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# INTELLIGENCE, CREATIVITY, PSYCHOLOGICAL AND PERSONAL QUALITIES OF EMPLOYEES AS FACTORS OF REAL ACHIEVEMENTS

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## ABSTRACT

*In the work, we analyzed the relationship of indicators of psychometric intelligence and psychometric creativity with intellectual, creative and social achievements. On the other hand, we tried to identify the role of different intellectual abilities and different forms of creativity, taking into account the different measures of their conjugation with real achievements, and also to analyze the role of those personal properties that, related to the peculiarities of organizing different forms of individual mental (conceptual, metacognitive, intentional) experience, act as a condition for real creative achievements of employees.*

*The main approaches to the study of intelligence and creativity in connection with various aspects of individual productivity were examined, the results of studies of the ratio of intellectual and creative abilities were analyzed, and ideas about the role of personal properties as a factor in the employee's real achievements were analyzed.*

**Keywords:** Reliability, Spiritual Intelligence, Validity, Work performance

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## 1. INTRODUCTION

The founder of the science of employment was the American engineer F. Taylor, who began his first experiments on the scientific organization of labour in 1882, and later wrote the book "Management" [1-2]. He attached great importance to the study, rationalization of labour actions and put forward three provisions for the organization and management of the production process:

1. It is necessary to focus on the factors of motivation, the subjective attitude of the worker to his own work activity, the formation of the employee's belief in the usefulness of work for himself. The main impetus for labour is, first and foremost, money, i.e. economic motives.
2. It is necessary to carry out detailed development of methods and techniques of the work activity of the worker on the basis of scientific organization of work, which involves the development of laws, rules, formulas, which need to replace the personal judgments of individual workers. This means tight regulation and standardization of methods and techniques, mandatory use of advanced tools, taking into account working conditions, the separation of functions of planning and execution, the concentration of initiative and management in the hands of production administration.
3. The main focus is not on the masses, but on each individual worker, his anthropological, psychological features, to which the tools of labour should adapt.

F. Taylor's system met the socio-economic conditions of US production in the early twentieth century, which were characterized by large numbers of migrants, ethnic and national differences, intense competition, and labour exploitation.

Psychological factors, which are a prerequisite for individual personality productivity, are the subject of a variety of psychological and interdisciplinary studies. Recently, this problem has acquired particular relevance, since, in modern society, great importance is attached to personal success, professional growth, competence, competitiveness in various fields of activity. Psychological research of the problem of self-realization of a personality is of particular relevance since, in the framework of the current socio-economic situation, the priority is the formation of an active, purposeful, self-developing creative person.

Intelligence, creativity and personal qualities are essential components of effective management of any organization and a prerequisite for its sustainable development. Without them, it is impossible to form in the activity of the organization, create a new product. Because unprofessionalism, weakened commitment, persistent negative skills in manners and thinking, rigid forms and methods of management activities make it impossible to achieve the goals of the organization.

The speed of responding to the growing demands of customers and adjusting their offerings to their needs is a defining feature of a developed market environment. Achieving such characteristics is possible through the use of the creative potential of the employees of the enterprise. Employee creativity and innovations are the prerequisites for achieving a greater competitive advantage and creating a foundation for business development. Creating and implementing new ideas is closely linked to creative (creative) potential. It is important to reveal the importance of the concepts of creativity and innovation in the functioning of modern enterprises, which is a dynamic mode that must respond to the challenges of the market

## **2. THEORETICAL STUDIES OF INTELLIGENCE, CREATIVITY AND PERSONAL TRAITS OF EMPLOYEES AS FACTORS OF REAL ACHIEVEMENTS**

Traditionally, individual human productivity is associated with intelligence and creativity. Intelligence is more often correlated with academic success, high achievements in professional activity and competence [3] (J. Raven, W. Schneider, E. Roh). Creativity is more often associated with creative achievements [4] (J. Guilford, E. Torrens). However, the ratio of these abilities with real individual achievements is not so clear. With high psychometric indicators of intelligence and creativity, a person may have average and below-average levels of academic success, professional achievement. Thus, indicators of individual cognitive abilities (in the form of IQ or a measure of the severity of creativity) cannot be considered as a reliable criterion for predicting real achievements.

