



Determinantes Psicológicos da Preparação para a Inovação entre os Jovens Estudantes Ucranianos

Psychological determinants of innovation readiness among the Ukrainian student youth

Determinantes psicológicos de la disposición a la innovación entre los jóvenes estudiantes ucranianos

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Resumo

No presente estudo analisou-se o tema da aptidão psicológica para a inovação da juventude ucraniana atual e os seus determinantes psicológicos. A relevância do tema baseia-se nas exigências crescentes dos empregadores em relação aos licenciados e às suas características psicológicas, que requerem uma adaptação rápida às novas condições e mudanças constantes, incluindo a aptidão para a inovação. Verificou-se que os fatores mais importantes da aptidão psicológica para a inovação são, por um lado, a baixa rigidez e o neuroticismo e, por outro, a capacidade de correr riscos em prol do sucesso, a elevada necessidade de auto-desenvolvimento e a agressividade. Foram estabelecidas as características psicológicas dos estudantes que têm um elevado nível de aptidão psicológica para a inovação. Foi apresentado o perfil psicológico da pessoa com um elevado nível de aptidão para a inovação. As características mais importantes de uma personalidade inovadora são a elevada autoestima e o nível de exigência, a estabilidade emocional e a força de vontade desenvolvida.

Palavras-Chave: Determinantes Psicológicos da Preparação para a Inovação; Esfera Emocional-Volitiva; Esfera da Necessidade Motivacional; Características da Personalidade Inovadora.

Abstract

This study analysed the topic of the psychological aptitude for innovation of today's Ukrainian youth and its psychological determinants. The relevance of the topic is based on the growing demands of employers on graduates and their psychological characteristics, which require quick adaptation to new conditions and constant changes, including aptitude for innovation. It was found that the most important factors in psychological aptitude for innovation are, on the one hand, low rigidity and neuroticism and, on the other, the ability to take risks in favour of success, a high need for self-development and aggressiveness. The psychological characteristics of students who have a high level of psychological aptitude for innovation were established. The psychological profile of the person with a high level of aptitude for innovation was presented. The most important characteristics of an innovative personality are high self-esteem and level of demand, emotional stability and developed willpower.

Keywords: Psychological Determinants of Innovation Readiness; Emotional-Volitional Sphere; Motivational-Need Sphere; Personality Characteristics of Innovative Personality.



Resumen

Este estudio analiza el tema de la aptitud psicológica para la innovación de la juventud ucraniana actual y sus determinantes psicológicos. La relevancia del tema se basa en las crecientes exigencias de los empresarios a los licenciados y sus características psicológicas, que requieren una rápida adaptación a las nuevas condiciones y cambios constantes, incluida la aptitud para la innovación. Se descubrió que los factores más importantes de la aptitud psicológica para la innovación son, por un lado, la baja rigidez y el neuroticismo y, por otro, la capacidad de asumir riesgos en favor del éxito, una alta necesidad de autodesarrollo y la agresividad. Se establecieron las características psicológicas de los estudiantes que tienen un alto nivel de aptitud psicológica para la innovación. Se presentó el perfil psicológico de la persona con un alto nivel de aptitud para la innovación. Las características más importantes de una personalidad innovadora son una alta autoestima y nivel de exigencia, estabilidad emocional y fuerza de voluntad desarrollada.

Palabras Clave: Determinantes Psicológicos de la Disposición a la innovación; Esfera Emocional-Volitiva; Esfera Motivacional-Necesidad; Características de la Personalidad Innovadora.

Introduction

Higher educational establishments all over the world are challenged to increase the competitiveness of their graduates, to create and develop the skills that will help not only to find a job, but also to create new working places, become entrepreneurs, increase the quality of services (Avakyan, & Vinogradova, 2019). All abovementioned requires the graduates to be active and ready for innovations. Those who are currently students will start building a career in a few years, most likely it will be a polyvariant (protean career) or unlimited (boundaryless career) career, which is associated with high professional mobility and development not only hard skills but also soft skills, a special place among which will belong to innovation. In its turn, the Universities are expected to change the management style, approaches for education, introduce innovative methods, which should prepare graduates for changes in the labor market and expectations of employers (Elrehail et al., 2018). A very important personal trait that promotes the fast adaptation for innovations is psychological readiness for innovations (Tukaev et al., 2020). The abrupt changes during the transition to market economy that require higher level of individual initiative and readiness to bear the responsibility for own actions encounter massive resistance in established cultural models of the past (D'anieri, 2018). Among the traits that complicate innovativeness development low motivation to learn and communicate, utilitarian motives are the most important. It



