PSYCHOLOGICAL PREDICTORS OF INNOVATIVENESS OF TEACHING STAFF
Olena Ihnatovych
Doctor of Sciences in Psychology, Senior Researcher,
Head of the Department of Psychology of Labor
Ivan Zyazyn Institute of Pedagogical and Adult Education of the National Academy of
Pedagogical Sciences of Ukraine
9, M. Berlinsky Str., Kyiv, Ukraine, 04060
lena_ignat70@ukr.net, https://orcid.org/0000-0002-0588-0620

Svitlana Polishchuk
PhD in Psychology, Associate Professor of the Department of General and Social Psychology
and Psychotherapy
National Dragomanov Pedagogical University
9, Pyrohov Str., Kyiv, Ukraine, 01601
mood2008@ukr.net, https://orcid.org/0000-0002-4599-493X

Abstract
The article considers the problem relevant for age and pedagogical psychology – the development of an innovative personality of the teacher. The article aims to highlight the theoretical and empirical predictors of the study of personality innovation. Tasks of research: definition and substantiation of psychological predictors of innovation of the person; conducting an empirical study and presenting its results to determine the levels of innovation of teachers. To build the psychological profile of the personality of an innovative pedagogical worker, a method of “self-assessment of professional innovative culture of a teacher” was used, which meets the requirements of standardization (analyzed left and right shifts, measures of asymmetry and distribution) and validity (α Cronbach = 0.8). In the process of development and validation of the methodology “self-assessment of professional innovative culture of a teacher” was performed content analysis, descriptive statistics, factor analysis. The “self-assessment of professional innovative culture of a teacher” method has sufficient reliability, satisfactory consistency and can be used to psychologically measure the levels of innovation development of teachers (Ignatovych, 2018). Empirical research included procedures of expert questioning, content analysis, psychodiagnostic methods: “Motivation to achieve success and avoid failure” (A. Rean); “Value orientations” (M. Rokich); personal self-actualization questionnaire (N. Kalina); intelligence structure diagnostics test (R. Amthauer); methods of multifactorial study of personality (R. Cattell); “tapping test” (E. Ilyin). In the context of the presented materials, the authors highlight the empirical generalization of the results of the study of psychological predictors of personality innovation and, in the particular, pedagogical staff of general secondary, extracurricular, vocational, higher, postgraduate education; the psychological profile of the personality of the innovative pedagogical worker is constructed. It is established that the definition of psychological predictors is of undoubted scientific and practical importance, as it allowed not only to determine the factors that determine the phenomenon of innovative teachers but also to assess the comparative contribution of these factors to the projected effect of its development in teachers. The defined system of psychological predictors of innovation development of pedagogical workers consists of gender-age, educational-professional, affective-cognitive, motivational-activity, value-orienting factors.
Keywords: innovation, gender-age, educational-professional, affective-cognitive, motivational-activity, value-orientation factors, pedagogical workers.

Introduction

Significant socio-economic phenomena occurring in modern Ukraine require teachers to have the appropriate level of psychological readiness of the individual to implement the ideas of educational development on an innovative basis. The Concept of the “New Ukrainian School” states that the school must be at the forefront of social change, and its graduate must be an innovator capable of changing the world around him, developing the economy, competing in the labour market, and learning throughout life. Modern conditions, content and forms of pedagogical work require from the individual new professional competencies, mediation of efforts and time not only at their request, as well as the threat and implementation in pedagogical practice, and this requires changes in content and technologies of training of future teachers postgraduate education of pedagogues-practitioners taking into account the need to develop in them the appropriate level of innovation provided that the era of principles of new knowledge and abilities of cognition. The specialist of this stage of social development – is a highly qualified innovative person who is able to create, implement and use pedagogical innovations, is able to solve problems in a non-standard way and act independently, proactively, take responsibility for their own actions and decisions. The ability to innovate has become a condition for human orientation in rapidly changing and transient world processes, a condition not only for adaptation to them but also for their own life and creativity. Therefore, the pedagogical worker who wants to meet the requirements of today must realize the need for knowledge of the theory of innovation and innovation processes in education. In this context, the problem of innovation of teachers becomes particularly important and relevant.