### **2.1. Intelligence as a Factor in Real Achievements**

Intelligence has traditionally been studied in the framework of the test direction. The consequence of this approach to the consideration of intelligence was the development of various hierarchical models [4-11]. The question of the structure of intelligence and the existence of the general factor “g” still remains unresolved, and the definitions of intelligence are reduced to operational (“intelligence is what the intelligence tests measure”) or dispositional (“intelligence is the subject’s tendency to behave intellectually in a certain situations”).

Intelligence is the general psychological sense should be considered as a resource that contributes to the successful adaptation of a person to changing environmental requirements, the mobilization efficiency of which is determined by the characteristics of the organization and interaction of different forms of mental experience - cognitive, conceptual, metacognitive, intentional.

In most works, intelligence is interpreted as the most important factor for success in an activity. Empirical studies mainly relate to the connection between intelligence and academic success, creative achievements, and professional competence [4; 12]. However, in the presence of correlations and repeatability of data, it is impossible to unequivocally talk about a direct relationship between the level of general intelligence (in terms of IQ) and real achievements. Many domestic researchers have shown that real achievements are associated with individual intellectual abilities, primarily conceptual.

### **2.2. Creativity as a Factor in Real Achievements**

The most motivating motives that can inspire a leader to be creative include: the desire to change status and make a career; the desire to unleash a complex management decision that will depend on the success of the entire organization; desire to benefit the organization; interest in management matters; the hope that the organization will become more independent and more autonomous; a desire to increase influence on staff; the opportunity to express yourself and your abilities.

The term "creativity" means the creation of something new. The basis of this word is the English noun "creativity", which comes from the Latin word "creatio". There is still no clear definition of the term "creativity", so scientists give the following interpretations:

- creative abilities of the individual, characterized by the ability to produce fundamentally new ideas and are included in the structure of talent as an independent factor;
- the creativity that not only puts forward ideas but also brings them to concrete practical results;
- an internal process that spontaneously proceeds in action;
- the ability to wonder, find solutions in a non-standard situation, focus on the new and the ability to deeply understand their own experience;
- the stage of inspired creativity, the process of detailing a creative product and giving it a specific subject form.

