allowed me to improve the knowledge and skills acquired during training", "I have been able to apply what I have learnt in my workplace learning placement", "During workplace learning I have learnt new professional skills", and "During workplace learning I have learnt the professional skills necessary for my employability".

### 3.3. Data analysis

In order to analyse the data and to achieve the first goal, all variables underwent a validity and reliability analysis in order to determine both their factorial design and their internal consistency; in addition to descriptive and regression analyses. The analyses were carried out separately for the "student attitudes variables" and "WL success dimensions" because they used different scale measurements. Moreover, "WL efficacy" was also analysed separately due to its formulation as a dependent variable. The different statistical analyses were performed with SPSS v.17 Statistical Package, Inc.

To validate the different variables presented, we used the Exploratory Factor Analysis [EFA] method that, according to Hancock and Mueller (2010:96), is used for "situations in which the variables to analyse have either been developed very recently or have not been previously analysed together, or when the theoretical basis of the analysis factor model are weak". To this end, we used Maximum Likelihood -given its greater robustness-, the Promax oblique factor rotation method -as the constructs are related-, and the combination of a KMO test with eigenvalues greater than one and a Cattell's Scree plot as criteria to determine the number of factors (Fabrigar et al., 1999; Conway and Huffcut, 2003).

In the same way, we used Cronbach's alpha coefficient to ascertain the degree of internal consistency of the various scales or factors, once their factorial structure was identified.

A multiple regression analysis was performed with the "student attitudes" and "WL success dimensions" variables as independent variables, and "WL efficacy" as a dependent variable; this analysis allowed us to achieve the second goal and therefore, to test H1.

## 4. Results

### 4.1. Data screening

A normality test on the sample revealed a tendency towards positive asymmetry, that is, a greater distribution of the sample towards the more positive values in the items. To compensate for the non-normality of the distribution, and due to the large size of the sample, we used robust Maximum Likelihood procedures. Table 2, Table 3 and Table 4 show means, standard deviations and intercorrelations of all items, according to their dimensions.

TABLE 2: Descriptive Statistics and Intercorrelations of Attitude Dimension

TABLE 3: Descriptive Statistics and Intercorrelations of Dimensions of WL Efficacy

TABLE 4: Descriptive Statistics and Intercorrelations of Efficacy Dimension

### 4.2. Student attitudes

The method employed to validate the "student attitudes" variable was EFA via Maximum Likelihood, beginning the analysis with a promax (oblique) factor rotation, an eigenvalue greater than 1, and setting the minimum value of the coefficients to .30. Bartlett's Test of Sphericity ($p < .05$) and the KMO measure (.929) suggested that the model was appropriate and that the analysis could be carried out. The Scree plot revealed the appropriate number of factors to obtain the most refined matrix, determining that between one and two factors had to be retained. The resulting model explained the 54.83% variance, with two factors emerging and a total of 12 items, without needing to eliminate any of the items.

The items converging on one same factor suggest that component one represents the students' social attitudes (eight items), and that component two represents their individual attitudes (four items). According to their composition, social attitudes are those directed towards other people, ends or objects, such as respect towards others or responsibility when being assigned a task, among others (M=1.69, SD=0.74). Conversely, individual attitudes are those whose goal is the self and which are related to the students' self-esteem, such as feeling ready or capable of carrying out the WL (M=2.06, SD=0.82).

Thus, the reliability analyses for the two factors were $\alpha = .89$ for social attitudes and $\alpha = .82$ for individual attitudes, which indicate a high internal consistency, according to Nunnally (1978).

### 4.3. Dimensions of success of WL

For the EFA analysis of the 41 items related to the WL dimensions of success, we followed the Maximum Likelihood method, by using a promax (oblique) rotation and an eigenvalue greater than 1, setting the minimum value of the coefficients to .30. The results of Bartlett's Test of Sphericity ($p < .05$) and the KMO measure (.948) provided an appropriate model from which the statistical analysis could be carried out. The Scree

plot showed that we must fix the model between six and seven factors to get an accurate one.

In the second analysis, the results of Bartlett's Test of Sphericity ($p < .05$) and the KMO measure (.948) showed that we could proceed. The resulting seven- factor model explained the 46.34% variance. However, items 30, 27, 37, 4, 5, and 32 had values below .30; for this reason, and due to the fact that the Scree plot suggested between 6 and 7 factors, we performed another analysis limiting the model to 6 factors.

