



## Original Article

# Knowledge of and attitudes to Occupational Health & Safety among tutors of a Vocational Training Institute (IIEK) in Greece: A pilot study.

Stavroula Bibila

University of Exeter, Graduate School of Education, Heavitree Road, Exeter EX 1 2LU, UK.

## Abstract:

This study aimed to develop two instruments, one for measuring knowledge of Occupational Health & Safety (OHS) and one for measuring attitudes to OHS, to examine differences in knowledge and attitudes among tutors teaching at a private vocational training institute in Greece (IIEK) and to identify significant predictors of OHS knowledge.

For the 9-item knowledge scale developed, a K-R 20 of 0.60 was generated while for the 9-item attitude scale a Cronbach's alpha ( $\alpha$ ) of 0.71 was generated. A cross-sectional, comparative research design was followed and the population (N=71) was stratified into "vocational area of expertise" groups. A proportional stratified random sampling strategy was used.

It was found that, for the sampled tutors (n=31), "hours of OHS training" was the sole significant predictor of OHS knowledge contributing for 76% of the explained variance. No significant contributions to OHS knowledge were made by "vocational area of expertise", "years of teaching experience" and "attitudes to OHS".

**Key Words:** Occupational Health & Safety, knowledge test, attitudes, survey

## Introduction

There is evidence to suggest that there is still work to be done in Greece in the area of promoting Occupational Health & Safety (OHS). As explained in one of the studies carried out by INE [(the Labour Institute of the Greek General Confederation of Labour ( $\Gamma\Sigma\Sigma\text{E}$ ) and the Confederation of Public Servants ( $\text{A}\Delta\text{E}\Delta\text{Y}$ )], due to limited research activity in the field of OHS, even the scale of occupational risk and workplace accidents remains unknown to the date [1]. Findings of the same study suggest that "an organized campaign should be launched to build awareness and provide information to workers and the public at large on the value of preventing occupational risk in the workplace."

When it comes to OHS training/education provided by the employer, the PD17/1996 [2] obliges employers to provide training to minimize the risk of workplace accidents, but this legislation does not give any specific descriptions of the type and duration of the training. Consequently, and as supported by the EKA report [3], "OHS education of employees is perceived a minimum law requirement rather than a company policy towards effective human resources development." (pp.11-12). If OHS is to become part of human resources management in post-compulsory education and training establishments in Greece, tutors may need to develop positive attitudes to and a good understanding of OHS risks [4]. The organizations on their behalf will need to create meaningful opportunities for educating and training staff on OHS issues.

Integrating OHS education/training into human resource management can be one way of building awareness on the value of preventing occupational health risks in Greece. In an

Corresponding Author: Stavroula Bibila

Email: [s.bibila@exeter.ac.uk](mailto:s.bibila@exeter.ac.uk)

© 2012 IJOSH All rights reserved.

employment sector (i.e. post-compulsory education & training) in which there is limited research activity in the area of OHS risk management, and with OHS education/training programmes still in their infancy stage, the study reported in this paper took place at a privately run institute of vocational training (Ιδιωτικό Ινστιτούτο Επαγγελματικής Κατάρτισης - ΙΙΕΚ) in a city of northern Greece.

The study had two parts reflecting its dual aim: 1) to develop two instruments, one for measuring vocational tutors' knowledge of OHS and one for measuring their attitudes to OHS and 2) to examine differences in knowledge of OHS and attitudes to OHS among different vocational tutor subgroups in order to identify key predictors of OHS knowledge. It was therefore hypothesized that:

1) Art tutors and tutors teaching in the Auto Mechanics department will display significantly different levels of "OHS knowledge" (i.e. their scores on the 9-item knowledge scale will vary significantly)

2) "OHS hours of training" will be a significant sole predictor of "OHS knowledge" (as defined by the 9-item knowledge scale)

3) There will be a positive correlation between "years of teaching experience" and "OHS knowledge" (i.e. scores on the 9-item knowledge scale)

4) Tutors with more positive attitudes to OHS (i.e. higher score on the 9-item attitude scale) will display greater "OHS knowledge" (i.e. higher score on the 9-item knowledge scale)

Participants were informed about the aim of the study by a letter that also made clear that participation in the survey was not compulsory and that the questionnaires would be destroyed immediately after data analysis. All questionnaires were anonymous and the anonymity of participants was safeguarded by omitting questions such as age and gender that could lead to their identification.

## Methods

The following four (4) departments agreed to participate in the study: Health Care, Hairdressing/Beauty, Auto Mechanics and dArts. The study used a cross-sectional, comparative design and the research population (N=71) was stratified into four (4) groups representing the departments taking part in the study.

50 questionnaires were prepared, divided proportionately to the

population strata and administered randomly to tutors by the academic coordinators of each department. To encourage tutors to answer the questionnaire, particularly as it contained an element of assessment, I omitted questions on demographics such as sex and age that tutors could see as a direct lead to their identification. The third part of the questionnaire related to tutors' key (background) characteristics (see Part 3 of Appendix II). The completed questionnaires were placed in a box for collection and a 62% response rate was achieved (n= 31). The same sample that was used for evaluating the measuring instruments was also used for the second part of the study.

