

STANDARD OF COMPETENCE FOR LECTURERS AND TRAINERS IN OCCUPATIONAL SAFETY AND HEALTH (OSH) – A RESEARCH BASED REQUIREMENT PROFILE

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1 INTRODUCTION

The “European Network Education and Training in Occupational Safety and Health” (ENETOSH) is a special communication platform for sharing information and experience on education and training in European and international OSH matters. The network was set up with the help of the European LEONARDO education programme and is in line with the European Community Strategy for Health and Safety at Work 2007-2012.

The aim of ENETOSH is to bring about a significant improvement in the quality of education and training in occupational safety and health and to provide long-term support for measures to mainstream safety and health into the education system. The creation of ENETOSH has provided a network for knowledge-sharing between the OSH sphere and education experts, covering all levels of the education system. The network is aimed at both teaching staff and persons involved in national and international policy-making in the realms of OSH and education.

ENETOSH has developed a standard of competence for lecturers and trainers in occupational safety and health working in the area of initial vocational education and training and in the area of continuing vocational education and training.

The ENETOSH standard covers competencies both in educational methods and in the field of occupational safety and health. The standard comprises four competence fields: (1) train the trainer, (2) basic principles of occupational safety and health, (3) occupational safety and health management and (4) workplace health management. The standard was developed on the basis of two different approaches – an experience-led, intuitive method (Phase I) and a task-analysis and empirical method (Phase II).

The ENETOSH EU project (Phase I) set up four working groups which prepared the first version of the standard. Beforehand, the project group had drafted background documents on the topic of education standards and the competencies required in the field of safety and health (Ylikoski, 2006; Swuste, 2006; Äyräväinen, Bollmann, Ylikoski, Swuste, 2006). The results of an empirical requirement analysis regarding the train-the-trainer competence were used (Koch, Strobel, Kici, & Westhoff, 2009; adapted by Turek, 2010) and developed further in the project. The field-related competencies were developed on the basis of the experience of experts from the ten European countries represented in the project. The development work drew on the categories and descriptors set out in the European Qualifications Framework (EQF) (European Parliament and Council, 2008; Bollmann & Windemuth, 2011). The ENETOSH standard has been recognised by 14 institutions from ten European countries

and is available in eleven languages. Work on developing the ENETOSH standard further began in April 2008 (Phase II).

This development work is being done on the basis of the Critical Incident Technique (CIT). Critical incidents are work situations that allow a clear distinction between high performers and low performers on the basis of their behaviour at work (Flanagan, 1954). The necessary data is being collected with the aid of the Task Analysis Tool (TAToo©). The survey asks participants to cite critical teaching/learning situations and successful responses displayed by a lecturer or trainer in these situations. These descriptions are then used to identify the competencies behind the response in a three-phase inductive procedure (TAToo, Koch, 2010).

Standards of competence should always be assessed to determine whether they actually reflect the requirements in their specific area of application. Only where there is a high match, the results can be used successfully for later training or as a basis for certification (SIOP, 2003; DIN 33430, 2002).

2 TASK ANALYSIS BY TATOO©

2.1 Participants and setting

In three consecutive studies the competence fields workplace health management, OSH management, basic principles of occupational safety and health (OSH basics) were developed further. In total 74 people from 14 countries participated in the validation studies. On average more than 80% of these were employed as lecturers or trainers and had worked in this sector for more than five years (97.3%). Participants for the studies were recruited via the ENETOSH-network. E-mails were sent to members of ENETOSH to invite people from the certain countries to participate in the surveys and later to keep them informed about the progress of the further development in the various fields. These multipliers recruited a total of $N_{WHM}=8$ people who participated in the further development of the workplace health management field of competence in study 1, $N_{OSHM}=36$ people in study 2 on the OSH management field and $N_{OSHB}=30$ people in study 3 on the OSH basics field to participate voluntarily in the studies as convenience samples. Table 1 shows the demographic composition of the samples in studies 1 to 3.

Table 1: Participants in the studies

	Study 1	Study 2	Study 3
	Workplace health management	OSH management	OSH basics
<i>N</i>	8 ^a	36 ^a	30 ^a
Age			
<i>M</i>	46	49	51
Status			
instructor and trainer	100%	61%	83%
Country			
Finland	13%	14%	57%
Netherlands	12%	6%	—
Austria	25%	14%	—
Switzerland	—	6%	7%
Denmark	—	—	3%

Belgium	—	3%	—
Macedonia (FYROM)	—	6%	—
Czech Republic	—	14%	—
Poland	—	—	—
United Kingdom	—	3%	—
Italy	—	—	3%
Portugal	—	—	13%
Turkey	—	8%	—
Germany	50%	28%	17%
Job Experience			
≥ 5 years	100%	92%	100%

Notes. ^aconvenience sampling via ENETOSH-multipliers

2.2 Data collection

The Task-Analysis-Tools (TAToo, Koch, 2010) comprises three tools: Tool 1 – collect, Tool 2 – group and Tool 3 – assess. For each study all three steps were carried out. Table 2 summarises the methods used in the studies.

