Creativity: Can it be Trained?
A Scientific Educology of Creativity

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Introduction by Co-Editors

The intention of the introduction by the co-editors adheres to the meaning of the following statement from the first paragraph in the Recurring Editorial that started in the 2005 issue of cd-IJE.

"The format for future content recognizes the existence of the newly forming body of knowledge, i.e. philosophy of educology, as knowledge about educology, and the existence of the already developing body of knowledge, i.e. educology, as knowledge about education."

The author's paper, in accord with the Recurring Editorial, is in educology and directly inquires, using quantitative methods of research, with the scientific educological question:

"Can creativity be taught in the educative experiences that organically inhere in the teacher education program at Vilnius Pedagogical University?"

The author, from the editorial's perspective, does not directly inquire with the axiologic and praxiologic educological questions, respectively, as:

"Ought students be taught creativity in educative experiences that organically inhere in the teacher education program at Vilnius Pedagogical University?"

nor

"How can students be taught creativity in educative experiences that organically inhere in the teacher education program at Vilnius Pedagogical University?"

Also, from this perspective, the author does not directly inquire with the philosophy of educology questions:

What is knowledge about educative experiences organically inhering in educational processes, i.e. what is educology?

and

What is the significance of educology?

Introduction by Author

Over the course of half of the last century, psychologists have had a particular focus on creativity abilities training. Developing educational programs that help to enhance students' creativity is among the most important goals of our educational system. The present study was undertaken to explore: (1) the university student's creativity ability, and; (2) the possibility of developing an effective program for enhancing this ability.

The research deals with problems of how to deliberately develop and systematically stimulate students' abilities to think creatively as well as to evaluate the dynamics of this ability on their own. The study reported in this article is based on humanistic and creative psychology theories.

The Conception of Creativity

Creativity is one of the most complicated concepts in psychology. "There is no universal agreement on what creativity actually is." (Wallace, 1986, pg. 68) Definitions of creativity differ, but they have in common their emphasis on people's ability to produce products that are not only high in quality but also novel. (Sternberg, 2001)

Thus the concept of creativity is defined differently but nevertheless many authors agree with creativity involves characteristics connected with the ability to find or do something new. The realization of the creative ability depends, not only on knowledge and skills, but also on the use of quick and different kinds of information found in tasks requiring this ability.

The literature on creativity discusses two main approaches: the cognitive approach (creativity as a cognitive process) and the personality approach (personal characteristics of creative persons). Life span development and social context influence are often discussed, also.

Humanistic Approach to Creativity

Humanistic theories claim that the human capacity for growth is central. Creativity, according to humanists, is a part of being a healthy human being. Human nature is understood as being conscious, self-direct, self actualizing, and healthy.

A. Maslow (1971) suggested that creativeness and the concept of the healthy, self-actualizing, fully-human person seem to be coming closer and closer together, and may recognize that creativity takes place in a social context. In the 1980s a social psychology of creativity emerged by recognizing the cognitive, differential, and developmental perspectives. (Simonton, 2000, pg. 154)

D. K. Simonton argued that socio-cultural environments (especially political environments) impact the degree of creativity. Warfare and anarchy depress the output of creative ideas. On the other hand, nationalistic revolts against oppressive rule tend to have a positive way for increasing the amount of creativity. Many nations have experienced golden ages after winning independence from foreign domination. An open society and cultural heterogeneity tend to facilitate creativity. (Simonton, 200, pg. 155)

Complex and Holistic Views of Creativity

Some scholars understand creativity in a more holistic view. R. Sternberg, L.A. O'Hara, and T. Lubart (1997) proposed an "investment theory of creativity." The basic notion of their theory was that in making any of kind of investment creative people "buy low and sell high." To develop creativity we need to understand what the resources of creativity are and help people to develop them. In other words, creativity is buying low and selling high. (Sternberg, O'Hara, and Lubart, 1997)

Research into creativity often focuses only on creative thinking. But creative thinking is only one of six resources of creativity. In summary, creativity training requires investing in six distinct interrelated resources, all of which must be present in some combination to get a positive result.

* knowledge: knowing what is new, not just reinvented;
* intellectual abilities: generating, evaluating, and executing ideas;
* thinking styles: a preference for thinking in novel ways by one's own choosing;
* motivation: making a move, having fun;
* personality: determination and persistence in overcoming obstacles;
* environment: one that supports the investment game and spreads risk.