Data were analysed using the PASW V 18.0 software package. As a first step, total counts, percentages and cross percentages of tutors' key characteristics and knowledge/attitude scores (compositional scales and subscales/factors) were calculated. For the knowledge scale data, runs tests confirmed that the sample is random and the distribution of data was confirmed as being normal by the Kolmogorov Smirnov test (apart from the scores on all four subscales/factors). The compositional knowledge scores of art tutors and tutors teaching in the Auto Mechanics department were compared using an independent sample t-test. Equal variance was verified by the Lavene's test. Pearson's r correlations were run to examine the relationship between tutors' compositional knowledge scores and "hours of OHS training" and compositional knowledge scores and "years of teaching experience". Spearman's rho correlations were used for the four knowledge subscales/ factor scores. A simple linear regression was run in examining "hours of training" as a sole predictor of knowledge. In examining the relationship between OHS knowledge and attitudes to OHS (measured by the 9-item Likert scale), a Mann-Whitney U test was run and the data of the attitude scale were treated as ordinal data. The level of significance for all tests was set at  $p \leq 0.05$ .

## The measuring instruments

The process of developing the measuring instruments followed closely the work of Aydemir [5] and had three steps: 1) legislation/literature review and concept development, 2) item development and consultation with experts 3) data collection, item analysis and reliability/validity assessments.

## The knowledge scale

The knowledge scale development started with a meeting with a senior manager at the Institute during which, five (5) main areas of concern were identified: 1) Fire safety,

2) air quality/ temperature in the labs and classrooms, 3) lifting & handling heavy loads, 4) causes of accidents and 5) reading mandatory/information/warning signs. These areas are in line with the PD 16/1996 Act [6] and according to the EKA report [7] they specify “hazards in areas of crowd congregation and work (i.e., trips in slippery surfaces, fire prevention, hygiene, etc).” (p.2). Appendix I contains the initial 14-item knowledge scale administered to subjects (in translation from Greek). Responses to the items were ‘true’, ‘false’ and ‘I am not sure’. Similarly to the work by Aydemir [5], the ‘I am not sure’ response was added in an attempt “to ameliorate the effects of guessing.”

Point-Biserial correlation (PBS) (rpb) was used as a method of discriminating among items’ difficulty levels by correlating the score of an item and the total score of all items. The analysis showed five (5) items yielding a disturbingly low rpb score < 0.20 with the rest of the scores ranging between 0.22 - 0.42. In measuring the easiness of each item, P values were calculated. The P values of the 14 items ranged from 0.20 to 0.94 with eight (8) items falling within the ‘extreme values’ range (i.e.  $P \leq 0.20$  and  $P \geq 0.80$ ) [8]. By multiplying the P value by 100, we can see the percentage of tutors that answered each knowledge item correctly (see Table 4).

Having taken into consideration the above, items 8, 10, 11 and 14 were identified as problematic and were removed from the scale. The remaining 10 items were reverse coded for factor analysis with the ‘I am not sure’ answer coded as a missing value. Exploratory factor analysis was carried out using principal-components. A four-factor solution yielded the best fitting and most meaningful result accounting for 68% of the variance. Factor 1 was named ‘Basic OHS’ (OHS is a concern for people working in offices, Risks associated with unclean air-conditioning systems, Elements of fire - the ‘fire triangle’), Factor 2 was ‘Advanced OHS’ (Causes of carbon monoxide poisoning, Correct posture for lifting heavy loads), Factor 3 was ‘Specific Training OHS’ (Correct posture for handling heavy loads, Earthquake/fire evacuation) and Factor 4 was ‘Fire Extinguishers’ (Types of fires/ fire extinguishers). The 10 items were loaded on a factor if they had a minimum factor loading of 0.7 and a minimum difference of 0.3 on all non-dominant factors [9]. Varimax rotation was used in an attempt to minimize the complexity of the factors by making the large loadings larger and the small loadings smaller within each factor. One further item, item 9, was removed from the scale because its total factor loading difference was 0.08. Table 1 presents the rotated factor loadings for the remaining 9 items.

**Table 1 Rotated factor loadings for the 4-factor solution applied to the 9-item knowledge scale**

Item	Item description	Factor 1	Factor 2	Factor 3	Factor 4
3	Preventing/extinguishing fires	0.772	-0.119	0.264	0.101
7	Air conditioners and air quality	0.733	0.108	0.015	-0.042
1	H&S in offices	0.703	0.166	0.011	0.072
6	Carbon monoxide and air quality	-0.063	0.770	0.066	0.062
13	Correct posture for lifting heavy loads	0.279	0.752	-0.140	-0.151
12	Correct posture for handling heavy loads	0.139	0.599	0.835	0.070
2	Using the lift in the event of an earthquake/fire/fire drill	-0.004	0.075	0.818	-0.162
4	Types of fires/fire extinguishers	0.154	0.124	0.205	0.845
5	Types of fire/fire extinguishers	0.325	0.326	0.189	0.775

Finally, the reliability of the knowledge scale was evaluated by examining how consistent responses were among the remaining 9 items. The 9-item knowledge scale yielded a K-R 20 internal consistency coefficient of 0.60, which is thought to be acceptable for short tests measuring diverse knowledge [10].