Step 1 – collect. The first step in the task analysis was to collect the data, which was done by means of structured interviews and questionnaires. This was done on the basis of Tool 1 with adjustments made for each field of competence and the objective. The interviews and questionnaires were divided into three parts. In the first one, the participants were asked to give a brief description of the objectives, tasks and responsibilities of a lecturer or trainer in each field of competence. In the second part, they had to describe the knowledge, skills and abilities (KSA, McCormick, Jeanneret, & Mecham, 1972) necessary for their job. They were asked to specify the necessary qualification, expertise, methodological knowledge, technical knowledge, IT knowledge and other knowledge. Afterwards, in the third step, the participants had to describe work situations that they had experienced or observed themselves and that were successfully managed by a lecturer or trainer in each field of competence. They were asked to describe how the situations came about, what exactly happened, what the instructor or trainer did in the situation and what the outcome was (critical incident report; Anderson & Wilson, 1997). They were asked to describe two situations.

After the data had been collected, the participants had an opportunity to give open feedback on the validation study or the questionnaire/interview. They were also informed about the steps described below.

Step 2 – group. The authors used a guideline provided in Tool 2 to group the data collected in the first step. To this end, the objectives and tasks described were put into a list, the descriptions were standardised and any redundancies removed – without foregoing any of the points made. The qualifications and knowledge cited by the participants were also put into a list. The requirements were classified in accordance with the questions in the questionnaire, e.g. as qualifications or expertise. The lecturers' and trainers' behaviour in the critical incidents outlined by the participants was extracted and put into a list. Again, as with the qualifications and knowledge, redundancies were removed and the descriptions standardised. The behaviour descriptions were then grouped based on similarity. The key question was: What requirement does a lecturer or trainer meet when he or she behaves in a certain way? The requirement categories were then given names that reflected as closely as possible the behaviour descriptions in them. It was also ensured that the terms were similar across the different fields of competence. This formed a basis upon which to compare the fields of competence with one another.

Step 3 – assess. The results of step 2 were integrated into a questionnaire template taken from TAToo Tool 3. An online version of the questionnaire was created and the persons who had participated in step 1 were invited by e-mail to answer the online questionnaire. Their task was to assess the importance of each requirement and each type of behaviour. The questionnaire consisted of the following three sections: (1) assessment of knowledge, skills and abilities (KSA, McCormick, et al. 1972), (2) assessment of behavioural requirements (CIT) and (3) questions concerning whether the results covered all aspects (completeness) and how valid they were. Sections (1) and (2) included the following assessment criteria: (a) importance of the requirement or type of behaviour for a lecturer’s or trainer’s success in the respective field of competence, (b) trainability of the requirement, (c) degree to which a requirement can be compensated for by other personal attributes. The respondents assessed the importance of the requirements and types of behaviour on the basis of the following 5-point rating scale *1 = not important, 2 = less important, 3 = nice to have, 4 = very important* und *5 = essential*. Trainability and compensability were assessed on the basis of a four-point rating scale, ranging from *1 = no* to *4 = yes*.

The level of completeness was assessed by asking respondents to indicate a percentage range according to the extent to which the work of a lecturer or trainer in the respective field of competence was reflected in the requirements. The respondents were also able to provide open feedback. The four percentage ranges used for this assessment were *0-25%, 26-50%, 51-75%* and *76-100%*.

Table 2. Overview of methods

	Tool 1 – collect	Tool 2 – group	Tool 3 – assess
Content	<ul style="list-style-type: none"> – Requesting tasks for each competence field – Requesting knowledge, skills and abilities (KSA) – Requesting present and future critical incidents (situation and behaviour) relevant for the competence field 	<ul style="list-style-type: none"> – Grouping of the data from Tool 1 – collect into requirement profiles 	<ul style="list-style-type: none"> – Assessment of each requirement and observable behaviour description according to its importance for successful work, its trainability and compensability – Concluding evaluation of the results
Method	<ul style="list-style-type: none"> – Online-questionnaire and telephone-interview guideline in English and German 	<ul style="list-style-type: none"> – Researcher carried out the grouping process 	<ul style="list-style-type: none"> – Online-questionnaire in English and German
Participants	<ul style="list-style-type: none"> – Trainers with OSH experience – Lecturers with OSH experience 	<ul style="list-style-type: none"> – Researchers of Dresden University of Technology 	<ul style="list-style-type: none"> – Trainers with OSH experience – Lecturers with OSH experience

