

## COMPETENCE DEVELOPMENT MODEL FOR OCCUPATIONAL SAFETY SPECIALISTS

**Dace Brizga**

Latvia University of Agriculture

dacebrizga@inbox.lv

**Abstract.** Having worked as an engineer and department manager in a manufacturing company the author of the research faced with the employers' and the employees' formal attitude towards occupational safety, which increases the likelihood of accidents. The occupational safety specialists' competence develops in the educational environment, in the work environment and outside of them. It is essential that identifying and minimising the work environment risk factors will lead to avoiding extreme or unpredictable situations, thus ensuring employees' health and wellness. Self-learning evaluation and reflective practice occur with the sense of the necessity to obtain new skills, which can be described as mastery and it can lead to the solution of the problem regarding formal attitude toward work and civil protection regulations. The aim of the research was to create a competence development model for occupational safety specialists. In the current research the author used reflection of personal experience as well as analysis and evaluation of opinions of the publications relevant to the research context, modelling, unstructured observations, talks, discussions and interviews. As a result of the research the occupational safety specialists' competence development model was created.

**Keywords:** competences development model, occupational safety specialists, professional competence.

### Introduction

Ensuring sustainable development and life-long health and wellness in our modern society is associated with sustainability in education. This can be achieved by improving the educational process, which would enhance the students' and occupational safety specialists' professional competence, because of the need to assess the possibilities to change the attitude towards the observance of work and civil protection regulations. The most characteristic feature of competence is the awareness of values, stability and continuity over a long period of time, which would allow employees to retain their physical and mental resources throughout their lives, in order to be able to fully perform their job obligations, taking into consideration the fact that the retirement age has a tendency to increase. It is essential that students and occupational safety specialists using their own and their colleagues' experience, develop their ability to perform self-assessment and evaluate their own and personnel's teaching and learning outcomes.

In several theories regarding professional competence it has been pointed out what skills are required for doing a job and in what way it has to be done and what competence is needed to achieve a result in a definite environment. In the process of the formation of the occupational safety specialists' professional competence the person's maturity level, experience, creativeness, reflection abilities, motivation, self-regulation and self-assessment play a significant role. In occupational safety specialists' study programmes the students are adults who have already obtained professional education in some other sector of the economy, and as a result the experience that is formed both in action and in perception, creates the ability to assess the processes, situations and to make correct decisions for acting in emergency situations.

### Materials and methods

The author used the following research methods: the reflection of personal experience, study of publications relevant to the research context (more than 200 sources of literature) and evaluation of the conclusions the author arrived at (28 sources) and modelling [1-3]. Unstructured observations, talks and discussions were carried out in the work and educational environment. The interviews were organised at the respondents' work places or places of residence in an informal atmosphere.

The author's experience was gained and reflection obtained:

1. When working as an engineer in a manufacturing company from 1986 to 2007 (the number of employees was from 500 to 1100). When working as a department head from 1994 to 2007 (the number of employees was 20)
2. When working as a teacher from 2009 to 2016 at the LUA, teaching the 1st- 4th year Food Technology Faculty first level professional higher educational programme students (553), Information Technologies Faculty study programme students (1367), Faculty of Economics and

Social Development study programme students (647), Agriculture Faculty study programme students (450), Faculty of Environmental and Civil Engineering Sciences study programmes (631), Faculty of Engineering study programme students (289), Veterinary Medicine Faculty study programme students (95) and second level professional higher educational study programme “Occupational safety” for 208 students. The author took part in designing and updating the programme “Occupational safety”.

The data from the fact stating experiment [4] carried out previously in three universities of Latvia – the Latvia University of Agriculture, the University of Latvia, the Riga Technical University (130 respondents) have been used in the current research.

In the development of the methodology and interpretation of the obtained data, the results of the previous research, in which the author took part, were used [4-13]. The author of the research presented the data of performing the self assessment of students’ competences regarding occupational safety in the conference “Teachers’ Training in the XXI Century: Changes and Perspectives” (XI International Scientific Conference, Šiauliai University, Faculty of Education).

## Results and discussion

Basing on the evaluation of the publications relevant to the context the conclusions the author had arrived at have been used in developing the competence development model of occupational safety specialists.

In personnel management the concept of competence is used to characterise the employee’s behaviour or action models in typical work situations that helps describe and explain how the work should be done and what skills are needed to do it [14; 15], but effective professional activity depends on the individual’s competence, the organisation’s environment and work requirements [16]. The competence of occupational safety specialists includes establishing of a safe work environment and reducing the formation of formal attitude through cooperation with the employers.