should be noted that the constantly increasing daily stress leads to the development of burnout, which in turn reduces the personal achievements in professional activities (Vasheka & Tukaiev, 2011; Tukaev et al., 2013; Tukaiev et al., 2013; Tukaev et al., 2020). Ali (2019) studied within the group of Pakistan students the influence of “Big Five” factors on the individual innovativeness. He established that extraversion, conscientiousness, agreeableness and openness to experience have positive influence on the innovativeness, and a high level of neuroticism deteriorates the innovativeness. A review of domestic and foreign literature on the issue of psychological readiness for change indicates its insufficient study. Also undeveloped at the present stage is the question of psychological determinants of personality innovation and the establishment of psychological characteristics that are inherent in people with a high level of readiness for innovation, which determines the relevance and timeliness of our study. Given the above, the goal of the study was to establish the level of psychological readiness for innovations in modern Ukrainian student youth; to establish a connection between the psychological readiness for innovation and the characteristics of the emotional-volitional sphere (anxiety, frustration, aggression, rigidity, neuroticism, responsibility, initiative, determination, independence, self-restrain, persistence, energy, attentiveness, consistency), motivational-need-sphere (need in self-development, motivation for success, commitment level, self-esteem), personal characteristics (creativity, risk for success, focus on the future, innovativeness of personality; extraversion; tolerance-intolerance for uncertainty); to identify the main factors of psychological readiness for innovation using regression analysis; to establish the psychological characteristics inherent in a person with a high level of readiness for innovation and to develop her/his psychological profile. We set up the following hypothesis:

H1: Psychological readiness for innovation is a derivative of a set of psychological characteristics of the emotional-volitional, motivational-need and personal spheres of youth.

Method

Participants

In total, 95 healthy volunteers, 1st-3rd year students of humanitarian and technical specialties of the National Aviation University (Ukraine, Kyiv) aged 18 to 21 years (Mage = 18.36, SD = 0.91 years) participated in this study. All participants were tested during September-November, 2019 - 1-3 months before the exam time (baseline session). The participants were eligible to enroll in the survey if they had no clinical manifestations of mental or cognitive impairment, verbal or non-verbal learning disabilities. The use of



psychoactive medication, drug or alcohol addiction and psychiatric or neurological complaints were exclusion criteria. The study was approved by the local ethical committee. Before survey, we obtained written informed consent from each participant in accordance with the World Medical Association (WMA) declaration of Helsinki.

Questionnaires

We assessed psychological readiness for innovation using various questionnaires. The "Psychological Readiness for Innovation" survey (Klochko et al., 2013) determined readiness across three components: initiative, activity preference for innovative tasks, and readiness for change. To measure emotional and volitional traits, we utilized methods like Eysenck's for anxiety and frustration (Raigorodsky, 2011), Chumakov's (2004) questionnaire for volatile traits, and Mandrikova's (2010) self-management questionnaire. Motivation and volition were evaluated using "Diagnostics of Need Fulfillment in Self-development," (Fetiskin & Mironova, 2001), Rean's questionnaire for success and failure motivation (Dvinin & Romanchenko, 2015), Elers' personality questionnaire for success motivation (Raigorodsky, 2011), and Dembo-Rubinstein's self-esteem measurement (Prikhodzhan, 1988). Personality traits were gauged by Levedeva and Tatarko's (2009) innovativeness self-esteem scale, Eysenck's extraversion scale (Raigorodsky, 2011), and Budner's tolerance-intolerance scale for uncertainty (Kornilova & Chumakova, 2014). Data analysis involved correlation analysis and multiple regression to identify the main determinants of innovation readiness. The study used a comparative method employing Student's t-test to distinguish psychological characteristics in individuals with high innovation readiness.

Results and Discussion

We expected a higher score of psychological readiness for innovative activities. The diagnostics of psychological readiness for innovations (Klochko et al., 2013) demonstrated the following levels of readiness among our respondents: a high level - 4,2%, above the average - 75,7%, average level - 18,9%, and low level - 1%. In accordance with such innovativeness criteria as personality traits (Personality Innovativeness Method) the following levels of innovativeness were diagnosed in the group of students: high level - 5,2%, low - 13,8%, and average - 81%. Mainly the average level of this criterion in our respondents can be an obstacle for employment and professional activities adaptation for the graduates and this makes the necessity to develop innovative readiness during studying at the University a priority.