K. Urban (1990) developed a "components model of creativity" constituted of six elements: three cognitive elements -- (1) divergent thinking (problem sensitivity, fluency, flexibility, originality, and elaboration); (2) a general knowledge base, i.e. broad perception, convergent, logical thinking, analyzing and synthesizing, thinking, and memory); (3) a specific knowledge base/skills, and; (4) personality elements; (i) motives (drives to knowledge, curiosity, need of novelty, playfulness, self-actualization, communication, devotion/duty, need of control, and instrumental use); (ii) task commitment (perseverance, concentration, object/product/topic, devotion, and relaxation, and; (iii) tolerance to ambiguity (risk taking, non-conformism, openness for experience, adaptation and resistance, and humor).

There are different definitions of creative thinking in that: (1) creative thinking involves the collaboration of a person's imagination, cognitive abilities, and the whole personality (Morgan, Forster, 1999); (2) creative thinking is a dynamic mental process and includes both divergent and convergent thinking (Guilford, 1956), and; (3) creative thinking involves different "facets" of creativity including the creative process, the person, and a solution. (MacKinnon, 1965)

Many scholars agree that creativity is a complex phenomenon and involves the collaboration of different components. (Gardner 1983; Amabile, 1996; Sternberg, Lubart, 2005; Urban, 1990)

The Effectiveness of Creativity Training

Can creativity be trained? The belief that creativity an be enhanced is discussed and common consensus holds that creativity can be enhanced because human potentials can be fulfilled. Efforts to enhance creativity will not expand one's inborn potentialities but they can insure that potentialities are maximized. (Plucker, Runco, 1999) Different components of creativity such as the cognitive, affective, attitudinal, interpersonal components can be enhanced through a stimulating environment that induces ideas and creates solutions to problems.

Many programs and courses in creativity have proposed ways of seeking to deliberately stimulate and develop an individual's creative productivity and achievement. Differences in the understanding of creativity influence the kind of training strategies applied. Scholars who see problem solving as a central aspect of creativity use techniques based on heuristics. If the main aspect of creativity is associational mechanisms, imagery techniques are suggested. There have been identified a number of general approaches applied in the development of creativity training including: (1) cognitive approaches; (2) personality approaches; (3) motivational approaches, and; (4) social interaction approaches. (Scott, Leritz, Mumford, 2004, p.4)

Creativity-development programs attempt to remove two major blocks to creative achievement. First of all they try to help individuals understand the influence of background, experience, and habits on present behavior. They help people to perceive themselves as creative beings and to get rid of internal blocks to creative functioning. Second, these programs provide present conditions that encourage creative functioning. They remove external blocks (environment, cultural influences) to creative behavior. (Parnes, 1999)

J. A. Plucker and M. A. Runco (1999) argue that everyone, no matter at what intellectual level, can enhance his/her creativity if they find, develop, and practice the right tactics. Tactics can be personal and interpersonal; they can focus on the problem, as a kind of assimilation (e.g. "turn it on its head"), or on the person who is dealing with the problem, as a kind of accommodation (e.g. "change of perspective").

Training programs should include consideration of knowledge, process skills, metacognitive skills, personality, and attitudes as "motivators" and of environment as context. (Goh, 1993, p. 10) Optimal conditions for creative performance have to pay attention to motivational orientation, the classroom environment that is conducive to stimulating thinking that is receptive to original ideas, and personality traits such as willingness to take a risk and having a sense of humor. (Morgan, Forster, 1999, pg. 31)

The most effective programs are those that try to influence different aspects of creativity – cognitive, personality, attitudes, behavior, interpersonal, affect, and environmental. Creativity training, then, can be effective. Sizable effects can be observed using the four major criteria applied in evaluating training – divergent thinking, problem-solving, performance, and attitudes-behavior. (Scott, Leritz, Mumford, 2004)

Theoretical Issues and the Goals of the Study

Creativity in this study is understood in terms of cognitive abilities that are involved in creative thinking expressed by the divergent thinking components of fluency, flexibility, and originality. (Guilford, 1950; Torrance, 1974; Sternberg, O'Hara, 1999, and; Scott, Leritz, Mumford, 2004, pg. 4)

Divergent thinking is the one component of creative thought understood as the distinct capacity to generate multiple alternative solutions to problems as opposed to the one correct solution. Divergent thinking is assessed through open-ended tests that acces thinking about consequences and alternatives, with responses being scored for influence (number of responses), flexibility (category shifts in responses), and originality (uniqueness of response).