Currently, the most developed areas of pedagogical innovation are the justification of the laws of functioning and development of innovation processes in various systems, pedagogical in particular, as well as determining the structure of content and results of innovation (Fedorova & Tatarchuk, 2015). The theoretical foundations of pedagogical innovation (Godin, 2017), regularities of innovative educational management (Tidd & Bessant, 2013), psychology of innovations (Kumar & Bharadwaj, 2016), psychological features of professional self-determination of the individual are developed and carefully characterized in scientific works. In the conditions of innovative development of education (Polishchuk, 2015). In the context of these developments, researchers largely cover the specific historical situation of modern education, determine some permanence and direction of the processes of creation, implementation, dissemination of pedagogical innovations for development, holistic renewal of psychological and pedagogical theory and practice, and innovation.

The urgency of this problem is due to a critical analysis of the preconditions, purpose, factors of emergence and development of innovations in education, studying the psychological aspects of this process, as well as identifying the specific part of reality that can study and explain the development of innovation as an individual teacher and education as a whole. In this aspect, V. Lazarev considers the innovation process, conditions, methods and results of its creation, as well as the relationship between the effectiveness of innovation processes and its factors, which influences these factors to promote the development of innovative education. It should be noted that in this case, the author used the concept of the innovation process as process of educational development through creation, dissemination and assimilation of innovations, which is based on innovative activity as purposeful transformation of educational practice through creation, dissemination and assimilation of new educational systems or any of their components (Lazarev, 2004). O. Khutorsky, in addressing the innovative nature of education, noted that its study can not...
be limited to the innovation process, as it includes – not only the transformation of educational practice but also the conditions, means, patterns, forms, methods, technologies etc., which are related to pedagogical innovations… The main point – is a personal factor that changes both students and teachers (Khutorsky, 2005). In the context of these statements, G. Ball concluded that the development of innovation of teachers is determined not only by factors that affect the renewal of education, but also factors of change that occur in the formation of the student and teacher, lead to effective interaction of personality, creativity, innovation, culture (Ball, 2006).

However, in determining the various factors in the development of educational innovation, the researchers ignored the question of psychological predictors of the development of individual innovation.

The aim of the study: coverage of the results of the study of innovation. Objectives of the study: determination of psychological predictors of personality innovation.

Research methods

To identify the levels of development of innovation of teachers, as well as to build a psychological profile of the personality of an innovative teacher, we have developed a method of “self-assessment of professional innovation culture of the teacher”. The “self-assessment of professional innovation culture of the teacher” methodology developed by us meets the requirements of standardization (left and right shifts are analyzed, measures of asymmetry and distribution) and validity requirements (Cronbach's $\alpha = 0.8$), providing comparison and analysis of data obtained from its data from the results obtained during the use of standardized techniques. In the process of development and validation of the methodology “self-assessment of professional innovation culture of the teacher” content analysis, descriptive statistics, factor analysis. The “self-assessment of professional innovation culture of the teacher” method has sufficient reliability, satisfactory consistency and can be used to psychologically measure the levels of innovation development of teachers (Ignatovych, 2018).

An empirical study of the innovativeness of pedagogical staff of general secondary, extracurricular, vocational, higher, postgraduate education included procedures for expert questioning, content analysis, diagnostics on a set of standardized psychodiagnostic techniques such as: method “Motivation to succeed and avoid failure” (A. Rean); method “Value orientations” (M. Rokich); personal self-actualization questionnaire (N. Kalina); intelligence structure diagnostics test (R. Amthauer); methods of multifactorial study of personality (R. Cattell); tapping test (E. Ilyin). We also used methods of mathematical processing of psychological data and their interpretation. Mathematical processing of the innovativeness of pedagogical workers of out-of-school, secondary, vocational and higher educational institutions obtained during the empirical study was carried out by methods of primary statistics, correlation analysis, variance and factor analysis, which revealed the dependencies and relationships between the studied characteristics.