Psychological factors of innovation readiness of student youth



To establish the psychological factors of innovation readiness of student youth, we conducted a regression analysis. This method of mathematical statistics allows to predict the value of the dependent variable by the values of the independent variable, establishing causal relationships between the phenomena being studied. There is a simple linear regression - a statistical method that predicts the value of the dependent variable Y by the values of the independent variable X, and a multiple regression model designed to predict the values of the independent variable Y by the values of several dependent variables (X1, X2, ..., Xk) (Nasledov, 2013). We aimed to analyze the impact (or better to say - the contribution) of several psychological factors on innovation readiness. To solve the problem, we have chosen the method of multiple regression. The dependent variable was the psychological readiness for innovation, and the independent ones were the indicators of the motivational, emotional-volitional, and personal spheres of the respondents. In addition to forecasting, regression analysis shows which characteristics (independent variables) are the most significant, the most important for forecasting the dependent variable, and which variables can be excluded from the model as insignificant. Thus, among the significant number of correlations, you can choose the most significant to predict the dependent variable - readiness for innovation. Correlation analysis was performed using Pearson and Spearman criteria. The first step in regression analysis is to establish statistically proven correlations between variables, which allows you to select only significant correlations in the next step to include these variables in the regression model. The analysis showed that innovative readiness is associated with different psychological characteristics of the individual. It is established that personality neuroticism is inversely related to psychological readiness for innovation, readiness for change and innovative activity (Table 1).

Table 1. Correlation between psychological innovation readiness and characteristics of emotional-volitional, need-motivational, personal sphere, n=95

		Innovation readiness variables			
		<i>Psychological readiness for innovation</i>	<i>Readiness for changes</i>	<i>Innovation activities</i>	<i>Initiative</i>
Variables of the emotional and volitional sphere	<i>Neuroticism</i>	-0,788**	-0,657**	-0,637**	
	<i>Rigidity</i>	-0,375*	-0,342*		
	<i>Initiative</i>	0,706**		0,765**	
	<i>Energy</i>	0,647**			
	<i>Purposefulness</i>	0,389**			
	<i>Aggression</i>	0,318*			0,549*



Variables of motivational-needs sphere	<i>The need for self-development</i>	0,485**			
	<i>Motivation for success</i>	0,466*	0,341*	0,407*	0,398*
	<i>Self-esteem</i>		0,554**	0,498**	
	<i>The level of claims</i>			0,496**	
Variables of the personal sphere	<i>Risk for success</i>	0,466**			0,500**
	<i>Focus on the future</i>	0,417**		0,397**	0,388**
	<i>Innovation personality</i>	0,466**		0,427**	0,482**
	<i>Tolerance to uncertainty</i>			0,445**	

* - Correlation is significant at 0.05 (2-way). ** - Correlation is significant at 0.01 (2-way).

That is, emotional instability, anxiety and sensuality of the individual, and uncertainty indicate the difficulty of perceiving something new and changing the usual way of working, people with a high level of neuroticism will avoid activities related to innovation, because the uncertainty and unpredictability of innovation is a stress factor for such people. Individual rigidity also prevents one from being ready for innovation and change. The inability to quickly change their behavioral reactions, attitudes, motives, leads to the fact that people do not keep up with modern innovation processes and may to some extent beware of them. There are characteristics of the emotional and volitional sphere, which are strengths for readiness for innovation - initiative, energy, purposefulness, aggression. It is generally accepted that the last factor, purposefulness, is one's super-factor defining personal innovativeness (Dyck, 1994). In our opinion, these characteristics determine a proactive life position. Aggression here should be understood in a constructive way as the ability to defend themselves, their vision, be persistent and boldly overcome obstacles (most respondents in the sample have an average level of aggression). Energetic and enterprising young people are not only ready for innovation and new experiences, but also easily get involved in activities to implement innovation in real life. Such results confirm the results of Kryukova (2015), which considers the volitional qualities of the individual as an integral part of psychological readiness for complex activities, including new and unfamiliar. Energy and