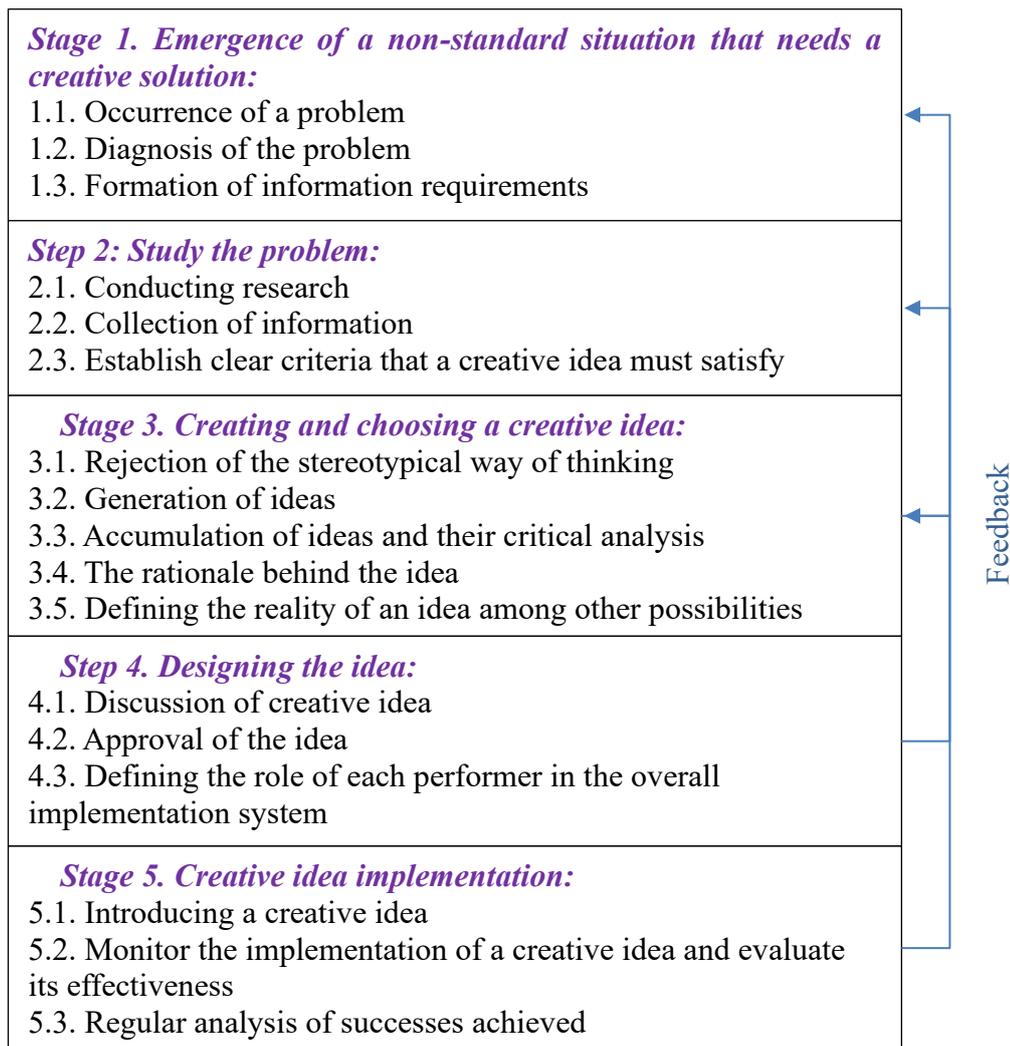
Approaches to the study of creativity are to consider the creative process that takes place in an individual at a particular point in time; in the analysis of the product of creative activity; in studying the personality of the creator; in exploring environmental conditions that foster creativity or, conversely, inhibit it.

Creative ideas are developed in the following sequence (Fig. 1).

The analysis of literary sources and own researches allow to consider the creative process in the form of four phases of the cycle: depression, recession, recovery, peak (Fig. 2). Naturally, such a consideration of the process of creativity is conditional, because in real life there is no clear delineation of phases and separate cyclic processes. It is difficult to determine exactly where each phase begins and ends. Preferably, the beginning of a new phase is considered to be the moment when an increase or decrease in the intensity of the level of creativity can be observed.

External factors that influence the creative process include: socio-psychological climate, motivation of the individual, the creation of working groups to show initiative.

Internal factors that contribute to creative thinking in business are motivational and personal (related to the awareness of the need or desire to develop new areas of activity of the organization, improve productivity, improve quality and after-sales service, expand the range of products, strengthen the position of the professions, employee) and cognitive-operating (intellectual level, thinking style, competence in performing tasks).



**Figure 1** Development of a creative idea

<b>Recession</b>	Loss of interest in work, low level of motivation give rise to a decrease in the level of creativity among employees. This phase is characterized by the ability to productively generate unexpected ideas, without worrying about their feasibility, correlation with the real demand of the environment.
<b>Depression</b>	Lack of organizational support, fear of criticism of expressed non-standard opinions, experience of failures creates dissatisfaction with working conditions and leads to reluctance of workers to think creatively and to offer extraordinary solutions. This phase is characterized by the standard and the pattern of idea generation.
<b>Revival</b>	Directed interest and willingness to create and research fundamentally new and unusual ideas. This phase is characterized by a heightened response to emerging contradictions of self-esteem and objective performance and is an important impetus for the generation of creative ideas.
<b>Peak</b>	Ease and speed of generation of original, unique, thoughtful and detailed non-standard ideas, subordination of creativity to spiritual motivation, persistent interest in certain work.