Results and discussions

In order to determine the psychological predictors of the development of innovation of teachers of general secondary, extracurricular, vocational, higher, postgraduate education, six normally distributed samples were formed (each with a volume of $n = 149$). Samples were formed using the built-in random number generator of MS Excel spreadsheets on such indicators like age, gender; education, speciality; dynamic features of neuropsychological activity (strength and mobility), innovation, general ability to search, perception, acceptance and use of new, including the need to find and learn new, logical selection, sense of language, the definition of common
features, ability to the analogy, classification, ability to judge, attention, memory), creative innovation (ability to create new, including the need for creation, the ability to conceptual abstraction, combinatorial abilities, arithmetic thinking, inductive thinking, spatial imagination, the ability to mentally operate with three-dimensional bodies in space); professional innovation (set of qualities of character and activity-important qualities of a teacher – contact, flexibility in communication, emotional stability, dominance, expressiveness, nonconformism, courage, sensitivity, trust, diplomacy, self-confidence, radicalism, self-control, orientation here and now, faith in the here and now, human capabilities, spontaneity, autonomy, autosympathy, adequacy of self-esteem); motives (success, self-actualization), meanings (full and emotionally rich professional activity, new knowledge, new information, new technologies, professional health, exciting work, nature conservation, human improvement, society, art, music, literature, love and respect, financially secure life, team, colleagues, leisure, entertainment, freedom, happy family life, happiness, creativity, self-confidence (values), activity, ingenuity, accuracy, politeness, high demands on life, harassment, cheerfulness, independence, intolerance to shortcomings, professionalism, responsibility, rationalism, self-control, courage, firm will, tolerance, breadth of views, honesty, efficiency in business, sensitivity) and the parameters of these indicators are below average with a general tendency to the middle: average value (M = 5.5), standard deviation (G = 2.0), median (Me = 5), mode (Mo = 4), minimum and maximum value (Xmin = 1), maximum value (Xmax = 10), positive left-sided asymmetry (A = 0.550867), equality of mean values of the studied samples (Fcr = 2.76), equality of variance and homogeneity (Gc = 0.531).

Further exploratory factor analysis of data by the method of leading components with subsequent rotation by the method of Varimx allowed determining (by the percentage contribution of each of the predictors in the total variance) a system of psychological factors of innovation of teachers: gender and age (3.283; 8.698% – factor contribution in total variance), educational-professional (3.786; 9.342%), affective-cognitive (3.793; 9.367%), motivational-activity (3.798; 9.369%), value-oriented (3.802; 9.372%) (Table 1).

Table 1

<table>
<thead>
<tr>
<th>Psychological factors</th>
<th>The variance of the factor</th>
<th>The contribution of the factor to the total variance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender and age</td>
<td>3.283</td>
<td>8.698</td>
</tr>
<tr>
<td>Educational and professional</td>
<td>3.786</td>
<td>9.342</td>
</tr>
<tr>
<td>Affective-cognitive</td>
<td>3.793</td>
<td>9.367</td>
</tr>
<tr>
<td>Motivational and activity</td>
<td>3.798</td>
<td>9.369</td>
</tr>
<tr>
<td>Value-oriented</td>
<td>3.802</td>
<td>9.372</td>
</tr>
</tbody>
</table>

Gender and age factors (gender and role characteristics; age from 25-40 years and 41-60 years) determine the individual differences in the structure of innovation and the features of interpersonal relationships of its properties. At a younger age, the development and functioning of personal innovation is an active search for means of realizing inner personal potential, ways to realize the needs of young teachers in cognition, creativity, achievement, and in older age the search for new narrows to the use of tools that are already established, fixed, which reduces the individual's susceptibility to the new. Thus, men (35%) and women (65%) aged 25-40 years tend to integrate and internal coherence of individual properties of innovation. In (29%) and women (71%) aged 41-60 years, the integration and internal coherence of innovation are expressed at a lower level. This is evidenced by fewer correlations. Representatives of this group had statistically
significant relationships between the innovative orientation of the teacher's personality and the
general level of innovation, and in the first group – between the innovative orientation of the
individual, personal readiness for innovative pedagogical activities, innovative receptivity.

