PEDAGOGICAL COMPETENCE MODEL FOR WORK SAFETY SPECIALISTS

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Abstract. The quality of the training in work safety issues provided to staff considerably affects work safety, which in its turn depends on the pedagogical competence of the work safety specialists. The problem nowadays is that competence as a very capacious conception has the tendency to expand its structure, usage in various fields of human action. The research describes four approaches towards competence. A bioecological model (Bronfenbrenner et al) has been selected as the methodological basis. A pedagogical competence model for work safety specialists has been developed on the basis of the acquired findings, the European Qualifications Framework (EQF) and the authors` research in competences.

Keywords: competence, competence approaches, model of pedagogical competence.

Introduction

The interaction between a person and the environment takes place both in work and in education. Therefore, a bioecological model (Bronfenbrenner etc.) has been chosen as a methodological basis for the research in order to structure the research in eco- and chronosystems [1; 2].

The authors` long term observations have proved that instructing staff on work safety issues in many cases are formal and pedagogical competence of work safety specialists is not always sufficient for the implementation of high-quality teaching work in the field of work safety.

The topicality of the research on the macrosystem level is determined by the progress towards *education for sustainable development*, implementation of the *European Qualifications Framework* (EQF), and diversity as suggests the notion of competence in the 21st century. The importance to carry out the research in Latvia is underlined by the necessity to undergo recertification of work safety specialists and to improve their appropriate professional development.

The research aims: to identify and analyse the competence approaches and to develop the model of pedagogical competence for work safety specialists.

Materials and methods

The descriptions of the notion of competence suggested by the authors, the previous studies on the significance of competence [3] and the pillars of education [2], the UNESCO documents on education for sustainable development [4], the documents on the EQF [5], as well as surveys and interviews provided by students and work safety specialists have been used in the research. Respondents: 23 specialists who have already obtained education appropriate to the EQF Level 6 in different study programs and have 1 ... 20 years of work experience. All respondents are currently studying at the EQF Level 6 in the appropriate study programme in *Labour Safety.* (Unfortunately, scientific articles and documents have inconsistent usage of the terms *competencies and competence*. The article keeps the terminology found in the sources used in it, but in the authors' research the term *pedagogical competence* includes knowledge, skills and competencies.)

Competence. The problem we face nowadays is that competence as a very capacious conception has the tendency to expand its structure, usage in various fields of human action. The competence components such as knowledge, skills, attitudes, abilities, will power, values, motivation, understanding, experience etc. are examined in various combinations. Theory refers to competence approaches, which adequately determine the inclusion of a definite component into the competence conception. Four approaches towards competence are typical nowadays [3; 6].

The first approach deals with the competence as a result in the teaching/learning environment. The creative usage of knowledge and skills with the tendency to be related to real life situations are measured. The tendency to explain the category of competence itself through its demonstration in action and determination of the outcomes are explained by the development of post-modern society [7]. The approach emphasizes the demonstration of competence in the action focused on *the outcomes of the learning process* [6], as well as interconnection between knowledge, skills and abilities and their practical application [8].

Kennedy, Hyland and Ryan [9] describe learning outcomes as the expected achievement in knowledge, comprehension and/or the ability to demonstrate them at the end of the learning process. This is the way the EQF are developed; it contains the following definition of competence [5]: *'Competence' means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy.*

The descriptions of knowledge, skills and competencies provided by the EQF focus on the outcomes and their demonstration. The emphasis is tricky as it is effective to follow and focus only on one aspect and it is difficult to reconcile with other approaches, but the lack of balance leads to significant deformations decades long, which leave a profound effect on several generations. Therefore, apart from putting the emphasis on the outcome there must be a system, which equally makes us assess the importance of the competence formation and development processes, as people are creative and reflective, and it may not always be apparent in the demonstration of outcomes.

The second approach refers to professional activities and stresses qualitative changes in the competence components. In the framework of this approach it is proposed that a professional aspires to reach higher quality standards, which are determined by a company. This approach apart from knowledge and skills recognizes attitude, experience, willpower and emotional intelligence as competence components. Contributions made by individuals in a competent action are highlighted [6]. This approach could be relevant to companies because *..it could be used to follow the increase in productivity and efficiency in the workplace* [6].

The third approach comprises the continuous development of the competence components during the lifespan. The developmental tendencies of competence understanding should be linked with the sustainable existence of the earth and the recognition of other cultures, and this aspect should be a starting point in the further researches of competence approaches, kinds, components and definitions. Unlike the first two approaches the competence has been emphasized as an indicator of individual outcomes. Apart from their demonstration the improvement of an appropriate learning program should be carried out. [6]

The fourth approach involves coordinated variations of the first three approaches.