In this study a special program was created to provide students with creativity capacities training, including how to make subjective evaluations of their own creativity features (creativity, originality, ability to generate ideas, and curiosity). The theoretical background of the program is based on creative psychology and humanistic psychology concepts.

The relevance of this study is that it will begin to establish relatively effective methods for a creativity training program developed by the author of this research. This program is one of the first such programs that seeks to know the possibility of enhancing students' creativity in Lithuania.

The purpose of this study was: (1) to reveal the changes of students' creative abilities, and; (2) to investigate the possibilities of enhancing students' creative abilities using the author's program. Focused on in the study was interactions between students' creative abilities variation and subjective evaluation of their own creativity.

Methodology of the Research

Subjects: There were 160 students of Vilnius Pedagogical University (VPU) involved in the research. All subjects were 22-25 years old (mean age 23). The subjects were randomly assigned to two experimental (n=80) and control groups (n=80). These students were VPU students who took part in the seminar "Psychology of Creativity."

Training Methods: The students participated in a method involved in a special program of creativity once a week for four months (32 hours). The program was developed in consideration of students' cognitive abilities in creative thinking (fluency, flexibility, and originality) as well as personal aspects. Special (cognitive, personality, imagination, techniques such as brain storming, drama, and problem solving were used to develop students' creative abilities. The experimental group (n=80) took part in the creativity training program, whereas, the control group did not.

Assessment Methods: The level of creative abilities (originality, flexibility, and fluency) was assessed by using the Torrance Test (TTCT, verbal, form A, 1974). The Torrance Test helped to distinguish the students' cognitive parameters of creativity, i.e. originality, flexibility, and fluency.

For evaluating ones own creativity, curiosity, originality, and ability to create ideas, the Dembo-Rubinstein Method (DRM) was used. The students were asked to evaluate their own (present and expected) creativity, originality, curiosity, and ability to create ideas.

Results

The study tried to evaluate the program's effectiveness on students' fluency, flexibility, and originality and how the program changed the students' subjective evaluations of their own creativity.

A positive effect was observed immediately after the completion of the program. The comparative analysis, between the experimental and controls groups, in the cognitive parameters of creativity (fluency, flexibility, and originality) as evaluated by TTCT, Verbal A Form, as well as subjective evaluations of one's own creativity by DRM has showed that the special program was effective, in that:

- All differences between evaluations of creative abilities, arithmetic average of declarative and control investigations were statistically significant (fluency – $t = 5,23$; flexibility – $t = 6,28$, and originality – $t=7,03$); $p<0.001$.

- All cognitive parameters of creativity (fluency, flexibility, and originality) were improved significantly. The significant effects of the creativity training program on components of divergent thinking involved all of the parameters of creativity (originality – $t=7,03$; flexibility – $t=6,28$, and; fluency – 5,23); $p<0,001$

- The creativity training program hanged the students' evaluations of their own creativity. The most significant influence was on students' present creativity

evaluation (p=0,004); expected creativity evaluation (p=0,033); present originality (p=0,001), and; expected curiosity (p=0,024).

The program was considered very useful by students who pointed to the fact that the program contributed to the development of their own creative abilities and changed their view of their own abilities to be creative and original and to create new ideas, also it awoke their curiosity to know more about creativity.

It was observed that while students from the experimental group perceived themselves as more creative after completing the program, the students from the control group perceived themselves to be at the same or even less creative level the second time they were requested to classify themselves on a scale of creativity, originality, ability to creat ideas, and curiosity. Most students emphasized the importance of and their interest in the program.

Conclusion

1. There are real possibilities to develop students' creativity during the learning process in the university. The program used in the research could be effective for the development of students' creative abilities and for making an impact on students' evaluations of their own level of creativity, originality, ability to create ideas, and curiosity.

2. The data suggested the need to rethink education in universities in order to promote better conditions for the recognition and development of creative potential. The high demand for creative persons by society makes a claim for change in all educational systems to make possible creative talent development and expression. It is especially important to teaching to pedagogically profile students who will educate the young people in the future. Creative teachers are able to nurture creative persons who will be responsible for the future of the world.

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