The result of the third analysis (Bartlett $p < .05$ and KMO .948) revealed a variance of 45.03% of the model, with items 37, 2 and 32 being eliminated due to having coefficients below .30. We eliminated these three items and carried out another EFA. In the fourth analysis we set the model to six factors as, if we did not fix the amount of factors, we would have to eliminate many items that did not reach the .30 coefficient value, which obtained a variance of 46.74% (Bartlett $p < .05$ and KMO .947). The coefficients revealed that we needed to eliminate item 33 as it obtained a value below .30. The item was eliminated and we carried out another EFA.

The fifth model showed six factors -with an eigenvalue greater than 1- and a variance of 47.18% (Bartlett $p < .05$ and KMO .945). The factor pattern highlighted the fact that items 23, 7 and 39 had coefficients below .30, and they were therefore eliminated.

Lastly, and after eliminating three items, we obtained a six-factor model (Bartlett $p < .05$ and KMO .940) which explained the 47.94% of variance, composed by 34 items (in total, seven items were eliminated).

Following this, we verified the internal consistency of the total scale (all the WL factors) in the first place. The value for alpha was $\alpha = .91$ for all 34 items, which indicates a high level of reliability. Nevertheless, in order to increase the value of alpha to .92, the results showed that we needed to eliminate item 27, "The duties I have carried out in the WL corresponded to an extant workplace in the company". In order to ensure maximum internal consistency in the scale, we eliminated item 27 and repeated the EFA.

In this last factor model, carried out via Maximum Likelihood and promax rotation and with an eigenvalue greater than 1, the variance was 48.42% (Bartlett $p < .05$ and KMO .937), composed by 33 items and six factors.

The consistency of the scale was $\alpha = .920$, with 33 items. Likewise, we verified the reliability of each factor. All the factors obtained values of $\alpha > .7$ except for the "possibilities of developing the WL" factor, which did not show a good reliability ($\alpha =$

.478), possibly because it only consisted of three items -the value of the coefficient increased proportionately as n (the number of items in the scale) increased (Cronbach 1951; Green et al., 1977; Niemi et al., 1986; Cortina 1993)-.

The construct validity of the variables, both in their analysis and in their internal consistency, allowed us to group items from different theoretical constructs into a single factor. We thus obtained a reduction of the dimensions considered in the theoretical model. Table 5 shows the classification of variables that we previously established in factors.

TABLE 5: Grouping of Theoretical Variables into Empirical Factors that Influence WL Efficacy

As shown in Table 5, there is interference from other variables in the emerged factors, but there are three theoretical constructs that maintain the same meaning: *school tutor's* role, *host company tutor's role*, and *student's motivation*. This confirms the theoretical approach on the importance of the school tutor (Suárez and Ledezma, 2005; Kuczera et al., 2008), on the role played by the company tutor (Grollman and Kämäräinen, 2008; Virtanen and Tynjälä 2008) and student's motivation for WL efficacy. Even if, in this context, motivation may seem irrelevant, due to the fact that WL is compulsory to complete the course, the theory underpins the notion that motivation is essential for any task to be completed successfully (Gegenfurtner, 2012), hence it is important to know the student's degree of motivation to complete WL.

The coherence of training of the school with the WL factor is composed of different constructs, such as prior knowledge acquired by the students throughout the course in the school, duties assigned in WL for the student to carry out in the host company, the student's motives for participating, and the work plan agreed to by the secondary school tutor and the tutor from the host company. This factor's composition confirms the theoretical approach on the need for coherence between the internships in a company and the secondary school's training program for the WL to be effective (Abdala, 2000; Hermosilla, 2003; CEDEFOP, 2010).

The factor possibilities of developing WL is composed of three items, each one of them being a different variable, and therefore offers low internal consistency. In this case, it contains aspects from prior knowledge acquired in the secondary school, the

characteristics of the workplace where the student is carrying out the internship, and the support of the tutor from the secondary school in carrying out WL successfully (Grollman and Kämäräinen, 2008; Virtanen and Tynjälä, 2008).

Finally, the integration into the company factor is basically composed of items from the WL work environment factor, of those aspects most related to the relationship with co-workers and the company as a whole (Virtanen and Tynjälä, 2008; Chiaburu et al., 2010); and of an item from the satisfaction variable related to the student's own performance in the WL internship.

In short, we present a definition of the emerged factors. The *school tutor's role* factor refers to all those functions and activities that correspond to the tutor from the educational facility whose goal is to help students performing WL to successfully achieve the objectives (M=3.41, SD=0.96). The coherence of training of the school with the WL factor includes all those aspects related to the educational coherence between the studies taught at the school and the skills the student will have to put into practice during WL; this takes into account the student's prior knowledge, the duties assigned in WL, the student's satisfaction with the knowledge acquired in the educational facility, the work opportunities in the host company, and the plan of activities to be carried out throughout workplace learning (M=3.72, SD=0.77).