#### The attitude scale

The 14-item Likert scale of Appendix II (in translation from Greek) was developed to measure the degree of favour or disfavour the subjects would tend to evaluate OHS with. Higher scores signified more positive attitudes toward OHS. Attitudes were seen to be consisting of an affect, a behaviour and a cognition [11]. Based on this tri-component conceptualization of attitudes, certain items of the scale assessed an affective component on a like or dislike spectrum (e.g. items 1 & 11) while other items assessed accident/emergency behavioural tendency on a use or avoid spectrum (e.g. items 2, 3, 4, & 5). Finally, items that assessed a cognitive component on a spectrum of desirability or undesirability (e.g. items 9, 10 & 12) were also included.

In evaluating the content validity of the scale, two public health researchers from Bolton NHS Primary Care Trust commented on it. Based on their suggestions, items 6, 13 and 14 were removed from the scale and two further items were reworded. For the remaining 11 items, factor analysis was carried out in the same manner described for the items of the knowledge scale. A two-factor solution yielded the best fitting and most meaningful

result accounting for 47% of the variance. Factor 1 was named ‘General beliefs and feelings’ and Factor 2 ‘Accident behaviour/intentions’. Two further items (items 7 & 8) were removed due to insufficient factor loading difference. Table 2 presents the rotated factor loadings for the remaining 9 items.

**Table II Rotated factor loadings for the 2-factor solution applied to the 9-item attitude**

Item	Item description	Factor 1	Factor 2
9	OHS is an important issue not just for the management, but also for all employees It is important that OHS inspections are carried out at Colleges by an external body regularly	0.842	-0.363
12	My estimation of teachers who promote OHS in the College is high	0.836	0.96
10	It pleases me to see Colleges investing in OHS training for staff	0.715	0.50
1	It would please me to get more involved in the promotion of OHS measures at the College	0.648	0.390
11	I would get anxious if I had a concern about an accident and the management was absent	0.519	0.120
3	All tutors should be able to name at least one first aider at the College	0.218	0.791
4	All accidents, no matter how small, should be reported	0.298	0.733
5	It is important that teachers know how to lift desks/heavy items	0.077	0.584
2		0.017	0.559

For assessing the reliability of the attitude scale, a standardised Cronbach's alpha ( $\alpha$ ) was run. For the 9-item attitude scale, a Cronbach's alpha ( $\alpha$ ) of 0.71 was generated indicating a good level of internal consistency of the data [8]. In addition, Cronbach's alpha ( $\alpha$ ) were calculated for each of the two sub-scales/factors yielding for Factor 1 ( $\alpha$ ) = 0.69 and for Factor 2 ( $\alpha$ )= 0.56.

**Results**

The findings of the study are presented in four different parts: Tutors' key characteristics, Tutors' knowledge of OHS, Tutors' attitudes to OHS and Predicting knowledge of OHS.

Tutors' teaching experience ranged between 1-20 years (M= 8.47, SD= 6) and the median (MD) was 7 years. Only 48% of the sampled tutors disclosed their years of teaching experience. Regarding their vocational area of expertise 19% of the sampled tutors taught in the Health Care department, 26% in the Auto Mechanics, 26% taught in the Arts department and 23% in the Hairdressing & Beauty. The percentage of tutors reporting to

have received OHS training at some stage in their life was 61%, while 32% had never received any OHS training. Of the tutors who reported to have received training, only 45% could remember the amount of training they had had, while 55% of tutors ticked the ‘I cannot remember’ box. The number of OHS training hours tutors had received ranged between 1-13 hours (M= 6.4, SD= 4) and the median (MD) was 6.5 hours. Table 3 presents tutors' key (background) characteristics.

**Table III Characteristics of the sampled population.**

Teaching experience (in years)		Have you ever received any OHS training?		Yes (%)	No (%)	No Response (%)
Mean (SD)	8.47 (5.9)			61	35	4
Median	7					
% of tutors who did not answer this question		52%		<b>Hours of OHS training received (%)</b>		
		1-3 hours		10		
<b>Vocational area of expertise (%)</b>		4-6 hours		13		
Health Care	19	7-10 hours		6		
Hairdressing & Beauty	23	Over 10		16		
Auto Mechanics	26	% of tutors who did not answer this question		55%		
Arts	26	OHS training (in hours) Mean (SD)		6.4 (4)		
No response	6	OHS training (in hours) Median		6.5		

In summarising tutors' OHS knowledge levels, Table 4 presents the percentage of tutors answering correctly to each knowledge item and the percentage of correct answers per vocational area of expertise. Items marked with a double asterisk (\*\*) indicate items with extreme P values (i.e.  $P \leq 0.20$  and  $P \geq 0.80$ ) that were considered to be relatively difficult or easy to answer. One interesting observation is that item 5, asking tutors whether fire extinguishers with red labels could be used on fires on electrical appliances/wiring, flammable liquids and metals, was found to be the most difficult item of the scale ( $P=0.20$ ) and was answered correctly solely by tutors of the Auto Mechanics department. The same item had a low Point-Biserial correlation ( $r_{pb} = 0.22$ ) implying that tutors who got this item wrong tended to do

well in the overall test and/or that tutors who answered this item correctly (i.e. tutors teaching in the Auto Mechanics) tended to do poorly overall.