Educational and professional factors (education and speciality) are a professional aspect of
innovation of teachers, is a kind of catalyst that enhances and directs the identification of individual
differences in cognitive processes, characterological and activity-important qualities, values,
meanings in innovative pedagogical activities of different types of educational institutions, qualified
in specialities in the field of natural sciences, humanities and physical and mathematical sciences.

Affective-cognitive factors (strength and mobility of neuropsychological activity; cognitive
and intellectual functions) characterize the uniqueness of thinking and intellectual activity.Teachers
with the inertia of nervous processes absorb information more slowly, but work more accurately
and more carefully perform the tasks of innovative pedagogical activities.Teachers with a weak or
mobile and strong nervous system are not able to quickly and efficiently perform the tasks of
innovative pedagogical activities in limited conditions or in conditions of responsibility that
requires mental stress and so on.In such conditions, pedagogical workers with a strong and inert
nervous system work better, who, at the same time, show lower results of intellectual actions in the
implementation of various content and methods of tasks that require rapid switching of
attention.Teachers with a strong nervous system have higher scores on factors C “Emotional
instability - emotional stability”, G “Subordination to feelings - high normative behaviour”, Q3
“Low self-control - high self-control”, F “Restraint – expressiveness”, O “Confidence” in
themselves - anxiety, which indicates their high level of self-control, responsibility, good control of
emotions and behaviour, restraint, self-confidence and low anxiety.Teachers with a weak nervous
system are characterized by opposite properties such as low self-control, impulsiveness,
irresponsibility, guilt, poor control of emotions and behaviour, anxiety.Thus pedagogical workers
with excitement mobility are inherent in a tendency to doubts, suspicions (factor L), orientation to
external reality (factor M), and to those who are characterized by the inertia of excitement –
credulity and self-immersion.The tendency to doubt, suspicion (factor L), self-immersion (factor
M), confidence (factor O), critical attitude (factor Q1) and poor control of emotions and behaviour
(factor Q3) are also demonstrated by teachers who have inhibitory mobility.

The differences of natural science thinking are generalization, clarity and effectiveness;
ability to spatial representation; ability to perceive, understand, prove the laws of natural facts,
phenomena in practical and pedagogical situations.Humanitarian thinking is characterized by
concreteness, clarity and imagery; the ability to operate with words as symbols; ability to perceive,
understand, explain the condition of other people, to anticipate the development of various socio-
pedagogical situations.Physical and mathematical thinking is accurate, consistent, symbolic,
abstract; ability to operate with mathematical symbols, numbers; ability to perceive, understand,
prove the connections of physical forces and elements of mechanisms in practical and pedagogical
situations.

Insufficiently developed abilities for logical selection, sense of language, the definition of
general features, conceptual abstraction, analogies, insufficient combinatorial abilities, inability to
classify and judge make it difficult to deploy intellectual actions at the analytical level. Intermediate
abilities of arithmetic thinking, inductive thinking, spatial imagination, inability to mentally operate
three-dimensional bodies in space, lack of attention and memory cause difficulties in the
development of intellectual actions of the individual on a practical level, and low creativity – on a
creative level. ambiguously affects the development of teacher innovation.
Motivational and activity factors (motives for achievement and self-actualization, behavioural, characterological and activity-important qualities) determine the intensity, amplitude and range of manifestations of innovation of teachers, as well as individual differences in character and qualities important for innovative pedagogical activities. A set of activity all-important psychological qualities (for naturalists – sensitivity, auto-sympathy, adequacy of self-esteem, the humanities – contact, flexibility in communication, orientation here and now, belief in human capabilities, expressiveness; self, self-control). An important role in the development of innovation is played by the desire for self-actualization in innovative pedagogical activities, to achieve success; emotional and volitional characteristics of the individual manifested in its propensity to risk, responsibility, determination, initiative, form the innovative nature of pedagogical communication and activities (exchange of innovative information, interaction and mutual understanding in the process of innovation).