**Figure 2** Development of a creative idea

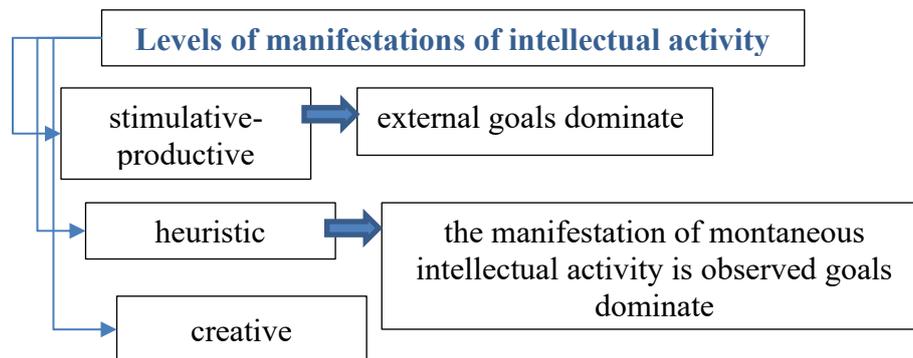
### 2.3. Personal Properties as a Factor in Real Achievements

Whether an individual uses his own intellectual potential, it depends on his motivation, competence in the corresponding field of activity and on external conditions. If in this context we talk about the relationship of intelligence and success in work, then intelligence determines the upper threshold, and activity - the lower threshold of success. Accordingly, “the employee’s place in this range is determined not by cognitive factors, but by personal characteristics, primarily, work motivation and traits such as diligence, discipline, self-control, lack of criticality, trust in authorities”. Many scientists in their works note that motivation turned out to be more important as a stronger predictor of work efficiency, training, retraining than intellectual abilities [13-15].

The problem of the role of motivation in self-realization of a person is discussed in the framework of two different positions regarding the contribution of internal and external motivation to this process. According to the first position, external motives (competitive motives, social assessments, goal achievement) create the conditions for the manifestation of creativity and intellectual abilities, while the result of an activity that raises self-esteem and enhances self-efficacy becomes personally significant. From another point of view, high real, especially creative, achievements are based on intrinsic motivation - the cognitive, or research need for cognitive activity for the sake of the process of activity itself.

The studies of D. Renzulli and colleagues [16] showed that productivity is associated not only with IQ, but also with the level of motivation (“preoccupation with the task”). In their opinion, the main reason for the low efficiency of work with high IQ is the lack of motivation.

There are three levels of manifestations of intellectual activity (Fig. 3).



**Figure 3** Levels of manifestations of intellectual activity

Thus, the correlation of internal and external motivation, as well as the hierarchy of values, plays a special role in human activity. Under the dominance of internal motivation, the content of the activity is an end in itself, while external motivation leads to fixation on external promotion or on the result of activity.

According to the Yerks-Dodson law [17], there is a certain average optimum of motivation for the success of an activity; data from the field of real achievements in human activity paint a slightly different picture. For example, increasing the motivation to achieve is positively associated with achieving high results in a number of professional sectors, in particular business. D. McClelland studied the relationship between achievement motivation and activity success. He conducted his work on the basis of small enterprises in India. It was shown that the success of an entrepreneur depends on the motivation for achievement. From the work of McClelland it follows that motivation (along with intelligence) determines the success of entrepreneurial activity [18], but does not affect creative scientific activity [19].

A particular impact on the success of an activity is attributed to the attribution of success or failure to certain factors. The subjective justification for the success or failure of one's activities can be attributed to an internal cause (for example, one's abilities) or external factors [20]. A key role in the disposition system of a successful individual is played by a sense of self-efficacy. A. Bandura showed that a person's confidence in the effectiveness of his own actions (self-efficacy) significantly affects the real effectiveness of actions [21].