### Hypothesis #1

In testing whether Art tutors and tutors teaching in the Auto Mechanics department displayed significantly different levels of "OHS knowledge" (i.e. their scores on the 9-item scale would vary significantly), an independent samples t-test was run. The test failed to reveal a significant difference between the mean scores of the two groups.  $t = -0.366$ ;  $df=14$ ;  $p=0.59$ .

Table 5 presents tutors' mean scores for all four knowledge sub-scales/factors per vocational area of expertise and the total OHS knowledge score (9-item scale). One interesting observation is that Art tutors scored higher than Health Care tutors and Auto Mechanics tutors. The latter scored significantly higher (a difference of one SD unit was observed) than the rest of the tutors only in factor 4 (i.e. use of fire extinguishers), but their overall score was below the 9-item scale average. A second interesting observation is that only tutors of the Hairdressing & Beauty department scored above average and with small variations in their scores (SD 0.4).

**Table IV Percentage of vocational tutors answering correctly to each knowledge item.**

Item	Item description	Answering correctly (%)	per area	of expertise	
		Tutors answering correctly (%)	correctly each	correct answer)	
		(% within	2*	3*	4*
1	H&S in offices**	81	26	30	22
2	Using the lift in the event of an earthquake/ fire/fire drill	58	11	33	22
3	Preventing/extinguishing fires	74	24	29	29
4	Types of fire/fire extinguishers	64	16	21	21
5	Types of fire/fire extinguishers***	20	0	0	0
6	Carbon monoxide and air quality	61	17	29	28
7	Air conditioners and air quality**	80	22	27	22
12	Correct posture for handling heavy loads	58	17	28	33
13	Correct lifting heavy loads posture**	80	19	23	26

Percentage of correct answers per vocational area of expertise\*.  
 (\* 1= Health Care, 2= Hairdressing/Beauty, 3= Auto Mechanics, 4= Arts), (\*\*items with extreme P values,  $P \leq 0.20$  and  $P \geq 0.80$ )  
 (\*\*\*) item with an extreme P value and low rpb = 0.22)

**Table V Tutors' mean scores on the knowledge scale per department.**

Area of expertise	Compositional OHS - M (SD)	Basic OHS - M (SD)	Adv. OHS - M (SD)	Spec. Training - M (SD)	Fire Extinguishers - M (SD)
	(max. score possible 9)	(max. score pos. 3)	(max. score pos. 2)	(max. score pos. 2)	(max. score pos. 2)
Auto Mechanics	5.50 (2.2)	1.87 (1.12)	1.37 (0.74)	0.87 (0.83)	1.37 (0.51)
Health Care	5.66 (1.2)	2.83 (0.40)	1.50 (0.54)	0.83 (0.98)	0.50 (0.54)
Arts	5.87 (1.8)	2.12 (1.12)	1.62 (0.51)	1.62 (0.74)	0.50 (0.53)
Hairdressing & Beauty	6.71 (0.4)	2.86 (0.37)	1.71 (0.48)	1.57 (0.53)	0.54 (0.53)
Average scores	5.87 (1.72)	2.41 (0.92)	1.54 (0.62)	1.16 (0.86)	0.74 (0.63)

By looking at the amount of OHS training received within each department (Table 6), it becomes evident that a considerable share of tutors teaching in the Hairdressing/Beauty and Arts departments had received training that exceeded 10 hours. In looking for links between the “amount of H&S training” received and “vocational area of expertise” a Pearson’s chi-square test of association could not be run as the conditions were not met.

**Table VI Percentage of training received per department (% within department).**

Hours of training	Health	Hairdressing/ Beauty	Auto Me- chanics	Arts
1-3	40%	-	25%	-
4-6	20%	-	50%	50%
7-10	20%	30%	-	-
Over 10	20%	70%	25%	50%
TOTAL	100%	100%	100%	100%

### Hypothesis #2

The hypothesis that “OHS hours of training” would be a significant sole predictor of “OHS knowledge” (i.e. scores on the 9-item scale) was confirmed. Initially a Pearson’s product moment correlation was calculated for “hours of training” and “9-item scale scores” yielding an  $r = 0.877$ ,  $p=0.00$ . Due to the large number of missing values to the question “how many hours of OHS training have you had”, the sample size for testing this hypothesis was 13 ( $n=13$ ). Based on confidence intervals (CI) calculations, for  $r = 0.88$  ( $n=13$ ) the 95% CI on the population correlation is 0.65 to 0.96. In testing hypothesis 2, a simple linear regression showed that “hours of OHS training” account for 76% (more or less) of the variance of “OHS knowledge” for the sampled tutors ( $R^2 = 0.76$ ,  $B=0.30$ ,  $SE=0.04$ ;  $p=0.00$ ). Given  $n=13$ , 95% CI for  $B= 0.20$  to 0.38.