3. RESULTS

3.1 Requirement profile

Table 3 gives an overview of the results of the task analysis for the workplace health management, OSH management and OSH basics fields of competence. The final requirement profiles were drawn up on the basis of the importance assessments carried out in the third step. Requirements and the descriptions operationalising them were included in the requirement profile if the participants gave them a median importance rating of at least 3 = *nice to have*. The requirement profile produced for each field of competence in this manner contains four to six

requirements derived from knowledge, skills and abilities and seven to eleven derived from critical incidents. Each requirement was operationalised based on specific and observable descriptions, of which there were two to 21 for each requirement. The table also contains one requirement and one behaviour description as an example for each field of competence. In addition, the requirement profiles included the median importance rating for each requirement and each description. Figure 1 contains an extract from the requirement profile of OSH basics.

Table 3. Resulting requirement profile for the analysed fields of competence

	<i>Number of requirements derived from</i>		<i>Observable description per requirement within the standard</i>
	KSA ^a	CI ^b	
<i>Workplace health management</i>	4	10	2 to 14 behavioural descriptions
Example	Convincing participants of WHM		Visualizing problems at enterprises by pictures, graphic charts
<i>OSH management</i>	6	11	2 to 21 behavioural descriptions
Example	Let the participants take an active part in OSH management training		Putting themselves in the position of a supervisor, a colleague or person who created the problem to the participant
<i>OSH basics</i>	5	7	4 to 9 behavioural descriptions
Example	Teaching principles and a basic understanding of safety and health		Use current accidents to debate with the participants on what should have been done to prevent them

Notes .^a KSA=Knowledge, Skills, Abilities ^b CI=Critical Incidents

Figure 1. Extract from the behaviour-related requirements for teaching OSH basics

Behaviour-related requirements

(skills and wider competencies)

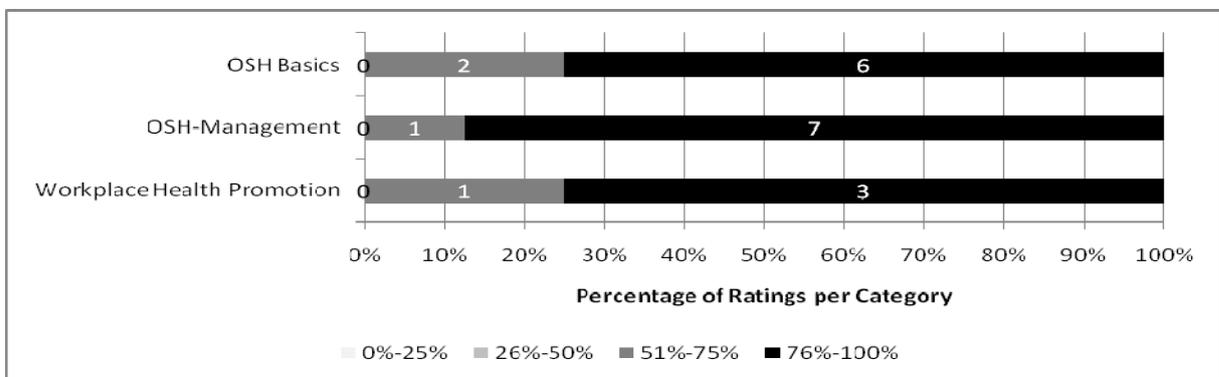
Teach principles and a basic understanding of safety & health	Rating
Explain that a proper investigation is important to find out the "real reasons" behind obvious facts and how to avoid incidents in future	very important
Explain that it is necessary for the employee to be truly committed to improving occupational safety and health	very important
Assess participants' training requirements	quite important
Use a variety of methods to teach occupational safety and health	quite important
Enable participants to understand the main mechanisms of occupational health risks and to understand how to act accordingly	quite important
Use examples of recent accidents to discuss with participants what should have been done to prevent them	quite important
Discuss the role of human error together with violations of safety regulations as the main cause of accidents	quite important
Explain that it is important to talk to people who have been involved in accidents	quite important
Explain that safety and health issues are concern for management and that they influence decision making and capital investment within organisation	quite important

The ENETOSH standard of competence describes the requirements related to the knowledge and the behaviour of lecturers and trainers in occupational safety and health. According to the example, for each field of competence there is an overview of the knowledge and the behaviour-related requirements (skills and wider competencies). In addition there are corresponding checklists for the practical use. Each competence field is assigned to one of the performance levels of the EQF.

