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The Role of Cognitive Styles in the Process of Educational-Learning Activity

The given article examines the role of cognitive styles of students in the process of their educational-learning activities. The urgency of researches in this direction is proved. Understanding of cognitive style in foreign and Russian psychology is presented. The general characteristic of cognitive styles such as «Field dependence-field independence», «Impulsiveness-reflexivity», «Tolerance-intolerance to unreal experience» is given. It outlined the main approaches to the study of cognitive styles — analytical, integrative and structured. The role of each style in the process of educational-learning activity of students is shown. In this research the correlation of the given cognitive styles is revealed.

Key words: educational-learning activity, cognitive style, field dependence-field independence, impulsiveness-reflexivity, tolerance-intolerance to unreal experience.

In psychology cognitive styles have special status as they provide communication between knowledge and the person, realise mediating, backbone function. Interest to their studying is connected with possibility of understanding, and consequently and increases the efficiency of educational-learning activity because the way of interaction of a student and educational situation depends on his/her cognitive and psychological properties [1; 20].

The term «cognitive style» was introduced into psychology in 50–60 of the XX-th century. During this period the American scientists (Gardner, Holzman, Klein, Lipton, Spence, 1959; Kagan, 1966; etc.) studied actively how people learn their surround world. Specific features of perception, analysis, structuration and categorisation of information became the subject of their researches. These features have been named «cognitive style». They were essentially divided from specific features in success of intellectual activity. Thus, cognitive style was considered as formally-dynamic characteristic of intellectual activity but not substantial (productive).

Though «cognitive» is translated as «learning», but «learning style» and «cognitive style» are not synonyms in the conceptual device of domestic psychology. «Learning style» is a reflection of the validity in the form of an informative image (touch, perception, mnemonic and thinking). The content of an informative image is on the first place. «Cognitive style» characterises mental mechanisms of processing of the information while making an informative image. On the first place there is a process of constructing an informative image [2; 19, 20].

In one of the first definitions of cognitive styles G. Witkins characterised them as steady learning preferences of the concrete person in primary use of certain ways of processing of the information [3]. These ways correspond to psychological possibilities and propensities of the concrete person.

Later cognitive styles were defined as individually original ways of processing of the information on the environment in the form of individual distinctions in perception, the analysis, structuration, a categorisation, event estimation [2; 20].

T.A. Guseva agrees that cognitive style characterises specific features of learning processes of the person (perception, thinking) [4].

I.V. Ravich-Shcherbo defines cognitive style through category of individuality. Cognitive styles appear as steady specific features of learning strategy, as the formal characteristic of individuality [5; 11].

M.A. Holodnaja gives an often-used modern definition: «cognitive style is an individually-original way of processing of the information which characterises specificity of mentality of the concrete person and distinctive features of its intellectual behavior» [2; 16].

M.A. Holodnoj's position consists in understanding cognitive styles as metacognitive abilities, which are caused by features of the organization of mental experience of the person [2; 226].

For today there are some various approaches to studying cognitive styles. The first of them — analytical. This approach considers and describes separate cognitive styles, their parameters, and the links between the parameters are established. The analytical tendency last decade has considerably gained strength. There is also an opposite, integrative tendency. It assumes to unite all the styles in one structure. Representatives of the third, structural approach, aspire to show different parameters cognitive styles as components of the general structure [1; 20].

By the present moment there are 10 mostly well studied cognitive styles. Among them: field dependence — field independence; impulsiveness — reflexivity; tolerance — intolerance to unreal experience.

Field dependence — field independence

Field independence is considered as a possibility of a person to overcome the influence of a stimulus fields. On the contrary, dependence from the context testifies about field dependence of the person [6; 221].