Low levels of self-efficacy are associated with depression, anxiety, and feelings of helplessness. Such individuals show low self-esteem, pessimistic thoughts about their own achievements, reduced motivation to take active actions, especially in difficult situations. On the contrary, people with high self-efficacy prefer to take on more complex tasks, set themselves higher goals. In the field of thinking, high self-efficacy facilitates the decision-making process and manifests itself in various general abilities, including academic achievements. Optimistic or pessimistic scenarios for different people also arise in accordance with their level of self-efficacy. Accordingly, if a person "accumulates" examples of events with the successful implementation of his goal in his individual experience, then this positively affects the productivity of all subsequent activities.

For the purposes of our study, it is important to highlight the following circumstances. First, when analyzing the role of intelligence and creativity, it is necessary to take into account the effects of the interaction of these cognitive abilities. Secondly, conceptual abilities that are responsible for the generalization and depth of the development of ideas and strategies for their implementation can act as a factor mediating the connection between intelligence and creativity. Thirdly, among the many diverse personal properties, those properties that come to the forefront of the organization of metacognitive experience (the formation of mechanisms of involuntary and voluntary self-regulation of intellectual activity, including a high level of metacognitive awareness and a sense of self-efficacy) and intentional experience (formed mechanisms selectivity of intellectual activity based on the active inclusion of personal experience).

### **3. THE EMPIRICAL BASIS OF THE STUDY**

The study consisted of two series: Series 1 - an empirical study of the relationship of intellectual abilities, verbal and non-verbal creativity with intellectual, creative and social achievements in old age. The sample consisted of employees of enterprises in Vinnytsya, Kyiv, Poltava, Ternopil, Kharkiv (123 people). Series 2 - an empirical study of personality traits as a factor in creative achievement at an older age (48 people).

The total sample size is 171 people.

Comparative analysis of the level of real achievements in groups of workers with high and low indicators of general intelligence, verbal and non-verbal creativity

Using cluster analysis in the sample, three groups of workers were identified: with high, medium and low levels of general intelligence, verbal and non-verbal creativity. Next, two extreme groups were compared (according to the U-criterion of Mann-Whitney). The hypothesis was tested that workers with high intelligence and high creativity (verbal and non-verbal) will have higher individual productivity, in comparison with their colleagues who have both low intelligence and creativity (verbal and non-verbal).

The results of a comparative analysis of the two extreme groups of workers are presented in Table 1.

**Table 1** Differences in real achievements between a group of workers with high (N = 29) and low (N = 26) levels of general intelligence, verbal and non-verbal creativity

Real achievements	Middle-rank Group 1	Middle-rank Group 2	U	P
Increase in sales	47.8	20.3	158	0,05*
Increase customer loyalty	39.5	25.8	136	0,000**
Qualities of thinking	48.7	23.8	62	0,05*
Sociometry (adoption)	36.3	18.3	112	0,001**
Sociometry (rejection)	35.4	19.7	114	0,000**

Note: \* - differences are significant at a level of  $\leq 0.05$ ; \*\* - differences are significant at the level of  $\leq 0.001$ .

As can be seen from Table 1, employees with both a high level of intelligence and creativity, compared with their colleagues with both a low level of intelligence and creativity, differ in all criteria of real achievements: they have higher sales results, better customer loyalty, higher expert assessment of the severity of the qualities of thinking, higher social status in the group.

To clarify whether it is correct to draw a conclusion about the connection of the "level of general intelligence" with real achievements, we raised the question of how real achievements depend on different types of intellectual abilities. Two groups of adolescents with a high and low level of severity of each of the four basic intellectual abilities (conceptual thinking, long-term semantic memory, mathematical abilities, spatial abilities) were identified in the sample. Next, a comparison was made of these two groups (according to the U-criterion of Mann-Whitney).