The *host company tutor's role* refers to those functions and activities of the tutor from the host company that are based on supporting the student as much as are necessary while he or she is carrying out workplace learning (M=3.72, SD=0.91).

The *student's motivation* factor refers to an intrinsic motivational component, that is, the student's motivation, effort or interest to carry out WL (M=3.95, SD=0.85).

The possibilities of developing the WL factor are extremely complex because, as we mentioned, it is composed of three items, each of which belonged to different theoretical construct. We define this factor as the conjunction of circumstances that allow students to carry out WL effectively, such as having up-to-date theoretical and practical knowledge, appropriate materials to carry out the tasks in the WL, as well as support from the tutor from the school during workplace learning (M=3.52, SD=0.89).

Finally, the integration into the company factor is defined as the student's impression that he or she has been well received by the host company, both by the co-workers and the company itself (M=4.19, SD=0.80).

### 4.4. Efficacy of WL

We carried out an EFA with the items belonging to the efficacy of the WL item (presented in the methodology section). We used the Maximum Likelihood method with a promax factor rotation and an eigenvalue greater than 1, establishing the coefficient of the values to .30. The results of Bartlett's Test of Sphericity ($p < .05$) and the KMO (.782) suggested that this model was appropriate to proceed with the statistical analysis. The Scree plot showed that the model only had one factor. The model explained the 49.09% variance, with a single factor emerging: efficacy of the WL (M=3.77, SD=0.88).

The fact that the dimension of the efficacy of WL emerged as a single factor demonstrates the unidimensionality of this scale. However, to be sure, we applied a reliability test, which produced a value of $\alpha = .792$, which points to a satisfactory degree of internal consistency and indicates that there is no need to eliminate any items to increase its reliability.

The results agree with the definition of WL efficacy: to complement the skills or knowledge acquired in VET developed within the institution; to apply their professional skills to a real work situation; and to acquire attitudes and skills necessary for employment.

### 4.5. Predictive power of the FET-WL

Multiple regression analysis was used to test the predictive power of student factors and the success of WL factors on WL efficacy (second goal). Before carrying out any statistical regression tests, we ensure that none of the assumptions of the multiple regression analysis were infringed (linearity, homoscedasticity, independence and lack of multicollinearity).

The method used to perform the multiple regression analysis was introduction, which means that all predictive or independent variables -social attitudes, individual attitudes, *school tutor's role, host company tutor's role, coherence of training of the school with* WL, students' motivations, integration into the company, and possibilities of developing WL- were entered simultaneously into the statistical model.

The first model explained the 66.9% of the WL efficacy variance, but we observed one non-significant factor: social attitudes. Excluding this factor, the second model explained the 66.9% of the variance once again; however, the individual attitudes factor was non-significant in this model.

The third model emerged with an adjusted $R^2$ of .669, which suggests a big effect, according to Cohen (1988); the model was carried out without the factors social

attitudes and individual attitudes. In this case, all six factors considered were significant, as shown in Table 6.

TABLE 6: Multiple regressions towards WL efficacy

This result refutes hypothesis one (represented in Figure 1) as two of the eight factors considered in the FET-WL model are non-significant; for this reason, the FET-WL explains WL efficacy with six factors. The final FET-WL is shown in Figure 2.

FIGURE 2: The FET-WL empirically tested model

This can be expressed by the following formula.

> WL efficacy = .124 + .656 of coherence of training of the school with the WL + .155 of *host company tutor's role* + .084 of *student's motivations* + .075 of integration into the company + .071 of possibilities of developing the WL - .041 of *school tutor's role*

The standardised coefficients show that the factor coherence of training of the school with WL is the most powerful (ß = .656, $p < .01$) in this model; meaning that in 66.9% of cases, if there is a high coherence between the school's VET and WL tasks, WL is effective. However, due to the fact that we performed a multiple regression analysis with six factors, coherence of training of the school with WL is related to the other factors, so all six factors are necessary to improve WL efficacy.

Finally, it is worth noting that the *school tutor's role* has a negative influence on the model (ß = -.041, $p < .05$), which suggests that WL efficacy decreases if the school *tutor's* has more involvement in the internship process, according to the student's perception. This result show a different students' perception of the tutor intervention: when the WL is not efficient, the student see more the tutor's intervention; when there is a WL efficacy, there is a lot of prior intervention of the tutor, but the student don't see it at all.

## 5. Discussion

The efficacy of workplace learning for students in vocational training is a crucial element in determining the quality of training as well as the results of public and private investment at this level. Having an instrument to measure the factors that influence the efficacy of WL may be of immense help for education policymakers and professionals in making decisions to improve the system. This is particularly relevant nowadays in Spain and Catalonia, where the Ministry of Education intends to change the WL model and introduce a dual training system.