The group of value-oriented factors consists of values (activity, ingenuity, accuracy, politeness, high demands on life, harassment, cheerfulness, independence, intolerance to shortcomings, professionalism, responsibility, rationalism, self-control, courage, firm will, tolerance, breadth of views, efficiency, sensitivity) and meanings (full and emotionally rich professional activity, new knowledge and information; professional health, exciting work, nature conservation, human development, society, art, music, literature, love and respect, financially secure life, team, colleagues, leisure, entertainment, freedom, happy family life, happiness, creativity, self-confidence). Value-oriented factors determine the pathologization of innovation of teachers. Differences in its axiologization in “Physicists-mathematicians” are manifested in the value attitude to physical and mathematical knowledge, symbols, signs, numbers, mechanisms, techniques and pedagogical innovations in the fields of physics, mathematics, computer science, cybernetics; “Humanities” – a value attitude to knowledge about man, society and pedagogical innovations in the fields of philosophy, sociology, psychology, history, culture, art, literature, music, “naturalists” – a value attitude to knowledge about nature, natural resources and pedagogical innovations in fields of geography, chemistry, biology. According to the results of correlation analysis, we found that the indicators of innovative susceptibility at the level of statistical significance p≤0.05 correlate with the indicators of strength and mobility of the nervous system, obtained by the tapping test of E. Ilyin (r = 0.54); R. Amthauer test scales of theoretical and practical intelligence (r = 0.47; r = 0.65); R. Kettel's questionnaire scales such as: factor B – “Intelligence” (r = 0.54), factor M “Practicality - developed imagination” (r = 0.57), factor Q1 – “Conservatism – radicalism” (r = 0.46); scales of the questionnaire of self-actualization of the personality such as: “Orientation in time” (r = 0.72), “Need for knowledge” (r = 0.74), “Aspiration to creativity (creativity)” (r = 0.82), “Spontaneity” (r = 0.67), “Autosympathy” (r = 0.73). The identified correlations give grounds to consider the affective-cognitive factors that determine the development of innovative receptivity of teachers, which is manifested in the processes of perception, memory, imagination and thinking, considered by us as providing teachers with the ability to perceive innovation, mastery. them, as well as their creation.

Indicators of innovation orientation at the level of statistical significance p≤0.05 correlate with the results obtained by the method “Motivation for success and fear of failure” (AA Rean): motivation for success (r = 0.47), motivation to avoid failure (r = - 0.5); indicators of the general desire of the individual to self-actualization (r = 0.62), indicators obtained on the scales “Values” (r = 0.6), “Self-understanding” (r = 0.5), “Autosympathy” (r = 0.41), “Contact” (r = 0.39), a questionnaire of self-actualization of personality; by the factors of MD “Adequacy of self-esteem”
Conclusions

The psychological predictors of the development of innovation of teachers include gender-age, educational-professional, affective-cognitive, motivational-activity, value-oriented factors. Gender-age (gender-role features; age from 25-40 years and 41-60 years) determine individual differences in the structure of innovation and features of inter structural connections of its properties. Educational and professional factors (education and profession) are a professional aspect of innovation of teachers, is a kind of catalyst that enhances and directs the identification of individual differences in cognitive processes. Affective-cognitive factors (strength and mobility of neuropsychological activity; cognitive and intellectual functions) characterize the uniqueness of thinking and intellectual activity. Motivational and activity factors (motives for achievement and self-actualization, behavioural, characterological and activity-important qualities) determine the intensity, amplitude and range of manifestations of innovation of teachers, as well as individual differences in character and qualities important for innovative pedagogical activities. Value-oriented factors determine the axiolization of innovation of teachers.