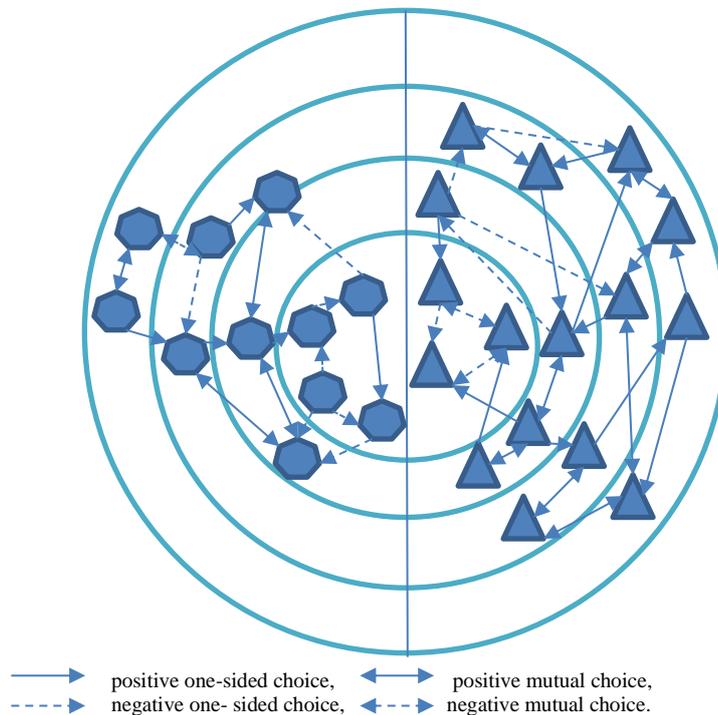
A summary of the number of differences in the level of real achievements between adolescents with low and high levels of different types of intellectual abilities (conceptual thinking, mathematical abilities, spatial abilities, long-term semantic memory) is presented in Table 2.

**Table 2** The number of significant differences in real achievements between groups of workers with low and high levels of four types of intellectual abilities

Basic intellectual abilities (factors)	The number of differences between groups $p \leq 0,01$	The number of differences between groups $0,01 \leq R \leq 0,05$	The total number of differences between groups
Conceptual thinking	7	2	9
Math abilities	2	1	3
Spatial abilities	3	1	4
Long-term semantic memory	5	2	7

Thus, in the group of workers with pronounced conceptual abilities (a high level of formation of operations of conceptual thinking and a high level of organization of semantic memory) there is a greater number of highly significant connections with real achievements, in particular, they are more successful in work and have higher intellectual achievements ( $0,01 \leq r \leq 0,05$ ) than their colleagues with low indicators of conceptual abilities. Mathematical and spatial abilities have less connections with various indicators of individual productivity. Thus, real achievements are associated not so much with the "level of intelligence", but primarily with the level of conceptual abilities.

The analysis also showed that workers with high rates of general intelligence, verbal and non-verbal creativity have higher social status in the group (Fig. 4).



**Figure 4** Sociogram of employees of two enterprises

#### 4. CONCLUSION

The nature of the relationship between intelligence and creativity is determined by the selective connections of individual intellectual abilities and various forms of creativity, in particular, the level of formation of conceptual abilities and development as an aspect of non-verbal creativity come to the fore. Intelligence and creativity act as factors in real (working, intellectual, social) achievements, provided they are closely interacted (integrated).

A comparison of the personal characteristics of workers with and without creative achievements allowed us to conclude that creative productivity is the result of the interaction of different levels of individual mental experience, taking into account the specifics of its organization: a conceptual (differentiated and generalized way of conceptualizing what is happening), metacognitive (high level of metacognitive awareness, including awareness of self-regulation techniques of intellectual activity and a sense of self-efficacy) and intentional (the active inclusion of personal impressions in the form of a predominance of internal motivation, the presence in the experience of personally significant events, specific subjective justifications of one's own activity).

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