initiative can be manifested in the mastery of those skills that help to be effective in a new field. In addition, any innovation begins with an idea, which for the innovator is presented in the "image", "vision" of how this innovation works in the future. It is possible to develop and realize this vision, to introduce innovation thanks to persistence, energy and purposefulness which allow to finish business. Motivation for success, the need for self-development, self-esteem and the level of aspirations - characteristics of the motivational-needs sphere - are also directly related to the psychological readiness for innovation. High motivation for success provides a person with a resource to move forward, a person is set to achieve maximum results. A person who is determined to succeed is not afraid of possible failures that may be on the way to innovation. People with adequate self-esteem and a high level of aspirations are characterized by self-confidence, the ability to rely on themselves, the belief "I can" and the desire to achieve the best results, which is a good prerequisite for readiness for change and innovation. We assume that high self-esteem allows a person to accept and experience a possible "failure" of innovative activities and start over. The need for self-development is related to the psychological readiness to innovate. If a person has a developed need for self-development, it is manifested in interest in everything new, experimentation, finding new experiences, active learning of new knowledge and skills. This need is the internal engine of human activity, which ensures its inclusion in innovation. There is a connection with the psychological readiness to innovate the following personal characteristics: risk for success, future orientation and the index of personality innovation, which is a combination of the above qualities. It is worth emphasizing the following understanding of a person's readiness for innovative activity: a person may be ready for innovation, but not be the author of an innovative idea. That is, such a person must notice, feel the potential of a new idea and be able to develop it. And in this task, the ability to take risks for the sake of success, to remain calm in an unstable environment and to be productive at all stages of the innovation process will be important resources. Orientation to future, a person's focus on perspective and development are key characteristics associated with innovation readiness and innovation. Indeed, innovation is the work of anticipation, the organization of the future, it is characteristic of people who are looking to the future and are on the opposite pole for conservative people who prefer stability. The combination of these two characteristics is an index of innovation - the internal readiness to perceive the new, which allows to overcome the natural resistance to innovation. Tolerance of uncertainty is also a variable that is directly related to the willingness to innovate. Whether a person will engage in innovation will depend on whether he or she endures situations of uncertainty. The innovation process is multifactorial, the innovator encounters situations when it is necessary to make quick decisions, when there are no guarantees of success, when it is necessary to count on the possible support of other people, this is the essence of the situation of uncertainty. In our opinion, such a personality trait as tolerance for uncertainty, promotes calm prudent behavior in uncertain situations and helps to perceive innovations and implement their own more easily. The correlation analysis allowed us to select significant correlations for the inclusion of variables in the regression model. The dependent variable was the



psychological readiness for innovation (methodology "Psychological Readiness for Innovation" by Klochko et al., 2013), independent - those psychological characteristics that have significant correlations with the dependent variable. As a result of regression analysis, it was found that the most important factors of psychological readiness for innovation are low rigidity and neuroticism on the one hand, and the ability to take risks for success, high need for self-development and aggression - on the other. Based on the results of regression analysis, the formula of the regression model in the form of a linear equation is constructed: Psychological readiness for innovation = 14,021 - 0,911 (rigidity) + 0,867 (risk for success) + 0,836 (aggression) + - 0,788 (neuroticism) + 0,374 (need for self-development). The results of regression analysis show that among the characteristics of the emotional sphere the most important for the formation of psychological readiness for innovation were emotional stability and flexibility, based on such properties of the nervous system as the strength of excitation, inhibition and mobility of nervous processes. We can also say that such a characteristic as the average level of aggression has a positive effect on the psychological readiness for innovation and helps in the stage of defending their opinions and implementing new ideas. The high level of need for self-development determines the psychological readiness for innovation because development cannot take place without mastering new knowledge and skills. The ability to take risks for success is an integral part of any new project and idea.

Establishing psychological characteristics inherent in a person with a high level of psychological readiness for innovation

The next step of our study was to establish the psychological characteristics of those students who have a high level of psychological readiness for innovation. To solve this problem, the sample was divided into 2 groups: the first group included respondents with a high and above average level of readiness for innovation, the second - with a medium and low level. The division into groups was carried out according to the total indicator of the questionnaire "Psychological Readiness for Innovation" (Klochko et al., 2013). Student's t-test for independent samples was used to compare the psychological characteristics of students in the first and second groups. The results of the comparative analysis are presented in table. 2.