Our study allowed us to empirically identify the factors that influence the efficacy of WL. These factors are the role of the educational facility's tutor, the consistency of the training at the school, the role of the workplace tutor, student's motivations, company integration, and the possibility of developing WL, as well as the social and individual attitudes of the students to WL.

We can observe a parallel grouping between these factors and the theoretical dimensions initially identified, namely student, VET school, company and training design (Peris, 2006; Consell de la Formació Professional de Barcelona, 2005; Cambra de Comerç de Barcelona, 2005); nonetheless, the model emerging from FET-WL diverges from the theoretical model in a number of nuances: the "student" dimension takes on a concrete form in the *student's* motivation factor and the "relations between the agents involved" dimension is embodied in two factors: the *school tutor's role* and the *host company tutor's role*. This variance between the two models could be due to the lack of the empirical studies based on WL factors in VET.

The identification of the factors of efficacy of WL has allowed us to achieve our first research goal: to create and validate an instrument for measuring the FET-WL model. This instrument enables us to diagnose the position of the factors that determine the efficacy of WL in VET and to propose improvements. The findings show that the instrument can be improved; it would be necessary to revise the possibilities of developing the WL factor, as it comprises three items of different variables and shows little reliability. For future research into the efficacy of WL, it would be useful to explore and test their viability.

On the other hand, in the second research goal, not only the FET-WL model give us information about which factors explain better WL efficacy in VET; it also provides valuable information about which factors are more influent in the WL process and, therefore, which factors better predict WL efficacy. Our results show that the FET-WL model predicts 66.9% of WL efficacy through six factors, which refutes our hypothesis

since not all the factors that compose the FET-WL model predict WL efficacy significantly (social and individual attitudes had to be extracted from the regression model).

The factors coherence of training of the school with the WL and *host company tutor's* role have a high prediction power of WL efficacy. That means if we guarantee a good fit between school training and WL, and we help the host company tutor to do his role properly, we have good possibilities of having an efficient WL. VET studies and educational institutions should focus on these two factors, because they are clue in its WL efficacy.

Because the study was conducted in the Barcelona area, the factors identified are limited to the Catalan VET model, and thus their generalization to other contexts is limited; for this reason, it would be necessary to replicate the variables of the Barcelona area context in order to apply the same model to other locations. In future studies it would be interesting to review other models of VET and adapt the FET-WL with a view to creating a model to evaluate the efficacy of WL to embrace cross-cultural factors. As mentioned, the VET Catalan model may adopt a dual training system in the near future; it would be interesting to explore whether the FET-WL model adapts to this new model or, conversely, if it has to be modified and expanded.

Identifying WL efficacy factors is an important contribution to scientific and community knowledge, since it has allowed us to take them into account in order to diagnose, gauge and predict the efficacy of WL for the first time. These elements offer important guidance as to the factors that must be taken into account to ensure effective training. Likewise, our study allows us to create a valid and reliable measure of WL efficacy in VET as well as predict it in 66.9% of cases.

These results show that the FET-WL may be a useful instrument for the various agents involved in workplace learning -schools, education authorities, and companies that host trainees- since it may improve the organisation and management of WL and thereby increase its efficacy, which would benefit of society as a whole.

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## Table 1

| Profile variables | Students' distribution according to their responses |
|---|---|
| Sex | Men: 540 (47.5%) |
| | Women: 597 (52.5%) |
| Age | <19 years: 394 (34.7%) |
| | 19-20 years: 229 (20.2%) |
| | 20-22 years: 306 (27%) |
| | >22 years: 205 (18.1%) |
| Work experience in months | 0 months: 468 (41.5%) |
| | 0-3 months: 129 (11.4%) |
| | 3-12 months: 251 (22.2%) |
| | >12 months: 281 (24.9%) |
| Number of employees of the workplace learning company | <10 employees: 373 (32.9%) |
| | 10-49 employees: 431 (38%) |
| | 50-250 employees: 149 (13.1%) |
| | >250 employees: 64 (5.6%) |
| | I don't know: 118 (10.4%) |

