ERD 2019

Education, Reflection, Development, Seventh Edition

FUTURE TEACHERS OPINION ABOUT INDIVIDUAL INNOVATION

Lavinia Șuteu (a), Liliana Ciascai (b)*, Ioan Ciascai (c)
*Corresponding author

(a) Babeș-Bolyai University, 1 Kogalniceanu Street, Cluj-Napoca, România, lavinia.suteu@ubbcluj.ro
(b) Babeș-Bolyai University, 1 Kogalniceanu Street, Cluj-Napoca, România, liliana.ciascai@ubbcluj.ro
(c) Technical University of Cluj, 28 Memorandului Street, Cluj-Napoca, Romania, ciascai@ael.utcluj.ro

Abstract

Innovation as a process and innovative person have been the subject of the researchers' concerns in the exact sciences, psychology and science of education, in the economic or technological fields, etc. Innovation and invention are often confused. The invention involves the production of new things (objects, processes, models or theories), while innovation involves identifying new ways in which an object can be used, identifying and optimizing new processes, and revising and transferring models or theories. They are both based on creativity, synthesis, analysis and evaluation skills, but in the case of the invention the ability to synthesize information is more important than analysis and evaluation, as compared to innovation where analysis and evaluation skills are essential. This study presents the results of a survey on innovative skills and a profile of innovative people. 219 students, future teachers for preschool and primary education were involved in the survey. The results indicate that participants agreed in a higher degree as to what skills are important for innovation and in a lower degree regarding the skills of innovative individuals. They also indicate the need to prepare future teachers for preschool and primary education to cultivate the innovative skills of their students and promote innovation culture within the institutions they work.

Keywords: Innovation, preschool, primary education, skills.

1. Introduction

We live in an era of innovation. Education for innovation should start from early ages and future teachers for preschool and primary education should be trained to develop to their students the skills involved in the innovation process. But are they open to innovation?

1.1. Innovation vs. invention

The distinction between innovation and invention it is often hard to be made, both being considered elements of continuous process (Fagerberg, 2004). Furthermore, both have been related to creation as considered the ability to think and act in an innovative / new way (Wagner, 2012). Creativity precedes invention and innovation (Standing et al., 2016, p. 43). Both invention and innovation involve creating ideas, products, concept and devices. However, innovation has often been related to new ideas, processes and products at a larger scale as compared to invention and may involve optimisation or a new use of an existing process or product. The distinction between innovation and invention may be also found in the applicative character of innovation and the demand to adapt an existing product to specific needs and requirements (Nickles, 2003; OECD, 2011).

Innovation, as a source of processes, products and services is determined by a need of an organization, market, and relates invention with the economic and social environment. The transfer of an invention into practice represents a complicated step, often impossible to be accomplished at the moment of invention because the knowledge, skills, materials and instruments that an inventor / discoverer needs are not always available at the time of the invention, but can be available at a given moment. The process of innovation includes the identification of needs, the analysis and transfer of information and strategic approach. In the last stage (the strategic approach), the innovative person uses his knowledge and skills to explore alternatives and opportunities, to develop ideas, to elaborate and test a prototype, to make revisions and share the results (Bezerra, 2005).

Marinova and Phillimore (2003) identify six generations of explanatory models which illustrate the complexity of the phenomenon of innovation. Based on a creative model and economic considerations, these models involve activities, participants, interactions and are completed with a process or technological product that is not a revolutionary one. Although they have been initially developed to explain innovation within different companies / enterprises, these models have extended to also explain other phenomena.

1.2. Individual innovation

Individual innovation is the result of a particular organization of cognitive experience of a person, acquired as a result of an internal process that involves adaptation, development and enrichment of one's own cognitive resources, and leads to an intellectual image and a personal interpretation of events, actions, ideas, problems (Shavinina, 2013, p. 4). Shavinina and Seeratan (2003) suggest that innovation has a multileveled internal structure: (1) a base of development, (2) a cognitive base of innovation, (3) an intellectual manifestation level of innovation, (4) a metacognitive manifestation level of innovation, and (5) an extracognitive manifestation level of innovation. Delcourt and Renzulli (2013) and Shavinina and Seeratan (2003) relate innovation to talent, creativity, exceptional intelligence and giftedness. Thereby, the

talent that leads to innovation arises at the intersection between competence in a given domain, commitment to a task and creativity and manifests at specific individuals, in certain moments and conditions.

