

DEVELOPMENT OF THE CREATIVITY POTENTIAL OF THE STUDENT'S PERSONALITY

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***Abstract.** The purpose of this article is to show the increasing of the individual creativity potential on the base of the students' integrative collaboration during the acquisition of the Building Constructions subject in professional university. The article deals with the issue of demand for highly-qualified, skillful and competitive specialists able to work in interdisciplinary team and organize collective work. Quantitative data analysis method was applied for analyzing the change in students' creative abilities after the pedagogical experiment – adapted tests of creative abilities, which were developed by E. Torrens. Increase of the students' creativity in the experimental class was deducted from the obtained data.*

***Keywords:** professional university, creativity potential, students' integrative collaboration, sustainable development.*

Introduction

The 2030 Agenda takes the transformative steps which are urgently needed to shift the world onto a sustainable and resilient path (The 2030 Agenda for Sustainable Development). It addresses both poverty eradication and the economic, social and environmental dimensions of sustainable development in a balanced and integrated manner. All countries are acting in collaborative partnership, will implement this plan (Transforming our world: the 2030 Agenda for Sustainable Development). The 2030 Agenda also addresses issues such as effective education organization. Sustainable development urges to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature. Policy in the sphere of education has traditionally been seen as an essential resource for the country's development. It is necessary to agree with the opinion of modern researchers in pedagogy that one of the main tasks of higher education is the development of the creative potential of students (Galpotthawela & Lubkina, 2018; Pafifova, 2015;

Pūre, 2010; Vidnere, 2010). Diagnosis of creativity and related mental processes, the development of creativity is especially important. Modern Latvian scientists and educators (Lanka, 2003; Meriste, 2004; Gudjons, 2007; Žogla, 2007; Kāposta, 2011; Vidnere, Roze, Kālis, Rože, & Krūmiņa, 2011) note that training of highly-qualified specialists requires extending fundamental knowledge, educational content differentiation and integration according to further basic professional activities, strengthening of vocational orientation, development of prospective professionals' creative thinking and research competence. Issues for study: the level of creativity of students of a technical university, using methods of creativity development.

The aim of the research is the organization of a teaching process in a professional university. The subject of the research – increasing of the creativity potential of the personality on the base of students' integrative collaboration. The research questions is “Does a students' integrative collaboration promote development of the individual creativity potential?”

Theoretical background

The trend of education process organization in university with the increasingly popular internationalized activities signifies the necessity of nurturing students with effective communication skills. Students' integrative collaboration model allows them to enrich the subjective experience of self-organization, self-control, self-expression and self-presentation, self-regulation, as well as self-reflection in their professional activities. Students' personal experience is converted efficiently through the integrative collaboration, expanding experience with new professional activities' skills in team. During students' educational process a teacher has to organise the teaching/learning process so that it should promote students' development through common knowledge constructing and decision making.

Given the fact that this research is related to the problems of reorganizing a teaching/learning process in a professional university, holism, constructivism and existentialism were chosen for a philosophical basis of students learning in the context of integrative collaboration.

A new type of scientific approach is currently being developed, which is based on a holistic approach to knowledge (Forbes, 1996; Martin, 2002; Forbes & Robin, 2004). Consequently, the understanding of education is changing too: besides the traditional understanding a new perception about an educated person is being formed, so the anthropological basis of pedagogy is changing. An educated person is a person who is prepared for life, is able to understand his place in it and find his bearings in complex issues of contemporary culture rather than a “knowledgeable” person with his own world outlook. Holism view is based on

J. Nakagawa's (2000), R.G. Nava's (2001), S.H. Forbes's and A.M. Robin's (2004) ideas. Works by J. Piaget are considered to be the basis of constructivism pedagogy (Piaget, 1954; Piaže, 2000), according to which knowledge, values, autonomy, etc. cannot be passed on to humans from the outside – they have to be actively constructed in the inner world of a person. The practical application of constructivism principles involves mainly the introduction of active teaching organizing forms into the teaching/learning process (seminars, projects, presentations, teamwork). Teacher's role is reduced to creating an interesting, multi-modal (diverse) and communicative interaction-focused educational environment.