3.2 Validity of the requirement profiles

Using a rating scale of four categories, ranging from 0-25% to 76-100%, the respondents assessed the degree to which the requirement profiles for the three fields of competence matched their own work as a lecturer or trainer. Figure 2 shows the results of that assessment for each field of competence. In the three studies, none of the respondents assessed this match as being lower than 51%. The majority of them assessed the match as being 76-100% for each field of competence – the most positive rating category.

Figure 2: Ratings of the validity of the requirement profiles



4. DISCUSSION

The presented studies are a first attempt to proof the validity of the ENETOSH standard of competence. The standard provides a common, scientifically proven basis for quality-assuring lecturers and trainers in OSH in Europe. The complete standard and additional information is available online (http://enetosh.net/webcom/show_page.php/_c-134/_nr-4/i.html). The ENETOSH standard makes it possible to select suitable staff for the required teaching tasks, to develop training content that is similar throughout Europe and to set up a system of certifying the people involved, if it makes sense to do so for lecturers and trainers (Swuste, 2011). Nevertheless the conclusions of the studies were limited with view of the participants and the method for validation. Up to now, only an internal criterion could be used for validation. Future studies have to investigate external criteria e.g. predictive validity for the success of training in the future work. Additionally, the trainees should be included and asked for the validity of the standard. According to the science-practice-character of the studies for future research, sampling should be done according to parallel criteria resulting in comparable compositions.

It is not, however, the ENETOSH standard itself that guarantees quality in safety and health education and training. Quality training depends on the sensitivity of lecturers and trainers towards their own behaviour in each specific situation and their ability to reflect on their actions.

REFERENCES

- Anderson, L., & Wilson, S. (1997). Critical incident technique. In D. L. Whetzel & G. R. Wheaton (Eds.), *Applied measurement methods in industrial psychology* (pp. 89-112). Palo Alto, CA: Davis-Black.
- Äyräväinen, A.; Bollmann, U.; Ylikoski, M., & Swuste, P. (2006). *Standards for the qualification of teachers and trainers in OSH*, ENETOSH Basic paper.
- Bollmann, U. & Windemuth, E. (2011). Standards in education and training in safety and health. IAG-report, Dresden
- DIN Deutsches Institut für Normung e.V. (2002). *DIN 33430 – Anforderungen an Verfahren und deren Einsatz bei berufsbezogenen Eignungsbeurteilungen* [Requirements for Proficiency Assessment Procedures and their Implementation]. Berlin: Beuth.
- European Parliament and Council (2008). *Recommendation of the European Parliament and of the Council 23 April 2008 on the establishment of the European Qualifications Framework for lifelong learning (2008/C 111/01)*, http://ec.europa.eu/education/lifelong-learning-policy/doc44_de.htm.
- Flanagan, J.C. (1954). The critical incident technique. *Psychological Bulletin*, 51, 327-358.
- Koch, A. (2010). *Die Task-Analysis-Tools (TAToo). Entwicklung, empirische und praktische Prüfungen eines Instrumentes für Anforderungsanalysen*. [The Task-Analysis-Tools (TAToo). Development, empirical and practical assessments of an instrument for job analyses.] (Doctoral Dissertation, TU Dresden, Germany). Retrieved from <http://nbn-resolving.de/urn:nbn:de:bsz:14-qucosa-39031>.
- Koch, A., Strobel, A., Kici, G., & Westhoff, K. (2009). Quality of the critical incident technique in practice: Interrater reliability and user's acceptance under real conditions, *Psychology Science Quarterly*, 51, 3- 15.
- McCormick, E.J., Jeanneret, P.R., & Mecham, R. C. (1972). A study of job characteristics and job dimensions as based on the Position Analysis Questionnaire (PAQ). *Journal of Applied Psychology*, 56, 347-367.
- Schuler, H. (2006). Arbeits- und Anforderungsanalyse [Job analysis]. In H. Schuler (Hrsg.), *Lehrbuch der Personalpsychologie* (S. 45-68). Göttingen: Hogrefe.
- Society for Industrial and Organizational Psychology – SIOP (2003). *Principles for the Validation and Use of Personnel Selection Procedures* (4th Edition). Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.127.5786&rep=rep1&type=pdf>.
- Swuste, P. (2011). Teachers and trainers of occupational safety courses, is certification necessary? In U. Bollmann & E. Windemuth (Eds.), *Standards in education and training in safety and health*. IAG-report, Dresden.

Turek, M. (2010). *Ermittlung eines Anforderungsprofils für Trainer und Dozenten im Arbeitsschutz mit Hilfe der 360° Analyse* [Ascertain a requirement profile for lecturers and trainers in occupational safety with the help of the 360° analysis] (unpublished diploma thesis). TU Dresden, Germany.

Ylikoski, M. (2006). *Challenges of the changing world of work for the competencies in OSH*, ENETOSH-Factsheet No. 1; www.enetosh.net.