Further, and as the knowledge subscale/factor scores did not show an equal distribution, Spearman’s rank correlations were calculated for “hours of training” and each of the four “subscale/factor scores” and “hours of training” and “9-item (compositional) scale scores”. The following results were yielded: Factor 1  $r_s = 0.316$ ,  $p=0.136$ , Factor 2:  $r_s = 0.299$ ,  $p=0.149$ , Factor 3:  $r_s = 0.873$ ,  $p=0.00$ , Factor 4:  $r_s = -0.78$ ,  $p=0.396$ , “9-item (compositional) scale”:  $r_s = 0.873$ ,  $p=0.00$ . This finding suggests that, for the sampled tutors, more hours of OHS training are correlated with greater knowledge of how to handle heavy loads and usage of the lift in earthquake/fire evacuation (Factor 3 - Specific OHS Training). In calculating confidence intervals

for rho, based on the Fisher  $r$ -to- $z$  transformation, given  $r_s = 0.87$  for  $n=13$ , 95% CI for  $r_s$  is 0.63 to 0.95.

### Hypothesis #3

The hypothesis that there would be a positive correlation between “years of teaching experience” and “OHS knowledge” (i.e. scores on the 9-item scale) was rejected. A Pearson’s product moment correlation was calculated yielding  $r = 0.30$ ,  $p=0.13$ . Due to the large number of missing values for the question “how many years of teaching experience do you have”, the sample size for testing this hypothesis was 14 ( $n=14$ ). Based on confidence intervals (CI) calculations, for  $r = 0.30$  ( $n=14$ ) the 95% CI on the population correlation is -0.27 to 0.71 and so we cannot reject the null hypothesis.

Further, Spearman’s rank correlations were calculated for “years of teaching experience” and each of the four knowledge subscale/factor scores. The following results were yielded: Factor 1  $r_s = 0.58$ ,  $p=0.419$ , Factor 2:  $r_s = 0.31$ ,  $p=0.456$ , Factor 3:  $r_s = -0.081$ ,  $p=0.385$ , Factor 4:  $r_s = 0.522$ ,  $p=0.02$ . Although it initially appears that there is a significant positive correlation between “years of teaching experience” and “knowledge of fire extinguishers”, in calculating confidence intervals for rho, based on the Fisher  $r$ -to- $z$  transformation, given  $r_s = 0.52$  for  $n=14$ , 95% CI for  $r_s$  is -0.01 to 0.82. so again we would have to reject this hypothesis.

Regarding tutors’ attitudes to OHS, we can say that in general tutors displayed positive attitudes. For factor 1 (general perception & feelings), and with a maximum possible score of 25, the median of the scale was 22 ( $MD=22$ ,  $min.=12$   $max.=25$ ) while for factor 2 (specific accident behaviour), and with a maximum possible score of 20, the median was 16 ( $MD=16$ ,  $min.=8$   $max.=20$ ). In the compositional attitude scale, and with a maximum possible score of 45, the median was 38 ( $MD=38$ ,  $min.=29$   $max.=44$ ). Table 7 presents tutors’ responses to each of the 9 items of the attitude scale.

Table 8 presents tutors’ median scores for all four attitude subscales/factors per vocational area of expertise and the total OHS attitude (9-item scale) scores. An interesting observation is that tutors of the Health Care department displayed the least favourable attitude toward OHS. Similarly to the rankings of the knowledge scale scores, tutors of the Arts and the Hairdressing/Beauty departments rendered the second highest and the highest score respectively.

Table VII Tutors' responses to the 9-item attitude scale.

Factor 1 items - General perception & feelings	Median (MD)- also the Mode	Strongly Agree (5)	Agree (4)	Not sure (3)	Disagree (2)	Strongly Disagree (1)
1. It pleases me to see Colleges investing in H&S training for staff	5	71%	19%	10%	-	
9. Health & Safety is an important issue not just for the management, but also for all employees	5	52%	26%	19%	3%	-
10. My estimation of teachers who promote H&S in the College is high	5	58%	39%	-	-	3%
11. It would please me to get more involved in the promotion of H&S measures at the College	4	26%	48%	19%	6%	
12. It is important that H&S inspections are carried out at Colleges by an external body regularly	4	48%	35%	13%	3%	-
Factor 2 items - Specific accident behavior	Median (MD)- also the Mode	Strongly Agree (5)	Agree (4)	Not sure (3)	Disagree (2)	Strongly Disagree (1)
2. It is important that teachers lift desks/heavy items safely	4	19%	35%	2%	10%	
3. I would get nervous if I had a concern about a H&S issue and the management was absent	4	23%	42%	29%	7%	-
4. All tutors should be able to name at least one first aider at the College	5	68%	26%	-	6%	-
5. All accidents, no matter how small, should be reported	4	36%	48%	13%	3%	-

Table VIII Tutors' median (MD) scores on the attitude scale per department.