Existentialist humanistic foundations play an important role in education, especially in the human personality priority (Maslow, 1954; Fromm, 1976; Rogers, 1980; Bass, 1961; Frankl, 2006; Антипин, 2002).

The scientists' theoretical guidelines concerning the impact of educational environment organization on the development of students' creativity potential have been identified and analyzed (Korčaks, 1986; Лесгафт, 1991; Ozoliņš, 2000; Špona, 2001; Zarembo, 2006 and others). In this research the definition of creativity proposed by E.P. Tunic (Туник, 1998) is used, according to which creativity is understood as the totality of thinking features and personality qualities that are required for the development of students' creativity. The model of students' integrative collaboration was developed, the form of the interaction between students and a teacher was determined and was used in *the third phase* of the research. According to the developed model the aim of organizing students' integrative collaboration is to promote the acquisition of learning skills, further professional self-education, including the development of creativity potential. Integrative collaboration is characterized by the development of experience, opinion exchange and strategy when physicians and technical sciences professionals (engineers) are participating (van Gejeka, 2013).

Methods

The results of the previous *first phase* of research indicated a necessity of learning environment reorganization in professional university, which logically led to the next part of the research - development of the practice scenario in order to prove the efficiency of integrative method in teaching such a technical subject as Building Constructions (van Gejeka, Pakrastiņš, & Ignatjeva, 2018).

In the *second phase* of the research the creativity potential of the students of Latvian professional universities was studied with the aim to develop the practical scenario of students' integrative collaboration. One of the main pedagogical and psychological aspects of creativity, mentioned in works of several authors, is the development of creative abilities (Zarembo, 2006; Liegeniece, 2010). To explore

the person's individual creativity potential Terrence test of creative thinking (Terrence, 1966, 1969) was used for this work that assesses personal creativity, flexibility and originality of thinking.

In the *third phase* of the research the formative pedagogical pilot-experiment was implemented in Riga Technical University, using students' integrative collaboration model as a method of creativity developing.

The empirical base of the study was formed by data obtained from a student's survey. Two Latvian professional universities from different regions have been chosen as a research area with students aged 18-27 years. Riga Technical University (RTU) and Rezekne Technical Academy (RTA) students were involved into the research of the individual creativity potential:

- RTU 80 students;
- RTA 33 students.

Riga Technical University 19 students as experimental group and 21 student as control group (age 18-25 years) was selected to take part in the piloting research.

Therefore, the methods of learning process organisation's investigation include:

- testing (Terrence test of creative thinking) as a quantitative research method;
- formative pedagogical pilot-experiment organisation for the verification of the developed students' integrative collaboration model.

Quantitative research methods are using SPSS 19.0 data processing program (Statistical package for the Social Sciences), Student test for data processing and analysis.

Results of the research

Pedagogical findings about the development of creativity potential on the base of students' integrative collaboration are analysed before the piloting research. Statistically significant differences when comparing the average indicators of the creativity factors in RTA and RTU are observed only by the factor Imagination. This factor is higher in RTA (see Figure 1).