Within the context of the research the process-oriented didactic model [1] was significant, since the essence of the model is independent studies having a dialogue with the teacher (both subjects are of equal worth). When designing the competence developing model of occupational safety specialists the author based her views on deductions about modelling [1-3].

At the beginning of the 21st century UNESCO included the fifth pillar – learning to transform oneself and society. Taking into consideration the fact that each individual’s and entire society’s changes in attitudes are significant, the actualisation of this pillar is of particular importance when learning and teaching occupational and civil safety [12].

Living in a globalized and modern world for an individual’s success, which is characterised by a gainful employment, income, health, safety, political participation and social cooperation, it is necessary to have individual competencies and institutional competencies; their application to contribute to collective goals [17]. The structure of competence is made up of knowledge, cognitive skills, attitudes, emotions, values and ethical motivation [18]. The authors of the research [17; 18] connect life skills with the concept of “a successful life” and well-being. In the context of occupational health and safety and civil protection working environment and place and attitude to it play an important role, but a specialist needs to obtain knowledge, skills and acquire competence on how to build the environment and maintain it in accordance with the workplace wellness provisions [9]. To achieve this, it is necessary to acquire:

- The use of interactive tools, since information and communication technologies are the tools by means of which data are obtained for definite purposes and dialogues with the world are made. Competence includes the ability to actively and creatively use language, symbols and texts, apply knowledge and information;
- Interacting in heterogeneous groups, since in a pluralistic society people have to cope with diversity and relate well to others, therefore empathy and social capital are very important. Competence includes the ability to have understanding among people, to work in a team, manage and resolve conflicts;
- Independent action, since each person’s individuality and society’s goals have to be realised in this complicated world; one should also fulfil one’s rights and take responsibilities,

understand different environments and how they function. Competence includes the ability to integrate into a multi-dimensional system, fulfil life goals to live successful lives, to defend one's rights, interests and needs [19].

After having analysed the relevant theoretical research within the context of occupational safety specialists' skills, it should be concluded that the use of interactive means should comply with ergonomic requirements because different elements of the system should form one coherent whole, taking into account the interaction between the individual and the environment, as shown in the research conducted earlier [20].

From the reflection of the author's personal experience and the research carried out previously, it was found out [4] that more than 70% of future occupational safety specialists considered that their knowledge was sufficient enough to ensure the use of appropriate PCs in compliance with ergonomic requirements. Nevertheless, almost 90% of the respondents do not comply with the rules concerning non-harmful healthy work at the computer and 95% of the respondents had symptoms which show evidence of the negative effect of the use of computers on health.

The development and formation of competence for promoting the formation of responsible attitude and for minimising formal attitude towards occupational safety is based on the process which is determined by values and their priorities. People should be motivated to act properly. People's value orientations are determined by a particular time and conditions [21]. The research on occupational safety [10] indicates that the formation of positive attitude of OHS specialists and the management of the organization are affected by the values the importance of which is different for adults in various stages of maturity.

Analysing competence, Rasma Garleja structures it in professional, social and individual development (sociocultural) competence. Its components are knowledge, skills, attitudes and its improvement. Defining the professional competence it has been pointed out that "Professional competence is the ability to carry out the activities within the framework of job functions, using the value filter, forming skills in selective choice of knowledge, the ability to integrate knowledge and values for achieving goals in professional work" [22]. Rasma Garleja considers that professional ability to act as the goal of professional education is formed through developing of professional (professional knowledge and skills), social (organisational culture and cooperation ability) and competence in work methods and technologies (ability to plan independently, do the job and control it), whereas Guy Le Boterf explains competence as mobilisation of resources essential for an individual for reaching a specific result and performing a certain task and points out that it includes three aspects [23-25] knowledge, know-how, attitudes and resources.

In the research conducted by L. Turuševa regarding competence the term "*performance*" has been used, because it includes behaviour and attitude, and it testifies about the person's competence and therefore it is more precise, since it is directed towards the success of the action and effectiveness [26]. The professional competence [27] should be based on ethics as professionalism – honesty, responsibility for quality and consequences; knowing how to act – developing thinking skills, basing not only on standards, but also on understanding. In order to act in a competent way (*agir avec compétence*), a person needs motivation and incentive – a desire to act (*vouloir-agir*).