The value of the given style for educational-learning activity is brightly found out in numerous researches. So, if for mastering learning material (for example a text) it is needed to be restructured, supporting on the inference type of questions, independent style is more successful and effective. Field dependence leads to deterioration of understanding of a material. This results comes from the fact that pupils with field dependent style are not inclined to a hypothetical-deductive way of semantic reorganization of a material. While writing lectures and scientific texts independent students work more on restructuring the text. They reduce the number of words, rephrase the thoughts, structuring the text by dividing it into paragraphs, underline, use colours and so on. Also field independent students understand the text better than field dependent ones if it is given in the form of isolated fragments [2; 53–54]. This cognitive style has significant correlation connections with sensations, selectivity of attention, thinking (in particular with ability to allocation of abstract connection), convergent abilities, learning [1; 23]. Field independent students are more successful academically. They easily generalise and transfer knowledge, choose more rational strategy of storing and reproduction of the material [2; 54]. Field independence corresponds with high indicators of spatial abilities, formal thinking, high level of creativity, memory processes, success of training to technical trades. The given style has significant correlation connections with 44 % of the studied functions and indicators [7; 118].

Field independent pupils are active participants of educational process. It is connected with the leading part of internal motivation in their training. On the contrary, field dependent pupils are trained more successfully in the conditions of external, and negative motivation.

As a whole while getting older and more educated style of field independence increases. By 17 it becomes style of peculiarity [3].

Impulsiveness — Reflexivity

Impulsiveness is considered as fast promotion of a hypothesis and fast decision-making in the conditions of uncertainty without the careful analysis of all possible variants. Reflexivity means slow reaction in the same conditions at repeated check and specification of hypotheses, the careful preliminary analysis of possible options of the decision [6; 222].

The given style makes essential impact on educational-learning activity and has significant correlation connections with 33% of the studied functions and indicators. So, person of reflexivity carefully and systematically collect great volume of the information before making decision. Impulsive person do not incline to gathering and analyzing the information. As a result their decisions are based on an insufficient informational basis [2; 79]. This cognitive style correlates with thinking, namely with ability to allocation of abstract relations, logical judgments, spatial thinking. It is closely connected with convergent abilities, indicators of divergent thinking (fluency and a elaborated), ability to learning [1; 23]. Also connections of reflexivity cognitive style with a finding and application of more productive ways of the decision of problems have been established; with field independence; high educational progress [2; 82]. Moreover, it was found out that

training directly influences impulsiveness level, namely — impulsiveness decreases at mastering scanning strategy by the student [3].

As a whole impulsiveness — reflexivity can be considered as an indirect measure of correlation of pro forma, control and executive stages in structure of intellectual activity [2; 83].

Tolerance to unreal experience

This cognitive style, as well as previous one, is shown in uncertain situations. It represents readiness for acceptance of the information which does not correspond or contradicts the experience of the person [2; 71].

As wide definition of tolerance to uncertainty foreign psychology uses the following definition: ability of the person to accept conflict and tension which arise in a dual situation, to resist unlinked and discrepancy of the information, to accept unknown, not to feel uncomfortable before uncertainty. In Russian psychology tolerance appears as the integrated personal characteristic including psychological stability, system of values, personal attitudes and various individual properties [8; 75].

The term «intolerance to uncertainty» is used today in two aspects. First, for a designation of an individual tendency to perceive and interpret available situation or environment as threat or a discomfort source. Secondly, to indicate the trend to perceive and interpret the future as a source of discomfort.

One of the first who introduced the construction of tolerance-intolerance to uncertainty was E. Frenkel-Brunswick. She investigated the subjectivity of human perception in the ambiguous conditions of stimulation and showed the importance of the decision point in the formation of the image [8; 76]. Her reference to the construction of cognitive style tolerance-intolerance to uncertainty became later and preferable direction in research of the authoritative person. In her works the author has shown that intolerance to uncertainty is the characteristic of a cognitive style of the authoritative (rigid) person [9; 51].

The term «tolerance» is actively used in researches of thinking. In foreign psychology there are special constructions — tolerance to contradictions and tolerance of thinking. They connect internal regulation of cognitive strategies.

Soviet psychology investigated intelligent strategy based on the activity approach. O.K. Tikhomirov's school showed the unity of indirect activity and dynamic aspect of removal of uncertainty in the mental operations of the subject [10; 69].

Conceptual scheme by S. Bohner represents a particular interest. In it properties of cognitive style are presented as primary characteristics of tolerance-intolerance, and property of the person — as secondary. Thus, tolerance — intolerance to uncertainty is the characteristic of a cognitive style as well as of a person [9; 52].