Profile of the students in the study

## Table 2

Descriptive Statistics and Intercorrelations of Attitude Dimension

| **Items** | i1 | i2 | i3 | i4 | i5 | i6 | i7 | i8 | i9 | i10 | i11 | i12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| i1 | | | | | | | | | | | | |
| i2 | .604** | | | | | | | | | | | |
| i3 | .559** | .749** | | | | | | | | | | |
| i4 | .530** | .645** | .630** | | | | | | | | | |
| i5 | .384** | .484** | .463** | .605** | | | | | | | | |
| i6 | .496** | .570** | .546** | .614** | .579** | | | | | | | |
| i7 | .474** | .424** | .432** | .363** | .319** | .458** | | | | | | |
| i8 | .382** | .433** | .405** | .345** | .256** | .426** | .404** | | | | | |
| i9 | .428** | .456** | .420** | .376** | .287** | .433** | .326** | .448** | | | | |
| i10 | .446** | .502** | .499** | .407** | .370** | .499** | .429** | .450** | .571** | | | |
| i11 | .510** | .556** | .539** | .570** | .419** | .543** | .366** | .415** | .674** | .657** | | |
| i12 | .536** | .548** | .563** | .586** | .512** | .570** | .442** | .415** | .433** | .571** | .595** | |
| Mean | 1.76 | 1.67 | 1.77 | 1.38 | 1.61 | 1.74 | 1.98 | 2.29 | 2.16 | 2.02 | 1.77 | 1.65 |
| SD[a] | .99 | .94 | .95 | .88 | .96 | .95 | 1.12 | 1.10 | 1.01 | 1.03 | .95 | .95 |
| N | 1137 | 1137 | 1134 | 1136 | 1136 | 1135 | 1137 | 1138 | 1138 | 1135 | 1138 | 1138 |

Notes:* p < .05. ** p < .01. [a]Standard deviation.