It is necessary to take responsibility and risk because professional competence behavior is influenced by social conditions, organizational management, group competence, as well as other influencing factors - context. The occupational safety specialist in his or her professional activity (performing an action in occupational safety), carrying out a pedagogical competence, promotes both - the forming of personnel's responsible attitude as a component in the formation of competence in the work environment and the formation of responsible behaviour in emergency situations. A competent specialist in occupational safety (Fig.1) should develop the ability to create and further develop the work environment (physical, social, information), to organise the study process in cooperation with other specialists, manage group work and the emotional state of the learners during the study process, to assess the learning outcomes, manage his or her professional development, to understand and determine occupational safety risk factors in a sector of the economy [28], including psychoemotional risk factors (development of stress and burn-out syndromes and the causes of the formation of formal attitude towards occupational safety and civil protection) [9-13].

The research conducted in Latvia [29] shows that the mental effort and psychoemotional load of the people employed in various sectors of the economy differ (e.g., for road construction workers it is average, but for office workers it is high).

The senior occupational safety specialist (Profession code – 2263 01) has the fifth professional qualification level according to the profession standard [30]. According to the standard, the senior occupational safety specialist carries out the organisation of the occupational safety system in an organisation or enterprise, monitoring of the interior work environment as well as expert investigation in the field of occupational safety; as a competent specialist, this person has the knowledge of occupational safety and environmental protection issues, and applies the related laws and regulations; carries out scientific pedagogical work in the field of occupational safety. The specialists who study work and civil protection need the reflection on the improvement of their professional and social competences. For the assessment of personal resources subjective criteria, such as - cognitive characteristics, emotional state, system of values, attitude, confidence and the ability to communicate - can be used. In the process of education it is important to ensure that the student (future occupational safety specialist) is aware of what should be learnt to allow for competence forming and development.

The student of the second level professional higher education study programme is an adult who already has a bachelor's degree or who has the second level professional higher education who already has practical work experience. It forms the conscious incompetence – the specialist understands that he or she needs new knowledge to be acquired in the chosen study programme. Both in study and work environment the development of competences takes place, which can be characterised by a competence development spiral [31] which is based on a four stage model [32-34]. In the research paper [35] Noel Burch in the 1970s in the article “The four stages for learning any new skill”, suggested, that individuals go through the following stages when learning something new:

- unconscious incompetence – doing wrong, oblivious to the fact that they are wrong;
- conscious incompetence – still doing things wrong but now aware they are doing it wrong;
- conscious competence – doing things right but having to keep thinking about how to do them;
- unconscious competence – doing things right without having to think about it.

The competence development spiral indicates the cyclical essence of learning, because, while carrying out self-assessment, and being aware of the necessity to acquire new knowledge and skills, it is possible to be included into the competence development spiral in any of the stages.

Within the context of occupational safety specialists, whose main value is health throughout people's lives [10], Edward Will Taylor's five stage conscious competence expanded model seems to be more suitable [36]. The occupational safety specialist's professional competence is characterised by the person's work experience, skills obtained, knowledge, creativity and their implementation in the social environment as well as attitude towards work and safety. The person's competence is determined by the ability to develop, to grow and learn new things. It is also determined by the ability to understand the people around us and the world in general, in order to make independent and responsible decisions in the context of occupational safety and civil protection.

Sustainable development of the society is connected with the forming of a new attitude concerning the formation and development of wellness during the process of education in the work environment which can be ensured by a competent occupational safety specialist. In the context of the UNESCO concept of education for sustainable development [37; 38] “The five pillars of education for sustainable development is a key orienteer for the 21st century education development and improvement in the context of lifelong learning both on a global and local scale in educational institutions and families. The fifth pillar of education “learning to transform oneself and society” – to develop the ability and willingness to integrate a sustainable life style in oneself and in society – is the foundation for a competent occupational safety specialist's study process and teaching – learning process to change the formal attitude towards work and civil protection which prevails in our society.

The module has been approbated, and the study course which was designed basing on this module has been positively evaluated by the students of the second level professional higher educational programme “Occupational safety”. The number of the respondents taking part in the evaluation was 20. The course was evaluated as „a very good study course, which can be applied both in the work

environment and in everyday life". The respondents appreciated "good practical examples from life and an opportunity to understand that it is necessary to study and develop oneself".