Identified psychological predictors of the development of innovation of teachers and the established correlations between them give grounds to predict the development of: 1) innovative receptivity of the individual as a component of innovation of teachers, which in some way provides the ability of teachers to see new, pedagogical activity or to accept already ready pedagogical innovations; 2) personal readiness for innovative pedagogical activity as a structural property of innovation, which determines the possibility of forming the interest of teachers in creating, assimilating and disseminating educational innovations, stable motivation for innovative pedagogical activity, ensures the formation of algorithm of purposeful actions to achieve effective results; 3) innovation orientation as a necessary component of innovation of pedagogical workers, which determines the formation and development of the system of personal values, determines the direction and results of innovative pedagogical activities.

The authors see prospects for further research in addressing the issues of psychological support for the development of innovation of teachers of different qualifications and different types of educational institutions.

Literature


References
ПСИХОЛОГІЧНІ ПРЕДІКТОРИ ІННОВАЦІЙНОСТІ ПЕДАГОГІЧНИХ ПРАЦІВНИКІВ
Олена Ігнатович
dоктор психологічних наук, старший науковий співробітник, завідувач відділу психології праці
Інститут педагогічної освіти і освіти дорослих імені Івана Зязюна НАПН України
04060, Україна, м. Київ, вул. М. Берлінського, 9
lena_ignat70@ukr.net, https://orcid.org/0000-0002-0588-062

Світлана Поліщук
cандидат психологічних наук, доцент кафедри загальної і соціальної психології та психотерапії
Національний педагогічний університет імені М.П. Драгоманова
01601, Україна, м. Київ, вул. Пирогова, 9.
mood2008@ukr.net,https://orcid.org/0000-0002-4599-493X

Анотація
У статті розглянуто актуальну для вікової та педагогічної психології проблеми – розвитку інноваційності особистості педагога. Метою статті є висвітлення теоретичних та емпіричних предикторів дослідження інноваційності особистості. Завдання дослідження: визначення та обґрунтування психологічних предикторів інноваційності особистості; проведення емпіричного дослідження та презентація його результатів щодо визначення рівнів розвитку інноваційності педагогічних працівників. Для побудови психологічного профілю особистості інноваційного педагогічного працівника було розроблено методику самооцінки фахової інноваційної культури педагога «СФІКП», яка відповідає вимогам стандартизації (аналізувалися ліво- і правобічні зсуви, міри асиметрії й розподіл) та валідності (α Кронбаха = 0,8). В процесі розробки та валідизації методики «СФІКП» здійснено контент-аналіз, дескриптивну статистику, факторний аналіз. Методика «СФІКП» має достатню надійність, задовільну узгодженість та може бути використана для психологічного вимірювання рівнів розвитку інноваційності педагогічних працівників (Ігнатович, 2018). Емпіричне дослідження включало процедури експертного опитування, контент-аналізу, психодіагностичні методики: методика «Мотивація досягнення успіху та уникнення невдач» (А. Реан); методика «Ціннісні орієнтації» (М. Рокіч); опитувальник самоактуалізації особистості (Н. Каліна); тест діагностики структури інтелекту (Р. Амтхауер); методика багатофакторного дослідження особистості (Р. Кеттелл); теппінг-тест (Є. Ільїн). У контексті презентованих матеріалів авторами висвітлено емпіричне узагальнення результатів дослідження психологічних предикторів інноваційності особистості й, зокрема, педагогічних працівників закладів загальної середньої, позашкільної, професійно-технічної, вищої, післядипломної освіти; побудовано психологічний профіль особистості інноваційного педагогічного працівника. Встановлено, що визначення психологічних предикторів має безсумнівне науково-практичне значення, оскільки дозволило не тільки визначити чинники, що зумовлюють феномен інноваційності педагогів, а й оцінити порівняльний внесок цих чинників у прогнозований ефект її розвитку у педагогічних працівників. Визначена система психологічних предикторів розвитку інноваційності педагогічних працівників складається з гендерно-вікових, освітньо-професійних, афективно-когнітивних, мотиваційно-діяльницьких, ціннісно-орієнтованих чинників.

Ключові слова: інноваційність, гендерно-вікові, освітньо-професійні, афективно-когнітивні, мотиваційно-діяльнісні, ціннісно-орієнтовані чинники; педагогічні працівники.

Піддано 17.08.2020
Рекомендовано до друку 03.09.2020