1.3. The competence to innovate

Competence, show Potolea and Toma (2010), can be defined as a behavioural pattern, which manifests in professional contexts and in solving complex tasks. Competence integrates knowledge which ensures the theoretical base of competence, skills representing the actional component of competence and the personality traits as the valuable, affective and motivational base of competence.

The competence to innovate represents a mix of personal characteristics, knowledge, skills, attitudes and motivations, all working in a specific context, in order to solve authentic tasks. The list of components includes: creativity, enterprising spirit, the integration of different perspectives, predictions, the management of change, critical thinking, motivation, teamwork (Marin-Garcia et al., 2016; Podmetina, Soderquist, Petraite, & Teplov, 2018), research, analysis, strategic and synthesis skills (Bezerra, 2005). UNDP (2016) identifies 6 levels in the development of the competence to innovate: critical assessment of an idea and product; analyses and identification of alternatives; adapting ideas, processes or products to a specific context and/or the optimization/change of ideas, processes or products; creating new perspectives, ideas or products; integrating ideas, perspectives, components or products and development of new actions.

2. Problem Statement

At an international level, innovation represents a goal of developmental policies (UNDP, 2016). As a result, it is important to promote a culture of innovation in educational institutions, not just in companies and organizations. Universities and high schools with technical specializations offer such programmes to their students. Students preparing to become teachers benefit to a small extent from training programmes in the field of innovation, although they could get involved in innovating the educational process and system.

In order to develop training programmes in the field of innovation, educational institutions have to find out what students believe regarding innovation in general and individual innovation, in particular. The results of the studies that focus on students' opinions regarding innovation could be used in the development of effective training programmes.

3. Research Questions

Students who prepare to become teachers in preschool and primary education are hardly ever informed during courses about innovation and the innovation process. As a result, their source of knowledge regarding innovation comes from their life experience and to a small extent, from schools. Therefore, this study puts forward the following question: What students who prepare to become teachers in preschool and primary education believe about innovation in general and individual innovation, in particular?

4. Purpose of the Study

This study aims to identify the opinions of prospective teachers concerning innovation (educability, genetic inheritance, the importance of innovation in the current society, the characteristics of innovative individuals), the skills that define the innovation competence and the profile of an innovative student.

5. Research Methods

The research was carried out during the second semester of the 2018/2019 university year. The survey was based on questionnaires adapted by researchers after Muñoz-van den Eynde, Cornejo-Cañamares, and Diaz-Garcia (2015) and Cachia and Ferrari (2010). The instrument consists of 60 items: 3 demographical questions and 57 items about innovation, structured in six categories: teacher's role in promoting innovation (8 items), the students' opinions regarding innovation (12 items), the skills needed to be developed to an innovator (11 items), the university openness to innovation (14 items), the characteristics of student as an innovative person (6 items) and the role of education in developing innovation skills (6 items). In the current study we have selected and analysed the respondents' answers to three categories of items (2,3,5). Internal consistency was assessed through Cronbach's alpha reliability coefficient. It was calculated for the 29 items (0.934) and the questionnaire as a whole (0.964). The numerical Likert scale (1 - totally disagree; 5 - fully agree) was used to formulate answers. To discuss the results presented in Table 01 and Table 03 was calculated for each item the sum of percentages of variant 1 and 2 and 4 and 5. The first sum represents the percentage of students who don't agree with an affirmation (marked with No), and the second one represents the percentage of students who agree with an affirmation (marked with Yes). In the case of some items the information was completed with percentages of total agreement or disagreement

The survey was attended by 219 respondents who participated online and voluntary. Most of the respondents were women (97%). The distribution by age groups was as follows: 48.4% respondents aged 18-24 years; 10% between 25-29 years; 15.5% between 30-34 years; 11.4% between 35-39 years; 9.6% between 40-44 years and the rest of the respondents exceeds 45 years. 70% of the respondents were third year future teachers for primary and preschool education, 3 were pursuing master's degree specialisation and 4 were PhD students. The rest of the respondents are teachers and 8 of them hold the title of PhD respectively master's degree.

6. Findings

Table 01 presents students' opinions concerning innovation. An equal percentage of respondents (43.38%) strongly disagrees with the idea that innovation is relevant only in the technical and artistic fields. The respondents consider that nowadays is important to be innovative (34.70% strongly agree), regardless of the profession (24.68% strongly agree). About half of respondents disagree with the idea that many other skills are more important than innovation (47.03%), that innovation is an innate talent (40.64%) and a characteristic of the eminent people (55.25%).