There exist different descriptions of the competence structure. Reetz [10; 11], on the basis of Roth`s studies, as well as according to Achtenhagen (Achtenhagen, 1975) and Meyer (Meyer, 1975), competence is divided into professional (professionelle Kompetenz, berufliche Kompetenz, Sachkompetenz, Fachkompetenz), methodological, social and self-competence [12; 13].

Currently the research on competence allows dividing it into the following partially overlapping types: meta-competence, key competence, social competence, professional competence and self-competence.

Meta competence (communication, self-development, creativity, analysis, problem solving) and the reflection as a binding activity of its core components (cognitive, functional, personal or behavioural, ethical competence) is highlighted, thus showing its connection with the professional competence [14]. Reflection competence means that an individual is able to assess his activities, draw conclusions and also change his decisions.

Key competences are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment [14]. The European Reference Framework sets out eight key competences: 1) Communication in the mother tongue; 2) Communication in foreign languages; 3) Mathematical competence and basic competences in science and technology; 4) Digital competence; 5) Learning to learn; 6) Social and civic competences; 7) Sense of initiative and entrepreneurship; 8) Cultural awareness and expression.

Self-competence shows in an individual`s ability to think independently, discuss, understand oneself, gain knowledge, express one`s point of view and take decisions.

Social competence [16] is characterized by cooperation, communication, competitiveness, self-competence and other features. Nowadays social competence means that the individual can be socially

active and responsible, and possess developed reflection skills. A socially active individual demonstrates his/her competence in a real situation and can enjoy equal cooperation.

Several aspects are important in professional competence: 1) continuous improvement of knowledge and skills that can be done formally, non-formally and informally; 2) sense of responsibility and autonomy in relation to its functions and duties; 3) professional ethics when carrying out their duties and taking decisions; 4) possibilities to be experts in their field of competence; 5) lifelong learning that is needed for the development of a field-related competences and specific competences, as well as for the development of social, meta and key competences, lifelong learning is also a positive factor in maintaining mental health; 6) the ideology of the company is one of the factors that has a professional influence (McIntyre according to Eraut, 1994) [17]; 7) creativity [18], particularly reflection-in-action which takes place at the same time when the activity does, including critical thinking.

Results and discussion

By adapting Bronfenbrenner and his followers` (Hirsto, etc.) *bioecological model of human development* a work safety specialist as a part of the model has been described, which is included in a number of microsystems [1; 2; 19] (Fig. 1).

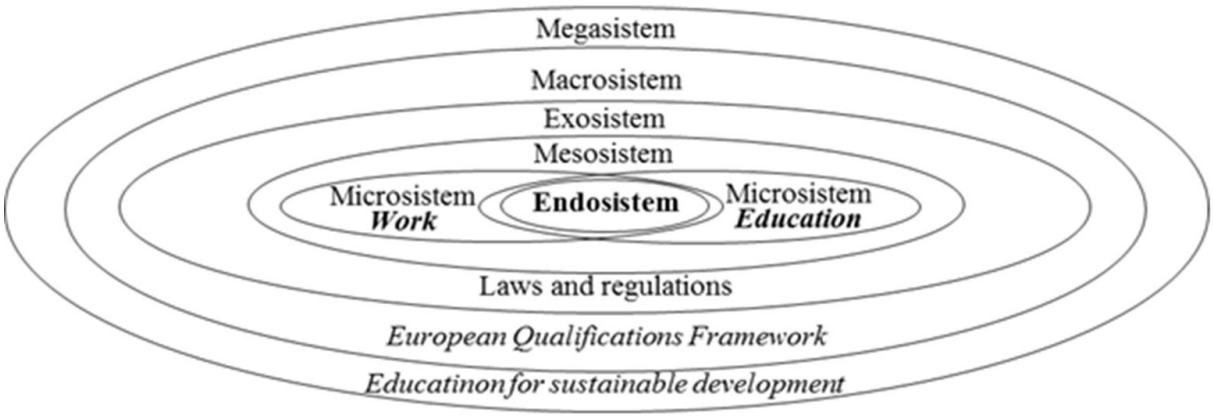

Fig. 1. **Work safety specialist (Endosistem) in bioecological model [1; 19]**

The *microsystem* is the layer closest to the person and contains the structures having direct contact with a work safety specialist (Endosistem). The microsystem encompasses the relationships and interactions that a person has with the immediate surroundings. A person is characterized by his/her endosystem. The psychological level of the endosystem [19] is important in our research and a cognitive system is included in it, together with the emotional system. They in their turn involve knowledge, skills and competencies, and attitudes and reflective ability to reflect. Experience, its formation and development are a substantial component of endosystem in chronosystem.