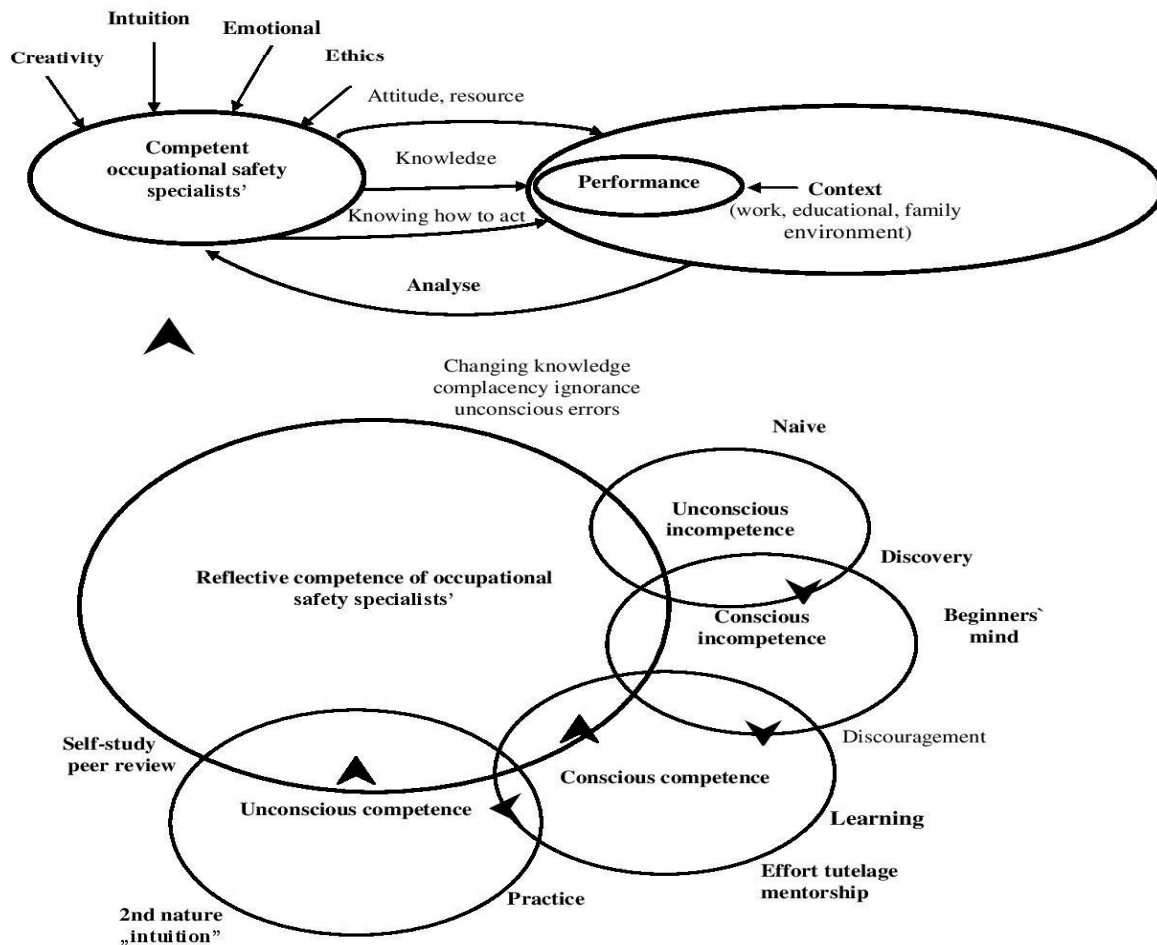


Fig. 1. Competence development model of occupational safety specialists (Author's design)

## Conclusions

1. Basing on the reflection of personal experience and the deductions obtained from the studies of the relevant publications, a competence development model of occupational safety specialists has been developed, approbated and positively evaluated.
2. Occupational safety specialists' competence develops in the educational environment, working environment, and outside of them. It is essential that the work environment risk factor identification and prevention would lead to the avoidance of arising of emergencies and unpredictable situations, ensuring the employee's health and life, as well as the employees' wellness.
3. The 5th pillar included in the UNESCO concept of education for sustainable development for the 21st century "Learning to transform oneself and society" - to develop the ability and willingness to integrate a sustainable life style in oneself and in society - is the foundation for a competent occupational safety specialist's study process and teaching- learning process to change the formal attitude towards work and civil protection, which prevails in our society.
4. It is recommended to develop variants of the competence development model of occupational safety specialists with the aim to further improve the study courses of the educational programmes for these specialists. During the process of their implementation it is desirable to emphasize the necessity to reduce the formal attitude towards occupational safety regulations.