Area of expertise	Compositional Attitude MD (min. score possible 9 - max. score possible 45)	Perception & Feeling MD (min. score poss. 9 - max. score poss. 25)	Accident behaviour MD (min. score poss. 9 - max. score poss. 20)
Health Care	36 (min. 29 - max. 44)	20 (min. 12 - max. 25)	17 (min. 13 - max. 17)
Auto Mechanics	37 (min. 30 - max. 43)	21 (min. 16 - max. 25)	16 (min. 14 - max. 19)
Arts	39 (min. 35 - max. 43)	23 (min. 19 - max. 25)	16 (min. 15 - max. 18)
Hairdressing & Beauty	40 (min. 30 - max. 42)	24 (min. 22 - max. 25)	16 (min. 8 - max. 18)

The After carrying out an item-by-item analysis, I found the following observation to be of particular interest: Although tutors of the Auto Mechanics department displayed less favourable attitudes to OHS than Hairdressing/Beauty tutors, the 3% disagreement to item 5 (i.e. "All accidents, no matter how small, should be reported") and 50% of the "I am not sure" answers came from tutors of the Hairdressing/Beauty department. On the contrast, 50% of all tutors teaching in the Auto Mechanics department strongly agreed with item 5, leading me to question whether there is a difference in tutors' perceptions regarding the nature and/or seriousness of accidents in these two vocational areas. Although there is no evidence to suggest this, it was similar

concerns regarding measurement of feelings and perceptions in this study that prompted me to treat the data of the attitude scale as ordinal data [11].

As part of the item-by-item analysis, Spearman rho correlations were run between the scores for each of the 9-item attitude scale and "years of experience". An  $r_s$  of -0.462,  $p = 0.041$  was found for "item 3" (i.e. I would get nervous if I had a concern about a H&S issue and the management was absent) and "years of teaching experience". In calculating confidence intervals for rho, based on the Fisher  $r$ -to- $z$  transformation, given an  $r_s = -0.462$  for  $n=31$ , 95% CI for  $r_s$  is -0.701 to -0.129.

We can therefore say that surveyed tutors with more years of teaching experience tended to feel less anxious if they had a concern about an OHS issue and the management was absent.

#### Hypothesis #4

In examining whether tutors with more positive attitudes to OHS (i.e. higher scores on the 9-item attitude scale) would display greater "OHS knowledge" (i.e. higher scores on the 9-item knowledge scale), tutors' responses to the 9-item (compositional) attitude scale were recoded as "low" (1-15), "average" (16-30) and "high" (31-45) and a Mann-Whitney U test was carried out. The test showed no significant differences ( $p=0.21$ ) in the median knowledge scores between tutors with "average" and tutors with "high" attitudes scores (there were no "low" scores). As the median knowledge scores of these two attitude categories were the same, hypothesis four was rejected.

The only significant predictor of "OHS knowledge" in this study was the "hours of OHS training" tutors had received. [(R<sup>2</sup> 0.76, B=0.30, SE=0.04;  $p=0.00$ ). for  $n=13$ , 95% CI for B=0.20 to 0.38.] No significant contributions to OHS knowledge were made by "vocational area of expertise", "years of teaching experience" and "attitudes to OHS".

#### Discussion

The study provided valuable insights into the levels of knowledge and attitudes regarding OHS held by the sampled tutors. It was encouraging to see that tutors of all four departments that took part in the study displayed highly positive attitudes to OHS in general. It is widely accepted [13] that theoretical OHS knowledge is not sufficient on its own for preventing accidents, assessing risks and recognising potential hazards and that positive attitudes/behaviours are essential elements of creating a prevention culture. In relation to this, there are two findings of the item-by-item analysis of the attitude scale that I believe worth some attention.

The first relates to the indication that tutors with more years of teaching experience would feel less anxious if they had an OHS concern and the management was absent. Although we cannot interpret this as a sign that more experienced tutors feel more confident to deal with OHS concerns or that they are more careless in their approach to OHS, I believe this is an issue worth looking into it in more detail. The second finding relates to item 2 (i.e. it is important that teachers lift desks/heavy items safely), the item that attracted the least favourable attitude score.

Although 80% of the sampled tutors had correctly identified the correct posture for lifting heavy items, they rated the importance of lifting heavy loads safely lower than any of the other items on the attitude scale. Again we cannot make any interpretations of this 'contradiction', but I believe it points us to the need to examine vocational tutors' processes of applying theoretical OHS knowledge to safe practices and their disposition to act according to their OHS attitudes [14].

Moving onto discussing the levels of OHS knowledge the sampled tutors demonstrated, the fact that no significant differences were observed in the mean scores of tutors of different vocational backgrounds prompts us to re-think before making any claims that certain vocational areas may be in need of OHS training/education or that other areas of vocational expertise could be excluded from such initiatives on the assumption that they are 'already' familiar with the basic principles of OHS risk assessment and safe behaviours. We saw the Art tutors scoring better than tutors teaching in the Health Care department and it was the tutors of the Auto Mechanics department that scored below the scale average score. If an OHS training programme is to be implemented at the Institute, a needs assessment needs to be carried out in order to serve as a guide based on which specific OHS training/educational activities can be designed, implemented and evaluated responding in this way to the trainees' and the Institutes' specific needs. Based solely on the finding of the study, it seems that certain tutors may benefit from further training on the different types of fires and the choice of fire extinguishers, on earthquake/fire evacuation procedures and on lifting/handling heavy loads. The fact that "hours of OHS training" was for the sampled tutors the sole significant predictor of knowledge among the other three predictors (i.e. "vocational area of expertise", "years of teaching experience" and "attitudes to OHS") reinforces the belief that OHS education/training can strengthen the creation of a prevention culture and improve the quality of work [13]. This in its turn opens up for discussion issues that are beyond the scope of this paper, such as the nature or type of training/education needed, its length and levels of engagements (for example lectures or practical approaches) and finally OHS training/education effectiveness measurement.