Pedagogical competence of work safety specialists forms in mesosystem, which includes two microsystems - *Work* and *Education*. Competence forms in formal, informal non-formal (study and professional development programs), as well as in informal education (outside standard educational programs). The process of informal education takes place in unconscious and conscious microsystem *Work* in daily work life and microsystem *Education* (complementary with formal and non-formal education) as well as in daily interaction in other microsystems in leisure time, in community life, that are not shown in the model. The e*xosystem* – this layer defines a larger system in which the person does not function directly. The laws and regulations governing work safety specialist`s education and competence [5; 20] are the main components in the research.

The *macrosystem* and *megasystem* – considered the outermost layers: macrosystem – the EU documents [5], megasystem – the documents of the global scale [4].

The model of learning outcomes has been developed by analysing the EQF (Fig. 2.1). The following explanation has been taken into account when developing the above model: *Similarities may exist between the categories (e.g., the column "competence" includes certain skills; the column 'skills' also contains certain forms of knowledge) but this is in the nature of things* [21].

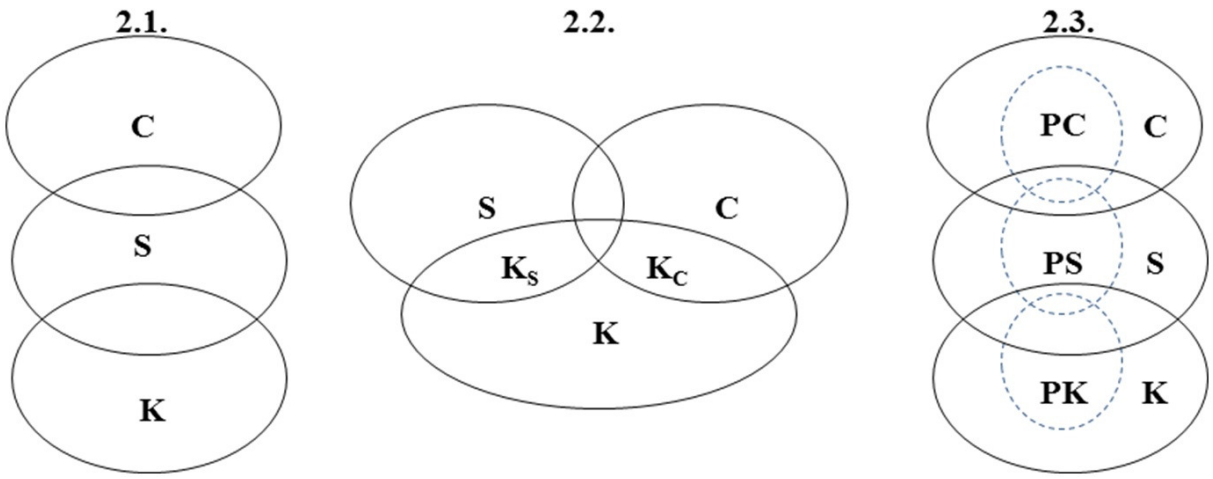

Fig. 2. **Knowledge (K), skills (S) and competencies (C):**
2.1. – in the EQF; 2.2. – in vocational standard PS 0100; 2.3. – pedagogical knowledge (PK), skills (PS) and competencies (PC); K_S – knowledge on the user level, K_C – knowledge on competence level.

The description of knowledge, skills and competencies given in the professional standard of the Republic of Latvia for a senior specialist of work safety [20] is different (Fig. 2.2). The standard includes knowledge on the user level, which actually can be defined as skills. It would be necessary to update the format of the standard according to the EQF [5]. The standard includes knowledge, skills and separate competencies that are attributable to pedagogical competence in the aggregate:

competencies – the ability to organize and implement training on work safety issues for employees, ability to develop work safety instructions and prepare informative materials on work safety measures in the working environment, ability to use information technology to perform his/her activities;

skills – to develop work safety instructions, organize and carry out work safety training on the enterprise level, apply information technology to perform his/her activities;

knowledge on the level of awareness – communication and work psychology, *the user level* – computer science and computer technology in work safety, pedagogy.

Pedagogical knowledge, skills, and competencies form a part of all work safety specialist`s knowledge, skills and competences (Fig. 2.3.).

The survey carried out among the work safety specialists who are studying showed that pedagogical competence is mainly acquired through informal learning. When starting to do the course in *Pedagogy and Work Psychology* the respondents conducted self-assessment of their pedagogical knowledge, skills and competencies in a 4-point scale. Nearly all indicators on pedagogical competence included in the professional standard had the assessment at its lowest rating (mode M_o = 2; median M_e = 2). An exception is knowledge on pedagogy on the user level, which has a slightly higher ranking (mode M_o = 3; median M_e = 3).

The research discovered decrease in unconscious incompetence and increase in conscious incompetence, which is the impact of the studies. After the classes the length of which was 10 hours in *Pedagogy and Work Psychology*, a repeated self-assessment was conducted, this time 13 respondents reduced their self-assessment by at least one point in one of the indicators. The self-assessment rates increased for 10 respondents who had already had pedagogical education or pedagogical experience. The increase of conscious incompetence is significant in building study motivation.