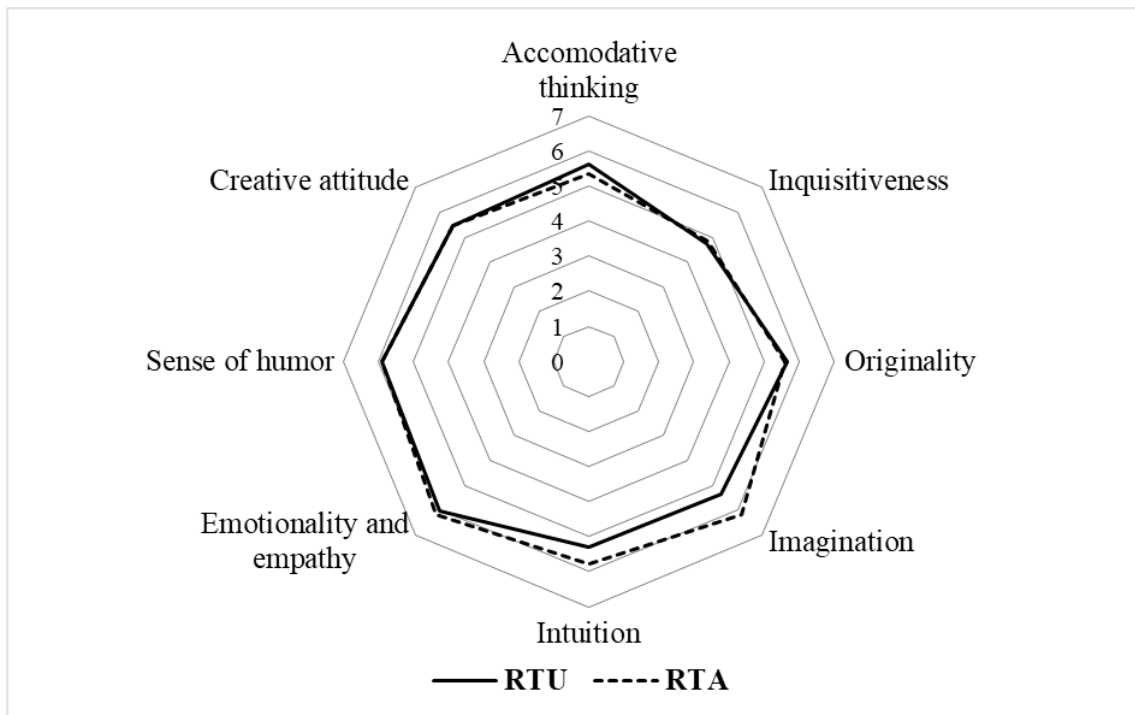


Figure 1 Average creative factors in RTA and RTU

The results of the statistical processing of creativity’s testing are shown in Tables 1 and 2, comparing average creative factors in RTA and RTU.

Table 1 Creativity factors’ descriptive statistics

University		Accommodative thinking	Inquisitiveness	Originality	Imagination	Intuition	Emotionality and empathy	Sense of humor	Creative attitude
RTU	Mean	5,51	4,73	5,54	5,25	5,49	5,88	5,85	5,30
	Median	5,50	5,00	6,00	5,00	5,00	6,00	6,00	5,50
	Std. Deviation	1,77	1,65	1,49	1,70	1,62	1,78	1,54	1,71
	Range	9	8	7	8	8	7	7	9
	Minimum	1	1	2	1	1	2	2	0
	Maximum	10	9	9	9	9	9	9	9
	Percentiles								
	25	5,00	4,00	4,00	4,00	5,00	5,00	5,00	4,00
	50	5,50	5,00	6,00	5,00	5,00	6,00	6,00	5,50
	75	7,00	6,00	7,00	6,00	7,00	7,00	7,00	6,00
RTA	Mean	5,33	4,82	5,61	6,18	5,79	6,18	5,91	5,48
	Median	6,00	5,00	6,00	6,00	6,00	6,00	6,00	6,00
	Std. Deviation	1,86	1,530	1,619	1,648	1,453	1,570	1,508	1,623
	Range	7	7	7	6	6	7	5	9
	Minimum	1	1	1	3	2	3	3	1
	Maximum	8	8	8	9	8	10	8	10
	Percentiles								
	25	4,00	4,00	5,00	5,00	5,00	5,00	5,00	5,00
	50	6,00	5,00	6,00	6,00	6,00	6,00	6,00	6,00
	75	6,50	6,00	6,50	7,50	7,00	7,00	7,00	6,00

A comparative creativity factors analysis was performed prior to the pilot-experiment at Riga Technical University.

Table 2 Student's t-test results of independent samples, comparing average creative factors in RTA and RTU

	t-test for Equality of Means	
	t	Sig. (2-tailed)
Accommodative thinking	,696	,488
Inquisitiveness	-,239	,811
Originality	,197	,844
Imagination	-2,301	,024
Intuition	-1,443	,152
Emotionality and empathy	-,411	,682
Sense of humour	-,023	,982
Creative attitude	-,026	,979

Among RTU students, an experimental group of 19 students (age 18-25 years) was selected to take part in the piloting research - formative pedagogical pilot-experiment. The results of the statistical processing of creativity's testing are shown in Tables 3, comparing the average indicators of the factors of creativity in the control and experimental groups before the experiment.