## References

1. Maslo I. Kognitīvā, pragmatiskā, komunikatīvā, uzdevumorientētā un procesorientētā didaktiskā modeļa salīdzinājums: “Par” un “Pret” (Cognitive, pragmatic, communicative, task-based and Process oriented didactic model comparison: “For” and “Against”). LU zinātnisko rakstu krājums “Vispārīgā didaktika un audzināšana”, Rīga, SIA Izglītības soļi, 2001. pp15 – 22. (In Latvian)
2. Frigg R., Hartmann S. Models in Science. 2012. [online] [11.01.2016]. Available at: <http://plato.stanford.edu/entries/models-science/>,
3. Models and Inferences in Science. Editors: Ippoliti E., Sterpetti V., Nickels T. 2016. 252 p.
4. Brizga D., Peks I., Bertaitis I. Computer use impact on students’ health in the context of ecological approach to occupational safety. Proceedings of 12th International scientific conference “Engineering for rural development”, May 23-24, 2013, Jelgava, Latvia, pp. 598.-602.
5. Stasa J., Skele A., Brizga D., Kristins I., Heidemanis I. Ergonomical Problems and its Solution During the Study Process. Proceedings of the International Scientific Conference „Human and Nature Safety 2009”. Part 1, Akadēmija (Kauno r.), 2009. pp. 9-12.
6. Bertaitis I., Karlsons U., Brizga D. Knowledge, Skills and Competences of Labor Protection Specialists. In: Žmogaus ir gamtos sauga 2012 : 18-oji tarptautinė mokslinė-praktinė konferencija, 2012 m. gegužės 16-17 d., birželio 14-15 d., Kaunas /Aleksandro Stulginkio Universitetas. Vytauto Didžiojo universitetas. – Kaunas, Klaipėdos Universitetas: Akadēmija, 2012. 1 - oji dalis, pp.33.-35.
7. Bertaitis I., Brizga D., Ozoliņa V. A pedagogical experiment in competence promotion for occupational safety and health specialists. In: Žmogaus ir gamtos sauga 2013: 19-oji tarptautinė mokslinė-praktinė konferencija, 2013 m. gegužės 16-17 d., birželio 14-15 d., Kaunas / Aleksandro Stulginkio Universitetas. Vytauto Didžiojo universitetas. – Kaunas, Klaipėdos Universitetas: Akadēmija, 2013. 1-oji dalis, pp. 13.-16.
8. Bertaitis I., Brizga D., Ozoliņa V. (2014) The classification of occupational health and safety specialists’ competences.. In: Žmogaus ir gamtos sauga 2014: 20-oji tarptautinė mokslinė-praktinė konferencija, 2014m. gegužės 7 - 9 d., Kaunas /Aleksandro Stulginkio Universitetas. Vytauto Didžiojo universitetas.– Kaunas, Klaipėdos Universitetas: Akadēmija, 2014. 1-oji dalis, pp 9.-11.
9. Brizga D., Peks L. Workplace wellness and specialists’ attitude to work safety. Proceedings of 7th International Scientific conference “Jelgava, Latvia, 2014, pp. 90-96.
10. Brizga D., Ozolina V., Peks L. Development of specialists' attitude to occupational health and safety. Engineering for Rural Development, Jelgava, Latvia, 2014, pp. 517-521
11. Brizga D., Peks L. Psychological aspects of non-observance of work safety regulations. Proceedings of the International Scientific Conference “SOCIETY, INTEGRATION, EDUCATION” May 23-24, 2014, Rēzeknes Augstskola. Izglītības un dizaina fakultāte. Personības socializācijas pētījumu institūts. Rēzekne, Latvia, 2.daļa, pp.42.-49.
12. Brizga D, Peks, L., Ozolina V. Psychological aspects of non-observance of work and civil safety regulations. Proceedings of the 8th International scientific conference, dedicated to the 15th anniversary of Institute of Education and Home Economics, May 15-16, 2015, Jelgava, Latvia. pp. 363-370.
13. Brizga D., Peks L. Work environment assessment in the aspect of work psychology processes. Proceedings of 14th International scientific conference “Engineering for rural development”, May 20 - 22, 2015, Jelgava, Latvia, Vol.14, p. 699-704.
14. Spencer L.M. Competency assessment methods. By Laurie Jo Bassi, Darlene F. Russ-Eft. What Works: „Assessment, development and measurement?” 1997. [online] [11.03.2015]. Available at: <https://books.google.lv>
15. Spencer L.M., Spencer S.M. Competence at Work: Models for Superior Performance. Wiley India Pvt. Ltd., 2008, 384 p.
16. Boyatzis R. The competent manager. N.Y.: John Wiley & Sons Inc., 1982, 308 p.
17. Rychen, D. S., Salganik, L. H. Defining and Selecting Key Competencies. Göttingen, Germany: Hogrefe et Huber. 2001.
18. Rychen, D. S., Tiana, A. Developing Key Competencies in Education: Some Lessons from International and National Experience. Geneve: UNICCO – IBE. 2004.