The lowest ratings (M_o = 2; median M_e = 2) were obtained when evaluating indicators that affect informal education. The competence model for work safety specialist has been developed after evaluating scientific literature, documents, survey results and the authors' experience. (Fig. 3). According to the ecological approach pedagogical competence possessed by work safety specialists should provide creation of teaching learning environment, organization of the classes and their conducting, and teaching and learning quality management/assurance. The teaching learning environment includes physical (space, furniture, lighting, air quality, ICT devices etc.), social (activity

leader/lecturer, audience) and information (program instructions, documents, training materials etc.) environment.

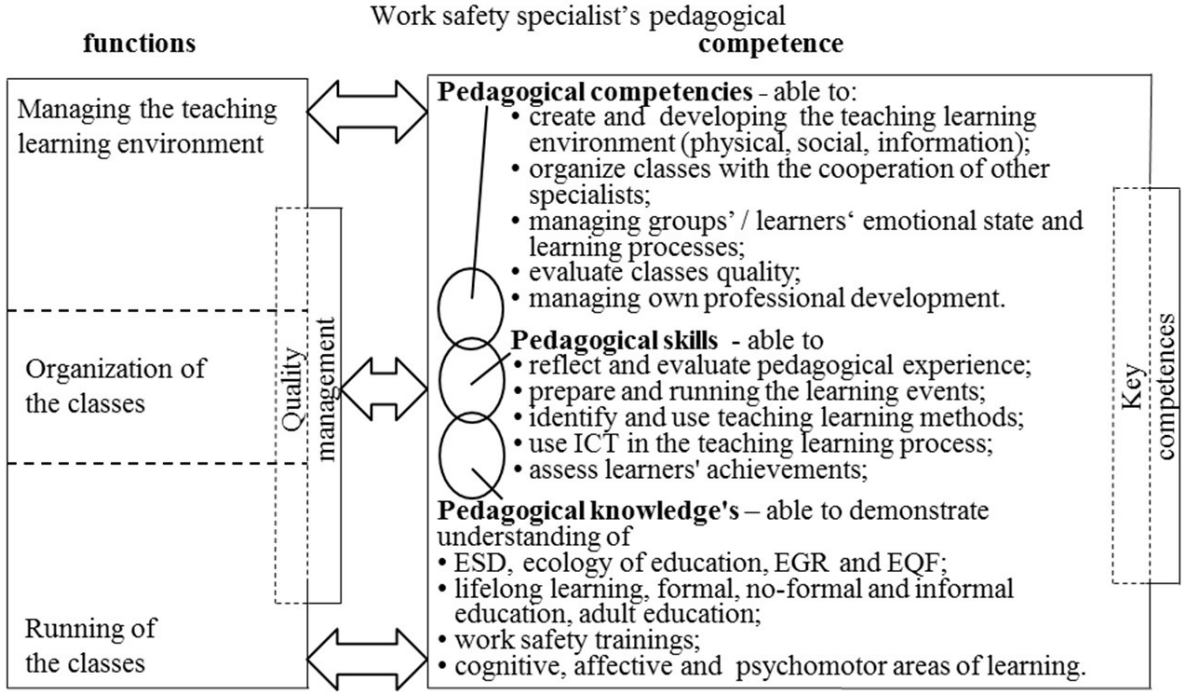

Fig. 3. **Work safety specialist's pedagogical competence model:**
ICT – Information and Communication Technologies; ESD – Education for Sustainable Development; EGR – Education for Global Responsibility; EQF – European Qualifications Framework

Organization of classes and their conducting include formulation of learning outcomes, selection of an activity leader/lecturer, venue and time, formation of a group, management of the condition of the listeners` resources, acquisition of knowledge, skills and competencies.

Teaching learning quality management/assurance includes external assessment (if the classes are conducted by other specialists), internal assessment and evaluation (the compliance of the planned learning outcomes to working environment and legislative documents, and the compliance of actual learning outcomes to the planned ones and the like).

Conclusions

In the identified sources the usage of the terms *competence* and *competencies* and understanding of the corresponding notions is different. Four approaches towards competence are typical nowadays. It is useful to apply the approach, which focuses on the learning outcomes observed in teaching/learning environment, for the development of the model of pedagogical competence for work safety specialists. Comparing the descriptors of the learning outcomes in the EQF and the description of competence in the standard of the Republic of Latvia some differences in the structure have been identified, so it is useful to consider the descriptors included in the standard so that they would comply with the EQF. The research shows that unconscious incompetence is dominant in the self-assessment of the work safety specialists` pedagogical competence, which does not facilitate the development of this competence. A graphical model of work safety specialists' competence has been developed that could be used for the improvement of the development and implementation of the study and professional development programs for those specialists.

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