Table 3 Student's t-test results of independent samples, comparing the average indicators of the factors of creativity in the control and experimental groups before the experiment

	t-test for Equality of Means	
	t	Sig. (2-tailed)
Accommodative thinking	,846	,400
Inquisitiveness	,122	,903
Originality	1,456	,149
Imagination	1,042	,301
Intuition	-1,762	,082
Emotionality and empathy	1,429	,157
Sense of humour	,534	,595
Creative attitude	1,656	,102

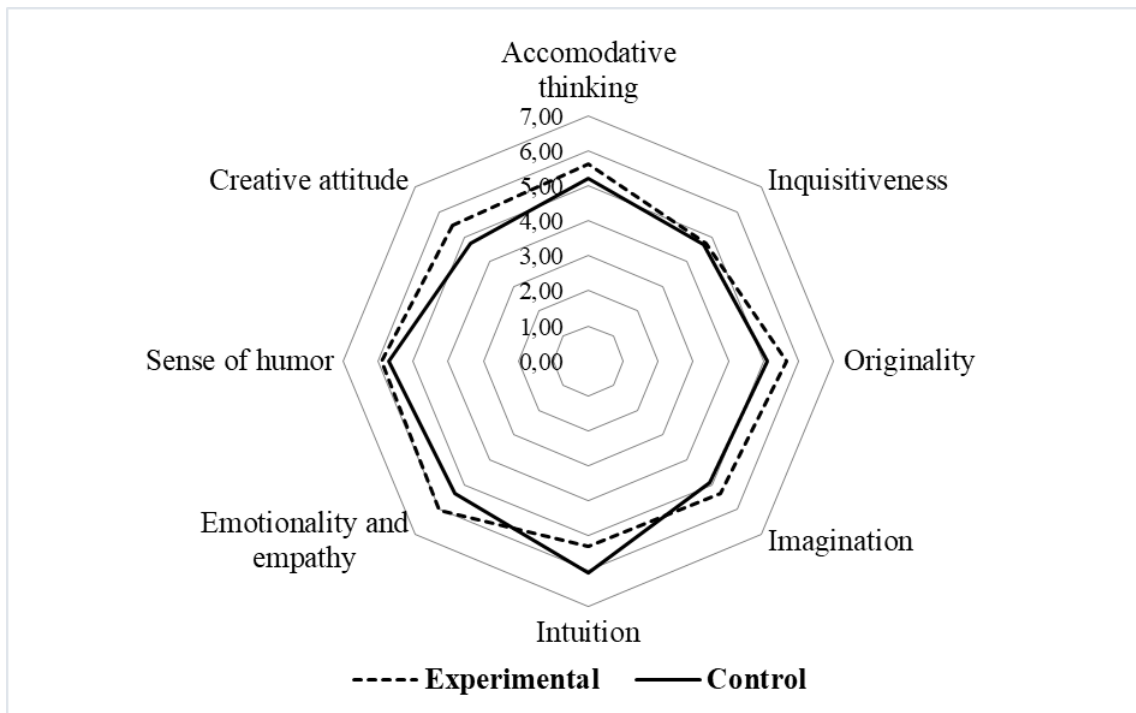


Figure 2 Creativity factors in the experimental and control groups before the experiment

Statistically significant differences between the average indicators of creativity in the control and experimental groups at the beginning of the experiment are not observed (see Figure 2).