## Table 3

Descriptive Statistics and Intercorrelations of Dimensions of WL Effectiveness

| **Items** | i1 | i2 | i3 | i4 | i5 | i6 | i7 | i8 | i9 | i10 | i11 | i12 | i13 | i14 | i15 | i16 | i17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| i1 | | | | | | | | | | | | | | | | | |
| i2 | .358** | | | | | | | | | | | | | | | | |
| i3 | .358** | .441** | | | | | | | | | | | | | | | |
| i4 | .319** | .352** | .427** | | | | | | | | | | | | | | |
| i5 | .134** | .114** | .168** | .123** | | | | | | | | | | | | | |
| i6 | .200** | .274** | .147** | .101** | -.005 | | | | | | | | | | | | |
| i7 | .335** | .301** | .351** | .266** | .121** | .239** | | | | | | | | | | | |
| i8 | .595** | .344** | .382** | .303** | .154** | .234** | .414** | | | | | | | | | | |
| i9 | .406** | .356** | .556** | .413** | .190** | .147** | .477** | .483** | | | | | | | | | |
| i10 | .597** | .291** | .305** | .267** | .126** | .230** | .397** | .659** | .434** | | | | | | | | |
| i11 | .302** | .426** | .412** | .535** | .100** | .210** | .333** | .293** | .418** | .298** | | | | | | | |
| i12 | .324** | .337** | .169** | .146** | .057 | .474** | .244** | .372** | .187** | .434** | .258** | | | | | | |
| i13 | .330** | .436** | .396** | .302** | .138** | .201** | .417** | .344** | .559** | .350** | .408** | .297** | | | | | |
| i14 | .059* | .204** | .071* | .035 | .251** | .059* | .048 | .089** | .034 | .023 | .111** | .129** | .101** | | | | |
| i15 | .261** | .276** | .348** | .577** | .075* | .074* | .279** | .260** | .352** | .232** | .526** | .149** | .260** | .026 | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| i16 | .331** | .315** | .477** | .411** | .200** | .078** | .264** | .332** | .401** | .281** | .425** | .170** | .291** | .170** | .448** | | |
| i17 | .268** | .215** | .318** | .222** | .139** | .214** | .319** | .301** | .373** | .293** | .272** | .279** | .293** | .095** | .214** | .320** | |
| i18 | .482** | .228** | .320** | .282** | .129** | .099** | .382** | .518** | .414** | .480** | .299** | .187** | .323** | -.007 | .250** | .344** | .311** |
| i19 | .279** | .454** | .410** | .312** | .167** | .243** | .342** | .305** | .446** | .295** | .447** | .336** | .460** | .201** | .306** | .392** | .310** |
| i20 | .410** | .270** | .483** | .261** | .162** | .088** | .337** | .438** | .515** | .392** | .290** | .180** | .342** | .021 | .258** | .422** | .322** |
| i21 | .303** | .153** | .211** | .176** | .252** | .033 | .207** | .330** | .268** | .311** | .187** | .089** | .211** | .231** | .170** | .246** | .081** |
| i22 | .253** | .265** | .128** | .163** | .060* | .341** | .194** | .255** | .188** | .275** | .226** | .537** | .271** | .079** | .138** | .150** | .215** |
| i23 | .225** | .213** | .161** | .078** | -.003 | .255** | .228** | .242** | .212** | .273** | .136** | .349** | .231** | .025 | .096** | .105** | .285** |
| i24 | .280** | .217** | .229** | .151** | .031 | .225** | .248** | .294** | .391** | .316** | .187** | .259** | .333** | -.060* | .163** | .130** | .266** |
| i25 | .213** | .226** | .208** | .148** | .064* | .222** | .277** | .269** | .289** | .241** | .219** | .273** | .275** | .031 | .133** | .102** | .433** |
| i26 | .235** | .485** | .335** | .283** | .111** | .260** | .334** | .267** | .435** | .238** | .429** | .331** | .531** | .236** | .233** | .244** | .272** |
| i27 | -.272** | -.288** | -.347** | -.258** | -.102** | -.189** | -.256** | -.331** | -.421** | -.322** | -.326** | -.264** | -.400** | -.084** | -.274** | -.335** | -.286** |
| i28 | .512** | .240** | .310** | .211** | .110** | .184** | .394** | .564** | .402** | .563** | .283** | .275** | .318** | .039 | .239** | .297** | .278** |
| i29 | .259** | .231** | .165** | .116** | .189** | .206** | .208** | .268** | .153** | .278** | .167** | .335** | .171** | .252** | .101** | .170** | .122** |
| i30 | .312** | .323** | .367** | .337** | .129** | .155** | .294** | .330** | .476** | .278** | .375** | .236** | .349** | .073* | .355** | .339** | .311** |
| i31 | .336** | .309** | .389** | .307** | .142** | .168** | .350** | .387** | .469** | .362** | .349** | .301** | .428** | .063* | .291** | .368** | .348** |
| i32 | .000 | -.016 | -.029 | -.009 | .072* | .063* | .054 | -.021 | -.023 | .006 | .019 | .068* | .024 | .144** | -.076* | -.042 | .027 |
| i33 | .347** | .192** | .263** | .173** | .134** | .141** | .298** | .398** | .363** | .358** | .200** | .251** | .293** | .051 | .179** | .223** | .341** |
| i34 | .347** | .286** | .478** | .342** | .141** | .080** | .312** | .377** | .454** | .323** | .374** | .173** | .304** | .079** | .368** | .515** | .266** |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| i35 | .323** | .293** | .180** | .148** | .098** | .407** | .226** | .347** | .190** | .361** | .212** | .657** | .275** | .107** | .134** | .174** | .229** |
| i36 | .332** | .301** | .190** | .166** | .085** | .406** | .255** | .357** | .191** | .400** | .231** | .699** | .256** | .142** | .118** | .193** | .236** |
| i37 | .250** | .154** | .172** | .113** | .084** | .173** | .166** | .290** | .207** | .266** | .128** | .204** | .154** | .030 | .139** | .182** | .195** |
| i38 | .317** | .301** | .159** | .136** | .032 | .455** | .209** | .304** | .192** | .374** | .220** | .637** | .270** | .082** | .113** | .138** | .249** |
| i39 | .448** | .328** | .523** | .369** | .205** | .135** | .381** | .487** | .619** | .444** | .369** | .201** | .418** | .081** | .339** | .405** | .306** |
| i40 | .206** | .198** | .207** | .374** | .093** | .188** | .217** | .217** | .294** | .211** | .364** | .202** | .217** | -.007 | .360** | .231** | .192** |
| i41 | .281** | .312** | .180** | .170** | .107** | .539** | .228** | .256** | .195** | .306** | .254** | .502** | .280** | .090** | .153** | .171** | .286** |
| Mean | 3.78 | 3.84 | 4.18 | 4.05 | 3.63 | 3.08 | 3.64 | 3.69 | 3.64 | 3.63 | 4.04 | 3.48 | 3.76 | 3.66 | 3.40 | 4.45 | 3.70 |
| SD[a] | 1.18 | 1.10 | .99 | 1.06 | 1.28 | 1.34 | 1.20 | 1.19 | 1.17 | 1.18 | 1.06 | 1.20 | 1.21 | 1.06 | 1.23 | .94 | 1.14 |
| N | 1138 | 1137 | 1134 | 1134 | 1130 | 1134 | 1138 | 1138 | 1136 | 1133 | 1136 | 1135 | 1136 | 1138 | 1137 | 1135 | 1136 |

Notes:* p < .05. ** p < .01. [a]Standard deviation.