For today in a number of researches it is established that people with high tolerance estimate a situation under its actual characteristics, without orientation to its «commonness», «expectancy». People with low tolerance resist to cognitive experience if it contradicts their knowledge. So, during experiments on sorting of objects it has been revealed that people with low tolerance group them in the standard, expected bases [2; 73].

As a whole, the tolerant person is described as accepting the novelty and uncertainty of the situation, and is capable to operate productively in these conditions. Intolerant person does not accept the novelty of the situation, in a broader sense — the diversity of the world. In this regard, the possibility of multiple interpretations of incentives he/she is stressed. Uncertain situations are understood as negative, which should be avoided. The possibility of uncertainty is interpreted as «dishonesty» or «abnormality». Conservatism, dogmatism, inflexibility, preference of predictability, clearness, a regularity, aversion of variability and originality are peculiar for intolerant person [8; 76].

Learning-educational activity of students is characterized by some uncertainty, that is, contains a variety of ways and means of setting goals, planning and organization of activity, its self-monitoring and self-estimation. So, the student should be aware of their own motivations, to understand what the motives are really effective. At lecture he should decide, what positions are important and useful for him/her. By preparing for a practical training it is necessary to define, what sources will be more suitable, informative, he must be able to highlight the main thing in them. This sort of uncertainty increases at a writing control and term papers, scientific projects. Also the student should plan the activity to keep within the terms appointed by the teacher. It means that the student should consider the specific features, correctly distribute the time, build rational sequence of actions, be able to reconstruct the work plan at change of objective and subjective circumstances. During the period semester and total control uncertainty appears in the form of tests where it is necessary to choose the correct from a number of answers. In the given conditions tolerance to uncertainty as

readiness for changes, novelty, independence can play a positive role in increase of efficiency of learning-educational activity.

In the majority of works cognitive styles are presented as bipolar constructions. M.A. Holodnaja has proved a phenomenon of splitting of poles and has offered quadripolar structure of cognitive styles. So, at studying «field dependence — field independence» it was shown that both poles include «the fixed» and «mobile» people. Thus, there are groups «fixed field dependent», «mobile field dependent», «fixed field independent», «mobile field independent» people. Mobile field independent examinees appear the most productive in the decision of the experimental problems, capable to pass to field dependent behavior if it is necessary for successful performance of the task.

Splitting of poles is investigated also on an example cognitive style «impulsiveness-reflexivity». People can be referred to the impulsive «fast accurate» and «fast and inaccurate». On a pole reflexivity there are «slow accurate» and «slow inaccurate» people. The most productive appear as representatives of a pole of impulsiveness («fast accurate»), and reflexivity («slow accurate»).

Key criterion of splitting of poles of the specified styles is involuntary intellectual control. It regulates the processing of information on a subconscious level. Involuntary intellectual control is shown in the field of attention (distribution and focusing), perceptions (accuracy of identification of objects), thinking (involvement of concept system in the process of information processing), instrumental behavior (braking of actions) and so on.

The generated mechanisms of involuntary intellectual control are found in «mobile field independent», «fast accurate» and «slow accurate» subjects and testify about their intellectual maturity. For this reason, the policy data can be considered as cognitive styles. Other poles are probably not the style but different manifestations of cognitive deficits, as characterized by aborted involuntary intellectual control [2; 222].

Researches in the field of splitting of poles of style «tolerance to unreal experience» have not been done yet.

Thus, cognitive styles are highly organized mechanism of regulation of intellectual activity. Their influence is found out in a wide spectrum of situations, including educational.

In the light of the aforesaid, we decided to find out how these cognitive styles correlated among themselves.

We have conducted research with participation of 110 first-year students at the age of 18–19 years old. They are trained at faculties: philosophy and psychology, foreign languages, philology, biology and geography, chemistry.

As methodical toolkit we used:

1. The test «AKT-70» by K.U. Ettrih [11]. The test is directed on diagnostics of cognitive style of «field dependence-field independence». With its help you can define the degree of orientation of the person at making decision on the base of knowledge and experience he has got or on external reference in the case they contradict his experience.