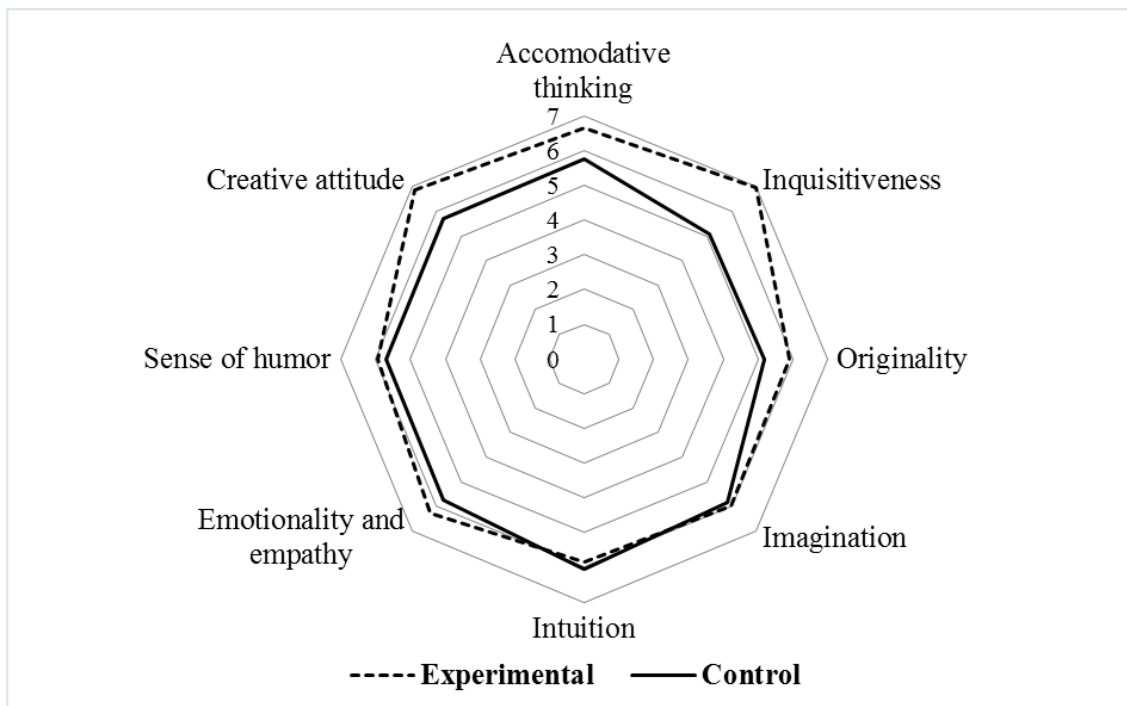


Figure 3 Indicators of creativity in the experimental and control groups at the end of the experiment

A comparative analysis of average creativity factors in the control and experimental groups at the end of the experiment revealed statistically significant differences in such factors as Accommodative thinking, Inquisitiveness, Originality and Creative attitude. In the experimental group, the creativity factors became higher than in the control group (see Figure 3) as:

- Accommodative thinking (increasing for 0.9 point);
- Inquisitiveness (increasing for 2 points);
- Originality (increasing for 0.9 point);
- Creative attitude (increasing for 1.3 point).

Table 4 Student's t-test results of independent samples, comparing the average indicators of the creativity factors in the control and experimental groups at the end of the experiment

	t-test for Equality of Means	
	t	Sig. (2-tailed)
Accommodative thinking	-2,866	,040
Inquisitiveness	-3,156	,003
Originality	-1,856	,049
Imagination	1,243	,276
Intuition	1,762	,284
Emotionality and empathy	1,429	,157
Sense of humour	,534	,595
Creative attitude	-1,956	,042

The results of the statistical processing of creativity's testing are shown in Tables 4, comparing the average indicators of the creativity factors in the control and experimental groups at the end of the experiment.

Conclusions

Thus, the analysis of the creativity potential in two Latvian Universities enabled to conclude that it is necessary to activate teaching organizing forms into the teaching/learning process in a professional university. Students' creativity potential is an essential resource in education strategy. Increase of the students' creativity indicators was implemented by purposefully organized learning process, based on the students' integrative collaboration model. Students teaching/learning process is more focused/oriented on team activities in work and development of individual creativity potential. We have already written about the learners' integrative collaboration model organisation in vocation school (van Gejeka, 2013). Advantages of the integrative collaboration are also apparent:

- students' qualitative improvement of training;

- practical experience of joint course projects in team - implementation skills for professional cooperation.

A pilot-study was successfully carried out with a positive effect on the development of creativity at Riga Technical University and revealed statistically significant increase in such creativity factors as:

- accommodative thinking;
- inquisitiveness;
- originality;
- creative attitude.

The results of pedagogical pilot-experiment do not provide the grounds for drawing clear conclusions about the research question “Does a students’ integrative collaboration promote development of the individual creativity potential?” However, the pilot-study determined the directions of remedial work and allowed to plan the implementation of the main pedagogical experiment in order to reorganize the educational process in a professional university in accordance with sustainable developing conception.

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