19. Rychen, D.S., Salganik, L.H. Key Competencies for a Successful Life and a Well-functioning Society. Göttingen: Hogrefe and Huber Publishers, 2003. 206 p.
20. Gedrovics J., Urpena I., Elers G. Rīgas Pedagoģijas un izglītības vadības akadēmijas studentu - datorlietotāju monitorings 2004.–2011: Studentu datorlietošanas paradumi un darba kultūras iezīmes (Monitoring of Riga Teacher Training and Educational Management Academy students as computer users 2004 - 2011: Computer use work habits and work culture). 2012, pp. 94-102. (In Latvian)
21. Raven J., Stephenson J. (Eds.). Competence in the Learning Society. New York: Peter Lang. 2001. 560 p.
22. Garleja R. Cilvēkpotenciāls sociālā vidē (The human social environment). Rīga: RaKa. 2006. 200 p. (In Latvian)
23. Le Boterf G. L'ingénierie et l'évaluation des compétences, Les Éditions d'Organisation.
24. 1998. (In French).
25. Le Boterf G. Construire les compétences individuelles et collectives, Editions d'Organisation, 2004. (In French)
26. Le Boterf G. Repenser la compétences, Editions d'Organisation, 2008. (In French)
27. Turuševa L. Ārējo sakaru struktūrvienības vadītāja profesionālā kompetence un tās veidošanās studiju procesā (Professional Competence of the Head of External Relations Unit and its Development in the Study Process). Latvijas Universitāte. Pedagoģijas, psiholoģijas un mākslas fakultāte. Promocijas darbs. 2010. (In Latvian)
28. Le Boterf G. Apprendre à agir et à interagir en professionnel compétent et responsable. Education permanente. 2011. (In French)
29. Bērtaitis I. Darba aizsardzības speciālista pedagoģiskā kompetence (Pedagogical competence of the labour protection specialist). Promocijas darba kopsavilkums. 2013. 88 p. (In Latvian)
30. Kaļķis V., Roja Ž., Kaļķis H. Arodveselība un riski darbā (Occupational health and risks at work). SIA "Medicīnas apgāds", 2015. 534 p. (In Latvian).
31. Darba aizsardzības vecākā speciālista profesijas standarts (Regulations Regarding Training in Labour Protection Matters). Saskaņots: Profesionālās izglītības un nodarbinātības trīspusējās sadarbības apakšpadomes 2011.gada 15.septembra sēdē protokols Nr.7 (In Latvian). [online] [11.05.2015]. Available at: <http://visc.gov.lv/profizglitiba/dokumenti/standarti/ps0100.pdf>
32. Conscious competence learning model. [online] [11.01.2016]. Available at: <http://www.businessballs.com/consciouscompetencelearningmodel.htm>
33. Black S. A. Qualities of Effective Leadership in Higher Education. [online] [11.01.2016]. Available at: [file:///D:/Users/User/Downloads/OJL\\_2015061617461002%20\(7\).pdf](file:///D:/Users/User/Downloads/OJL_2015061617461002%20(7).pdf)
34. Fitch B.D. Law Enforcement Interpersonal Communication and Conflict Management: The IMPACT Model.
35. Bates B. Learning Theories Simplified. 2015.
36. Taylor W. Courtesy of Will Taylor. Chair, Department of Homeopathic Medicine, National College of Natural Medicine, Portland, Oregon, USA. 2007. [Online] <http://www.businessballs.com/consciouscompetencelearningmodel.htm>
37. UNESCO. Education for Sustainable Development (ESD). [online] [11.01.2016]. Available at [http://portal.unesco.org/geography/en/ev.php-URL\\_ID=14132&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/geography/en/ev.php-URL_ID=14132&URL_DO=DO_TOPIC&URL_SECTION=201.html)
38. Briede B., Pēks L. Ekoloģiskā pieeja izglītībā (Ecological approach in education). Jelgava, University of Agriculture, 2011, pp. 160. CD-ROM, (In Latvian).