The main limitation of the study relates to sampling issues. As the study aimed at collecting data that were representative of the four vocational areas taking part, the sample cannot be considered to be representative of the total tutor population at the college ( $N\approx 280$ ). Due to under-sampling, the 44% return rate secured 31 questionnaires rather than the required 50 that could



give us a representative result for the total population of the four departments taking part in the study (N=71). The large numbers of missing values to key (background characteristic) questions hypothesized to be correlates of tutors' increased knowledge of OHS and attitudes to OHS, further restricted the power of the sample. Indicatively, I report: For the t-test performed, for alpha 0.05 and the found effect size (d) of 0.20, a statistical power level of 0.07 was yielded for n=31. (for an 0.80 observed power, the sample would have to be 310 per group). For the single linear regression and the R<sup>2</sup> of 0.76 found, the observed power was 0.90.

If the study is to be carried out at a larger scale with the intention to generalize the findings, and a multiple regression is to be run in determining significant predictors of OHS knowledge, then particular attention needs to be paid to sample size estimations and the ratio of observations to independent variables. This, according to Bartlett, Korlik and Higgins [9], should not fall below five. Similarly, the same ratio needs to be applied to factor analysis with the additional criterion that at least 100 observations are needed in order to carry out factor analysis.

Regarding the development of the OHS knowledge scale, and its initial aim to cover a diverse area of knowledge in a small amount of items, it is debatable whether the scale needs to be redesigned to cover only one or two areas of OHS or whether the existing scale can be used to cover a diverse area of knowledge at the expense of compromising its homogeneity. Further, if we are to take into account item difficulty and item discrimination indices, the debate will revolve around issues of whether some items that display an anomaly (i.e. low rpb or low P value) should be excluded when they form an essential part of OHS knowledge, for example the question about the use of black-labeled fire extinguishers. Decisions about the homogeneity of the scale and its length will have an impact on issues of establishing internal consistency of the items of the scale [15].

Moving beyond issues of item analysis and internal consistency, if the stability and concurrent validity of both scales developed in this study are to be assessed, then the use of external criteria (for example a test-retest and/or looking at the correlation of the scale with existing measures of OHS knowledge and attitudes) may be necessary before carrying out a study at a larger scale using the two measuring instruments presented in this paper.

## Conclusion

The main finding of the pilot study reported in this paper is that





for the surveyed tutors teaching at a private Institute of Vocational Training (Ιδιωτικό Ινστιτούτο Επαγγελματικής Κατάρτισης - ΙΙΕΚ) in Northern Greece, "hours of OHS training" was the sole significant predictor of OHS knowledge contributing for 76% (more or less) of the explained variance. No significant contributions to OHS knowledge were made by "vocational area of expertise", "years of teaching experience" and "attitudes to OHS". The study provided valuable insights into the levels of knowledge and attitudes regarding OHS held by the surveyed tutors and it can serve as a basis for further research and/or an OHS training needs assessment at the Institute in which the study took place.

## References

1. INE-GSEE. Institute of Labour of the General Confederation of Employees in Greece. Annual Reports 2007-2008. Athens: INE-GSEE; 2007. (In Greek)
2. PD (Presidential Decree) 17/1996 (Greece). Measures for improving occupational health and safety to comply to guidance 89/391/EU and 91/383/EU; 1996. (in Greek).
3. EKA. Work & Safety in Europe Report. Jan. 2008. Athens: EKA; 2008a.
4. EASHW (European Agency for Safety and Health at Work). Mainstreaming occupational safety and health into university education. Luxembourg: Publications Office of the European Union; 2010.
5. Aydemir N. Developing two different measures for assessing knowledge of and attitudes toward epilepsy for the Turkish population. *Epilepsy & Behavior*. 2008;12: 84–89.
6. PD (Presidential Decree) 17/1996 (Greece). Minimum health and safety specifications of work areas to comply with guidance 89/654/EU; 1996. (in Greek).
7. EKA. An introduction to the existing occupational health and safety activities in Greece: National Report; 2008b:online (Retrieved April 12, 2011 from <http://dforsa.vubp.cz/files/vysledky/recko.doc>)
8. Nunnally JC. *Psychometric theory*. 2nd ed. New York: McGraw-Hill; 1998.
9. Bartlett. JE., Korlik. JW. & Higgins CC. Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance Journal*. 2001;19:43-50.
10. Kehoe J. Basic item analysis for multiple-choice tests. *Practical Assessment, Research & Evaluation*. 1995;4:online. (Retrieved April 12, 2011 from <http://PAREonline.net/getvn.asp?v=4&n=10>)
11. Gross R. *Psychology: The science of mind and behaviour*. 3rd ed. London: Hodder & Stoughton; 1996.
12. Jamieson S. Likert scales: how to (ab)use them. *Medical Education*. 2004;38:1217–1218.
13. EASHW (European Agency for Safety and Health at Work). Mainstreaming occupational safety and health into education. Luxembourg: Publications Office of the European Union; 2004.
14. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1999;50:179-211.
15. Streiner DL. & Norman GR. *Health Measurement Scales A Practical Guide to Their Development and Use*. New York: Oxford University Press; 1989.