## Table 4

Descriptive Statistics and Intercorrelations of Effectiveness Dimension

| **Items** | i1 | i2 | i3 | i4 |
|---|---|---|---|---|
| i1 | | | | |
| i2 | .557** | | | |
| i3 | .501** | .415** | | |
| i4 | .522** | .445** | .483** | |
| Mean | 3.95 | 3.64 | 3.66 | 3.84 |
| SD[a] | 1.18 | 1.17 | 1.06 | 1.05 |
| N | 1130 | 1136 | 1138 | 1137 |

Notes:* p < .05. ** p < .01. [a]Standard deviation.

## Table 5

Grouping of Theoretical Variables into Empirical Factors that Influence WL Effectiveness

| **Theoretical Variables** | **Empirical Factors** |
|---|---|
| High school tutors | School tutor's role |
| Company tutors | Host company tutor's role |
| Prior knowledge<br>Duties<br>Satisfaction with the workplace learning<br>Reasons for carrying out the workplace learning<br>Plan of activities | Coherence of training of the school with the workplace learning |
| Reasons for carrying out the workplace learning | Student's motivations |
| Prior knowledge<br>Work environment<br>High school tutors | Possibilities of developing the workplace learning |
| Work environment<br>Satisfaction with the workplace learning | Integration into the company |
| Student's attitudes | Social attitudes<br>Individual attitudes |

