FOREST ENGINEERING STUDENTS COMPETENCE DEVELOPMENT IN ADULT EDUCATION

Jelena Ruba
Latvia University of Life Sciences and Technologies, Latvia

Dace Brizga
Latvia University of Life Sciences and Technologies, Latvia

Diana Svika
Latvia University of Life Sciences and Technologies, Latvia

Olga Miezīte
Latvia University of Life Sciences and Technologies, Latvia

Linards Sisenis
Latvia University of Life Sciences and Technologies, Latvia

Abstract. *Forest engineering students need to develop their competence in order to ensure a sustainable working environment in the relevant sector of economy. The aim of the study was to clarify the dynamics of the development of the students' competence in the learning process. The methodological basis of the study included the analyses of the relevant publications in the context of competence and adult education. The authors' personal reflections and work experience at the Forest Faculty of Latvia University of Life Sciences and Technologies were taken into consideration. To assess the development of students' competence in the forest engineering studies a survey was carried out. Within the framework of the study and as the result of improved adult studies, there was a significant improvement of students` competence in the field of forest engineering. The self-assessment of competence at the end of the course was higher than at the beginning of it.*
Keywords: *adult education, competence, forest engineering students.*

Introduction

Forest engineering students need to develop their competence to be able to provide a sustainable working environment in their respective sector of the economy. The research was carried out at the Forest Faculty, within the framework of the Labour protection study programme that has resulted in the development of labour protection specialists' competence model (Brizga, 2018). The model has been approbated in the study programme course of the senior labour protection specialist and it has been stated that this model can be adapted in the study process of other programmes.

In order to clarify the possibilities of using this model in the study course *Utilization of Forest Resources,* a pilot research case study was carried out within this course.

The main questions of the case study were the following:

1. Did the competence increase as a result of improving and acquiring the study course *Utilization of Forest Resources* according to the aforementioned model.

2. What level of knowledge and skills has been achieved as a result of the completion of the study course?

Within the framework of the research, the analysis of relevant publications in the context of competence has been carried out. The personal experience of the researchers while working at the Forest Faculty of Latvia University of Life Sciences and Technologies was used.

The case study was conducted with a part-time students' group in which the characteristics of adult education had to be observed.

Literature review

The Cabinet Regulation No 287 "On the implementation of the adult education governance model plan for 2016-2020" (The Regulation of the Cabinet of Ministers [TROTCOM], 2016) indicates that one of the goals of the Sustainable Development Strategy of Latvia "Latvija 2030" is the development of lifelong learning, including – education of employed adults – constant development and improvement of skills and competence.

Adult education has been defined in several documents, including the (Education Law [EL], 1999), which states that it is a "multifaceted process of educating persons which ensures the development of the individual and his or her ability to compete in the labour market during the course of a lifetime of a person".

Adult education (Cedefop, 2008) is general or vocational education for adults after acquiring initial (former) education and practical training to meet professional and personal needs, which aims to provide general education to adult learners on specific themes of interest.

The education obtained allows the people to take responsibility for themselves and others. It is open for the dialogue and new perspectives to transform one's life and improve competences (Ouane, 2011).

According to the definition given in the (Competence dictionary [CD], (2011), the key competences are those that are necessary for individuals to improve themselves, for developing responsible attitudes, civic activities, social inclusion and employment.

Competence studies show that it can be divided into the following partly overarching types: meta-, basic, social, professional and self-competence (Briede & Pēks, 2011).

Competence is a dynamic characteristic feature of a person that develops at the beginning of Professional education as a competence development towards proficiency (Зимняя, 2005). In the professional development the improvement of one's personality, self analysis of knowledge, skills and qualifications are important as well as self-assessment; the improvement of emotional self-regulation, analysis and development of relationships are equally important.

Basing on the experience in adult research, Tatjana Koķe (2012) points out the principles and approaches for ensuring successful adult learning. This means that adults need to participate in planning, organizing and evaluating their learning process, maximally evaluating their own experience; the content should be topical, problem-centred, and the problem addressed should be related to the adult's professional, social or personal life. Basically, in adult education it is necessary to focus on how theoretical knowledge can be transformed into the necessary life skills.

When studying in the programme "Forest Engineer", students have to acquire knowledge and skills to work with modern design and production technologies, acquire the management and production organization competences of a forestry enterprise; they also have to acquire knowledge of the full cycle of forest management, technologies and forest economy.

The research shows that the teacher motivates and supports the adults in the process of studies and at the same time, the teacher ensures the quality of the classes, thus arousing interest in the learners to attend classes, acquire skills and achieve the goals of an organized learning course (Murray & Mitchell, 2013).

In adult education (Hoare, 2009; Pfaffenberger, 2013) self-development and self-efficacy play an important role in intellectual development.

During the study process, discussions with both lecturers and fellow students on the acquired experience are important. Competence assessment and self-assessment contribute to the acquisition of self-assessment skills (Ross, 2006; Ross & Bruce, 2007).

Theoretical findings (Rubene, 2012, 184) prove that in a critical education process an adult is aware of a lack of his/her competences and develops the necessary key competences.

Creativity in the learning process pertains to innovations in a particular field and refers to flexibility, openness to the new, the ability to find new solutions, new methods, and the ability to face challenges in problem solving by surpassing the traditional methods. When analysing meta-creativity, one should be able to improve his/her energy, creativity and mental well-being (Cropley, 2001), because "a creative personality must have knowledge and competence in

a field, and it is important to know the strategy for solving a problem, one should be motivated and interested in the problem to be solved" (Garleja, 2006, 56).