## Appendix I

(The initial 14-item knowledge scale administered to subjects. Following item/factor analysis, items in italics were omitted from statistical analysis)

	Statements	True	False	Not sure
1	People who work in offices should NOT worry about Health & Safety.	True	<b>False</b>	I am not sure
2	You should NOT use the lift in the following circumstances: Earthquake evacuation, fire evacuation, fire drill evacuation.	<b>True</b>	False	I am not sure
3	A fire has 3 elements: Heat, fuel and oxygen. You can prevent or extinguish a fire by removing ANY one of them. (the "fire triangle").	<b>True</b>	False	I am not sure
4	Burning paper, wood and textiles are classified as 'A type' of fires. RED-LABELED fire extinguishers CAN be used on them.	<b>True</b>	False	I am not sure
5	RED-LABELED fire extinguishers CAN also be used on fires on electrical appliances/wiring, flammable liquids and metals.	True	<b>False</b>	I am not sure
6	Central heating systems, portable generators and engines running in a badly ventilated room can ALL cause carbon monoxide poisoning.	<b>True</b>	False	I am not sure
7	In the classroom, unclean/poorly maintained air-conditioning systems can cause a number of health problems (bacterial Legionnaire disease, allergies, the 'air conditioning fever').	<b>True</b>	False	I am not sure
	<i>During the summer months the maximum temperature variation between the temperature outside and the classroom temperature should NOT exceed 5° C (for example, if the outside temperature is 42° C, then the classroom temperature should NOT be below 37 ° C)</i>	<i>True</i>	<i>False</i>	<i>I am not sure</i>
	<i>Two of the four most common causes of workplace accidents are: 1) Slips and trips and 2) manual handling (lifting, carrying, holding)</i>	<i>True</i>	<i>False</i>	<i>I am not sure</i>
	<i>If teachers see spilled liquid on the floor, they should 1<sup>st</sup>) walk around it and 2<sup>nd</sup>) return later on to see if cleaning staff have dealt with it.</i>	<i>True</i>	<i>False</i>	<i>I am not sure</i>
	<i>The 1<sup>st</sup>) standing posture is the CORRECT one. You should never bend over without bending your knees.</i> 	<i>True</i>	<i>False</i>	<i>I am not sure</i>
12	The 1 <sup>st</sup> ) position of handling heavy items is the CORRECT one. You should always hold/carry heavy items away from your body. 	True	<b>False</b>	I am not sure
13	The 2 <sup>nd</sup> ) position of lifting heavy items is the CORRECT one. You should always bend your knees and hips and not your waist. 	<b>True</b>	False	I am not sure
	<i>Information signs are green in colour, have a white edging and are square in shape. The 1<sup>st</sup>) sign is an information sign.</i> 	<i>True</i>	<i>False</i>	<i>I am not sure</i>

## Appendix II

(The initial 14-item attitude scale administered to subjects. Following item/factor analysis, items in italics were omitted from statistical analysis)

	Statements	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
1	It pleases me to see Colleges investing in OHS training/education for staff	5	4	3	2	1
2	It is important that teachers lift desks/heavy items safely	5	4	3	2	1
3	I would get nervous if I had a concern about a H&S issue and the management was absent	5	4	3	2	1
4	All tutors should be able to name at least one first aider at the College	5	4	3	2	1
5	All accidents, no matter how small, should be reported	5	4	3	2	1
	<i>It is important that all teachers know what to do in an emergency</i>	5	4	3	2	1
	<i>It is my responsibility to know what to do in an emergency</i>	5	4	3	2	1
	<i>If I saw a colleague putting staff/students at risk, I would say something to him/her</i>	5	4	3	2	1
9	OHS is an important issue not just for the management, but also for all employees	5	4	3	2	1
10	My estimation of teachers who promote OHS in the College is high	5	4	3	2	1
11	It would please me to get more involved in the promotion of OHS measures at the College	5	4	3	2	1
12	It is important that OHS inspections are carried out at Colleges by an external body regularly	5	4	3	2	1
	<i>It is wrong to say that OHS measures are bureaucratic to implement</i>	5	4	3	2	1
	<i>OHS measures are cost effective for an organization in the long run</i>	5	4	3	2	1

### Part 3 of the questionnaire

1. Have you received any OHS training (at any stage in your life/career)? YES  NO

If YES, how many hours have you received? .....

1-3 hours  4-6 hours  7-10 hours  Cannot remember

2. In which department do you teach? .....

3. How many years of paid teaching experience do you have? (please do **not** count any voluntary work and practical placements as a trainee-student teacher) .....