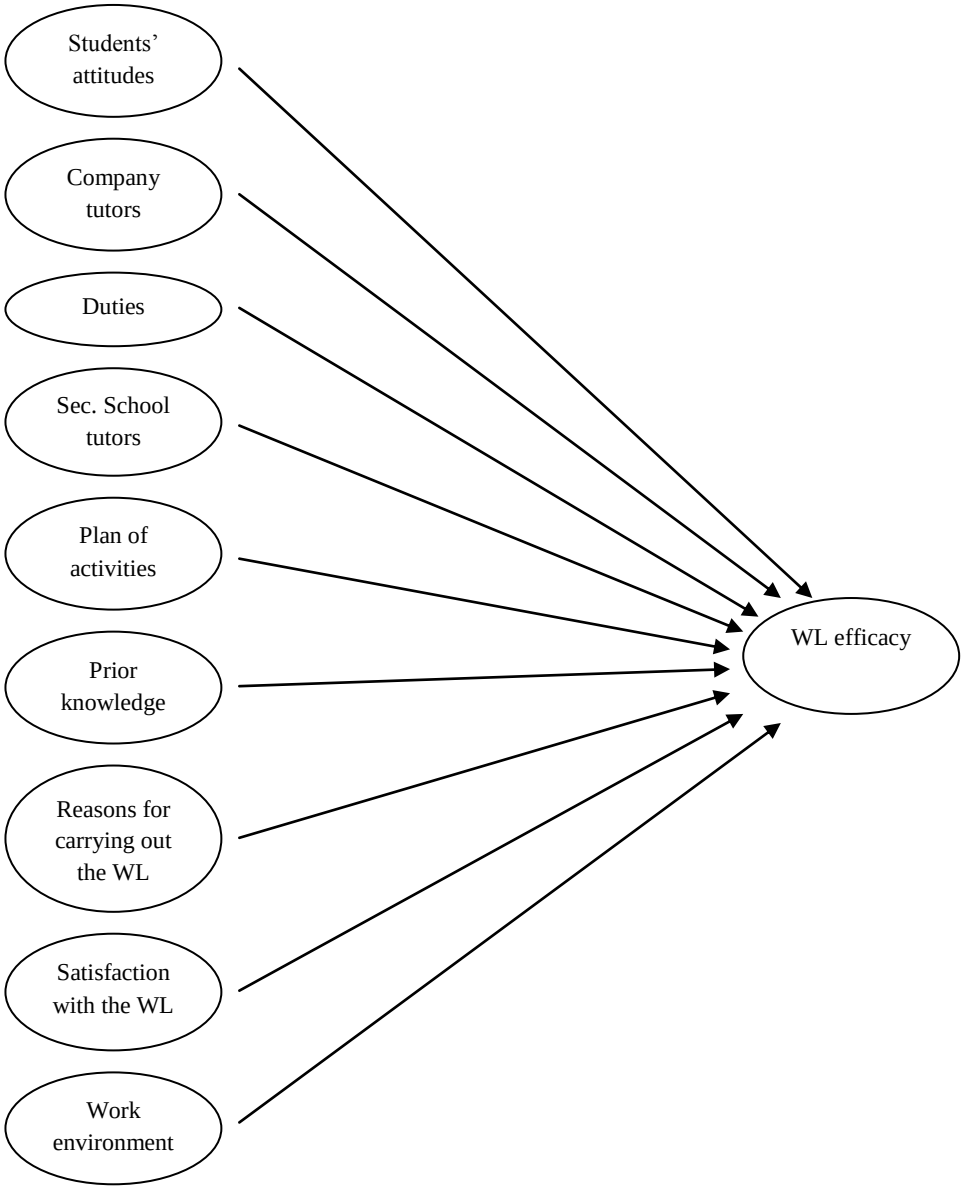
## Table 6

Multiple regressions towards WL effectiveness

| **Independent variables** | **B**[a] | **SE B**[b] | **ß**[c] |
|---|---|---|---|
| (Constant) | .124 | .097 | |
| School tutor's role | -.038 | .018 | -.041* |
| Coherence of training of the school with the WL | .748 | .029 | .656** |
| Host company tutor's role | .149 | .022 | .155** |
| Student's motivations | .086 | .022 | .084** |
| Possibilities of developing the WL | .070 | .018 | .071** |
| Integration into the company | .083 | .027 | .075** |

Notes: *p < .05. ** p < .01. [a]Unstandardised coefficient, [b]Standard error, [c]Standardised coefficient.

**Figure 1**

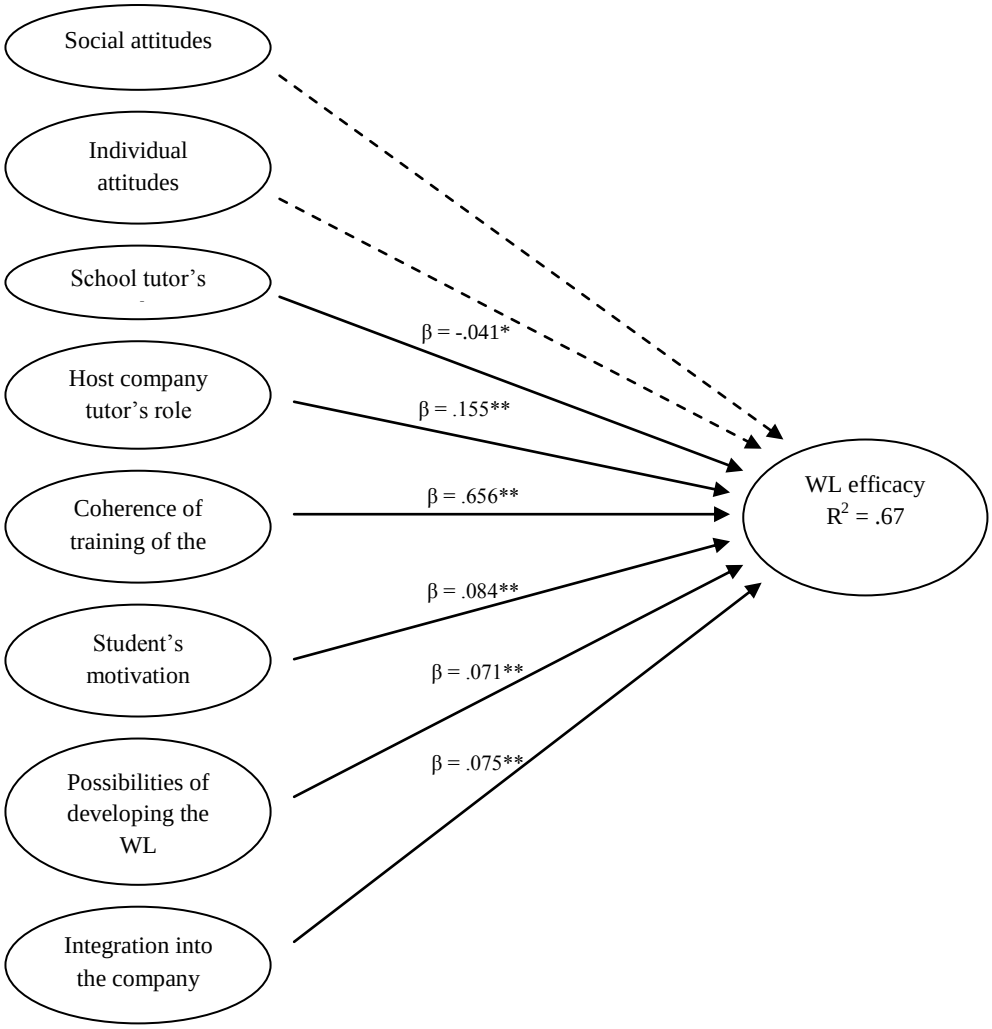



Note:

⟶Hypothesized direct relation

The FET-WL theoretical model

**Figure 2**




Note: * p < .05; ** p < .01

Significant relation

Non-significant relation

The FET-WL empirically tested model