Creativity is important in education as a performance (McLellan & Nicholl, 2011) to promote innovations in everyday life.

The main focus in the study process was on self-directed rather than teacher-guided learning, because, according to the research, - self-directed learning is an active student's participation in curriculum planning, acquisition of knowledge and skills and assessment of one's own learning outcome (Katane & Katans, 2014).

The survey was conducted in two stages: It was carried out in February and May 2018, and 11 part-time students were involved in it. The task of the study was to find out was to clarify the dynamics of the development of the students' competence in the learning process. The summary of the obtained data is presented in Table 1. The students performed self-assessment of their competence. Self-assessment (Толочек, 2005) manifests itself as a regulating mechanism of a personality's behaviour, assessment of one's own performance, and assessment of self-concept.

Methodology

In the study process the Labour Protection Specialist Competence Model (Brizga, 2018) was used. The publication states that the model was approbated in the study programme of the senior labour protection specialist and it can be adapted to other study programmes. In the adapted model, two competence components have been used instead of four components. The two components are knowledge and skills. The traditional education model, when the information transfer to the student took place almost without the student's participation, has been replaced by the new one, when the teacher defines the problem, creates an idea, gives the student the tools for acquiring the learning skills with tasks that require the use of previous experience and competence. When addressing problem situations, students develop critical thinking. Working in small groups where participants have different skills and abilities, and when they learn from each other, exchange ideas and relevant information, helps develop collaborative competences.

In the process of cooperative learning, students use their experience, their intellectual and emotional potential and learn from each other learning in groups, thus, there is a close cooperation among the participants. Cooperative learning is the process during which each member of the group and the whole group are oriented towards achieving the stated goal.

During the first class, the student was introduced to the use of the selected model and the learning method that promote cooperation during the learning process, as well as a survey was carried out regarding the self-assessment of students' competence.

Since they were part-time last year students, their initial competence was acquired through their previous study courses and work.

After the lectures, the students were divided into groups and received an independent work assignment. The elaborated independent work was presented and shared with the students and the lecturer. The presentations were supplemented with a video material that the students had taken while doing practical work in the forest. Additionally, a survey was carried out in which 46 full-time students participated. The aim of the survey was to clarify the competence development in this study course. After the survey results were summarised, it was concluded that it was necessary to improve the study course. One of the suggestions was that the course should be taught during the 1st year of the study programme or its content should be improved, so that it would not overlap with other study courses. That would be a condition for the improvement of competence within the framework of the study programme. The duration of the course was 4 months – during the session when students met each other and in students' workplaces during the inter-sessional period. After the completion of the course, the students performed a repeated self-assessment of competence (knowledge and skills).

Research results

Self-assessment results of competence level (knowledge and skills) at the beginning of the course and after the completion of the course are summarised in Table 1.

Table 1 **Competence development in the study course Utilization of Forest Resources**

Respondent codes	Self-assessment of competence level *5- point scale*							
	Knowledge				Skills			
	Points		Number		Points		Number	
	Beginning of course	End of course	=	>	Beginning of course	End of course	=	>
1	2	4	-	2	3	4	-	1
2	4	5	-	1	4	5	-	1
3	4	5	-	1	4	5	-	1
4	4	4	1	-	4	4	1	-
5	4	5	-	1	4	5	-	1
6	4	5	-	1	4	4	1	-
7	4	4	1	-	4	4	1	-

8	4	5	-	1	4	5	-	1
9	4	5	-	1	4	5	-	1
10	4	4	1	-	4	5	-	1
11	3	4	-	1	4	4	1	-
Total	41	50	3	9	43	50	4	7
Distribution of data								
Level	2	1	-			-	-		
	3	1	-			1	-		
	4	9	5			10	5		
	5	-	6			-	6		
Descriptive statistics								
Mode	4	5			4	5		
Median	4	5			4	5		
Range	4	5			4	5		
Mean	3.73	4.55			3.9	4.55		

Descriptions (Table 1):
> at the end of the session the assessment is higher than at the end of it.
= the assessment has not changed.

During the study process, two respondents pointed out that it would be more purposeful to include the course in the first year study programme, thus it could be a basis for the further improvement of knowledge and skills, which could be strengthened during the practice period in the forest.

Nine respondents acknowledged that the competence development model meets their requirements, giving 5 points, and two respondents gave 4 points.

During the course the individual self-assessment of the competence (knowledge and skills) did not change for seven respondents (3+4=7), it increased for 16 respondents (9+7=16). Statistically significant (p=0.06 < p=0.10) individual self-assessment changes were observed.

Conclusions and recommendations

As the result of the pilot case study, it was found that:

1. At the end of the course students' competence increased, statistically significant (p = 0.06) changes were observed in individual self-assessment due to the collaboration process between the teacher and students;

2. Upon the completion of the study course the knowledge and skills of all respondents were evaluated with a mark 4 or 5 (on a 5-point scale);

3. Basing on the experience gained from the case study, it is recommended to carry out research involving a larger number of respondents to improve the model used in statistically significant results from the research and to recommend it for the further use in the study course *Utilization of Forest Resources;*

4. In order to improve competence, it is necessary to take into consideration the suggestions made by both full-time and part-time students.

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