Table 2. Significant differences in psychological characteristics in groups of students with different levels of readiness for innovation

Scales of methods	Average meanings		Sig. (2-tailed)
	Students with a high level of readiness for innovation	Students with an average level of readiness for innovation	
<i>“The person’s qualities innovative self-assessment scale” by Levedeva N.M. and Tatarko A.N. includes</i>			
Risk for the sake of success	15,0	12,3	0,011
Focus on the future	15,1	13,3	0,015
Innovative personality qualities (general index of person’s innovativeness)	45,8	40,2	0,001
<i>“Diagnosing the realization of need in self-development” by Fetiskin</i>			
The need for self-development	60,3	56,2	0,001
<i>Eysenck Personality Questionnaire (EPQ)</i>			
Extraversion	16,2	8,3	0,000
Neuroticism	8,0	16,9	0,000
<i>Methods of diagnostics for motivation to succeed by T.Elers (Motive to Achieve Success)</i>			
Motivation for success	16,8	13,2	0,003
<i>The questionnaire of M.V.Chymakov “Volatile traits of person”</i>			
Initiative	16,2	10,9	0,002
Energy	20,5	14,2	0,005
Independence	12,3	9,9	0,039
Persistence	11,2	8,2	0,028
Purposefulness	37,1	32,7	0,004
Volitional qualities (total score)	128,5	101,0	0,000
<i>Dembo-Rubinstein’s method of self-esteem and commitment measurement</i>			



Self-esteem level	64,8	42,8	0,000
Level of claims	82,0	55,7	0,000
<i>Budner's scale of tolerance-intolerance for uncertainty</i>			
Tolerance to uncertainty	56,2	52,0	0,006

The results of comparative analysis showed that students with a high level of innovative readiness have such characteristics of the emotional-volitional sphere as a low level of neuroticism (i.e. emotional stability), high levels of initiative, energy, independence, perseverance, focus and high level of volitional qualities in general. All these characteristics indicate such a property as the ability to achieve the goal, go for it and insist on it for its own sake. Similar results were obtained by Finnish scientists, according to which the most important for individual innovation are the psychological factors relating to goal orientation (Aldahdouh et al., 2019). Among the indicators of the motivational-needs sphere, students with a high level of innovation were diagnosed with a strong motivation to succeed, high self-esteem and a high level of aspirations. We can conclude that this group of respondents has self-confidence, as well as high demands on themselves and others, which contributes to their ability to seek new solutions and set completely new goals and not be afraid to be pioneers in their field. This group is also characterized by a pronounced need for self-development, which does not allow them to sit in one place and helps to find new impressions, hobbies, improve their skills and abilities. Also, in the group of students with a high level of readiness for innovation are more pronounced such personal characteristics as tolerance for uncertainty, extraversion, future orientation. They are more likely to take risks for the sake of success, future orientation and greater expression of innovative personality traits, including creativity. Thus, because of a comparison of groups with a high and medium level of psychological readiness for innovation, we can offer a psychological profile of a person with a high level of innovation readiness. The most important features of an innovative personality were high self-esteem and level of demands, emotional stability and developed willpower. This indicates the leading role of self-regulation and high self-esteem in the ability to innovate. A person who is ready for innovation does not doubt himself, does not get nervous and does not worry too much about the result, sets serious tasks and thanks to strong-willed self-regulation is able to bring the case to an end. Also, important psychological characteristics of a person capable of innovative activities were the need for self-development and innovative personality traits. To acquire new knowledge or skills, to set new goals and achieve them, the inner need for self-development is important. It is this need that pushes a person to new achievements, causes dissatisfaction with the current situation and encourages the search for new impressions and changes. Among the innovative qualities of the individual, the risk of success and future orientation contribute the most to the willingness to innovate. The ability to change the usual way of life, stability, predictability and security to uncertainty,



for example, when changing jobs or organizing their business, helps the innovative person to move and achieve the desired success. Not the least role here is played by tolerance for uncertainty, which helps a person who creates something new to hold out for a certain period and not to abandon the intended project.

Focusing on the future allows people with a high level of willingness to innovate to see the future, set goals and not look back for fear of failure. Such individuals do not live with memories of the past and pay less attention to the present moment of life, which is typical for young people who have little life experience, and most importantly - still ahead. Thus, the established psychological determinants of innovation readiness and psychological properties of people with a high level of innovation readiness allow to influence it by developing and stimulating exactly those psychological characteristics that determine it.

Conclusion

The study allowed to identify the main factors of psychological readiness for innovation in modern student youth. Among them, the most significant were low levels of rigidity and neuroticism, and high rates of need for self-development, constructive aggression and the ability to take risks for the sake of success. A psychological profile of a student's personality with a high level of psychological readiness for innovation has also been developed. Dominant qualities were high self-esteem, level of demands, emotional stability and developed volitional qualities. Future orientation and tolerance to uncertainty are characteristic of an innovative personality. In our opinion, the diagnosis of these qualities will help in the professional selection of people to work in areas related to innovation, as well as help higher education institutions to focus on the formation and development of those psychological characteristics of students that will help them in the future become ready for innovation and competitive in today's labor market.

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