Table 01. Respondents' opinions concerning innovation

Item	N	Yes (%)	No (%)	M	SD
The ability to innovate is characteristic to eminent people only	219	18.72	55.25	2.40	1.12
The ability to innovate is an innate talent	219	29.22	40.64	2.80	1.14
Innovation is only relevant in the artistic field (visual arts, music, theatre, etc.)	219	12.79	69.41	2.02	1.11
Innovation is only relevant in the technical field (engineering, science, technology, etc.)	219	11,87	70.78	1.99	1.07
Nowadays it is important to be a person able to achieve innovations	219	71,23	8.22	3.95	1.01
In any profession it is required to be innovative	219	62,10	17.81	3.67	1.13
Innovative people are intelligent	219	64,38	12.79	3.74	1.02
People can learn to be innovative	219	67,12	9.13	3.88	1.01
Innovative skills develop with effort	219	63,47	12.33	3.73	1
Anyone can be innovative	219	52,51	23.29	3.47	1.23
Innovation is not as important as it is thought to be, there are many other more important skills	219	24,66	47.03	2.64	1.15
Innovative people have a rich imagination	219	76,71	7.31	4.11	0.98

25.11% of the respondents completely agree that everyone can be innovative and that innovative people are intelligent. Also, over 50% of the subjects agree that innovation can be developed through learning, with effort. The highest percentage of total agreement is registered with reference to the fact that innovative people have to possess a rich imagination (43.38%).

Between 80% -87% of respondents agree with the affirmations regarding the skills needed to be an innovator (Table 02). The highest percentage of total agreement (70.62%) is recorded with reference to the affirmations that "in order to be able to innovate you must have to develop your creativity and interest in innovation".

Table 02. The skills needed to be developed for becoming an innovator

Item	N	M	SD
The ability to identify needs or opportunities	219	4.29	0.95
The ability to generate and select important ideas	219	4.32	0.95
The ability to deepen and develop ideas	219	4.42	0.89
The ability to make timely decisions	219	4.33	0.96
The ability to reflect on developed ideas	219	4.34	0.94
Ability to represent ideas in various forms	219	4.28	0.93
The ability to evaluate ideas	219	4.26	0.94
The ability to solve problems	219	4.35	0.98
Creativity	219	4.52	0.90
Planning skills	219	4.33	0.96
Interest in innovation	219	4.51	0.92

The skills involved in the innovation process are less valued in comparison to creativity and motivation. One possible explanation would be that respondents are less informed about the innovation process and as a result, attach little importance to the specific steps it implies.

Table 03. The characteristics of the student considered to be an innovative person

Item	N	Yes (%)	No (%)	M	SD
The intelligent student is also innovative	219	56.16	18.72	3.55	1.04
The innovative student thinks logically	219	55.25	15.98	3.57	1.06
The innovative student thinks critically	219	61.19	14.61	3.73	1.11
The ability to innovate is present in any student (it is not something rare)	219	41,55	29.22	3.15	1.15
Innovative students are dreamers, broken from reality	219	16,89	56.16	2.39	1.15
Innovative students are skilful ones	219	36,53	31.51	3.07	1.14

In what concerns the characteristics of the innovative student, the respondents appreciated the most the following: critical and logical thinking (30.14% total agree respectively 21% total agree). The lowest percentage of "total agree" is recorded by the statement: "innovative students are dreamers, broken from reality" (5.02%). More than half of the respondents (55.16% agree) consider that the intelligent student is also innovative.

7. Conclusion

Innovation competence is considered nowadays a key-competence (UNDP, 2016). According to the results of the present study, there is a high degree of agreement regarding the importance of innovation in today's society and in any profession. Likewise, as the averages of the items indicate, respondents appreciate to a great extent the skills of the innovation process, including creativity and the interest for innovation. Respondents disagree with the affirmations that relate innovation with talent, predisposition for dreaming, disciplinary field, eminent individuals, but agree the fact that innovative persons have a rich imagination.

The results of our study reveal that there is a need to make changes in the curriculum for the initial training of students who prepare to become teachers in the preschool and primary education. These revisions should not materialize into a specific subject focused on the innovation process, but the concern for the development of innovation competence needs to be present regardless of a given subject.

Acknowledgments

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