2. The test «Comparison of similar drawings» by J. Kagan [12]. The test is applied to diagnostics of cognitive style of «impulsiveness — reflexivity». This style characterizes individual distinctions of people in propensity to make decisions quickly or slowly. «Impulsive» examinees are inclined to react quickly in a situation of a plural choice, thus hypotheses are put forward without sufficient analysis of all possible decisions. For «reflectivity» examinees slow rate of reaction in a similar situation is peculiar. Hypotheses are checked and repeatedly specified, the decision is accepted on the basis of the careful analysis of signs of all offered objects.

3. «A new questionnaire of tolerance-intolerance to uncertainty» by T.V. Kornilova [8]. The technique is applied to diagnostics cognitive style «tolerance to unreal experience». People with high tolerance assess the situation according to its actual characteristics, without taking into account its «commonness» and «expectancy» is peculiar. People with low tolerance are resistant to cognitive experience if the data contradicts his/her knowledge.

In a questionnaire «field dependence-field independence» (the test «AKT-70» by K.U. Ettrih) the following data has been obtained. In all examinees only 7 people (6,7 %) are characterized as field independent, 93,3 % of first-year students is inherent cognitive style of field dependence.

Then we have addressed to studying cognitive style of «impulsiveness — reflexivity» (the test «Comparison of similar drawings» by J. Kagan). We remind that people can be impulsive «fast accurate» and «fast inaccurate». On a pole of reflexivity, there are «slow accurate» and «slow inaccurate» students. The result of the specified 4 groups in our research was as follows.

The greatest quantity of students are inherent cognitive style of «slow accurate» (42,7%). They incline to the detailed preliminary analysis of options of decisions, to finding of more productive decisions. They make the decision slowly, but make less mistakes. The group following in number — «fast inaccurate» (29,1%). These students are inclined to make quick decisions and to operate, without considering all spectrum of possible decisions, without aspiring to find the optimum. That is why they are often mistaken. Least of students are «fast accurate» (16,5%) and «slow inaccurate» (11,7%). «Fast accurate» pupils are not inclined to collect and analyze preliminary the necessary information, find the decision quickly, and are seldom mistaken. «Slow inaccurate» are opposite, despite that that they carefully collected a lot of information, they are often mistaken.

Let us remind that, according to M.A. Holodnaya, it is possible to consider cognitive styles such poles as «fast accurate» and «slow accurate». These styles testify intellectual maturity of the person. Poles «fast inaccurate» and «slow inaccurate» are not styles, they are various manifestations of cognitive deficiency. They testify about unshaped involuntary intellectual control [2; 222].

Studying of tolerance-intolerance of first-year students by T.V. Kornilova's technique was the next step. High level of tolerance to unreal experience, uncertainty (59,2%) is inherent to the greatest quantity of students. It reflects their acceptance of changes, readiness for novelty, preference of more challenges, aspiration to independence. The group of students following in number possesses average tolerance (37,9%). Features described above are expressed in their average degree. Least number of students show low level of tolerance (2,9%). They prefer clearness, orderliness, do not accept uncertainty, try to conform to the rules and principles always, various ways, opinions they tend to divide into correct and wrong.

Further, we have revealed interrelations between the three cognitive styles.

Field independent and highly tolerant students are «fast accurate» (75%). «Fast inaccurate» among them only 25%. On the contrary, field independent students with average tolerance 100% out of 100% are «fast inaccurate». The fact that attracts attention is that all field independent students settle down on an impulsiveness pole.

Among the field dependent students style of «fast accurate» is presented to a less degree. With highly tolerant students it is observed at 15,8%. There are statistically significant distinctions with the group of field independent and highly tolerant first-year students ($\varphi_{\text{min}} = 2,467$, $\varphi_{\text{кр}} = 2,31$ at $p = 0,01$). It means that among field independent students with high tolerance there are significantly more «fast accurate» than among field dependent and high tolerance students. Style «fast accurate» is also inherent to 13,9% of field dependent students with the tolerance of average level. None of the first-year student with low tolerance and field dependence uses the given style.

Fast accurate is about the same percentage of the field independent and field dependent students with high tolerance and field dependence with an average tolerance (25%, 24,6% and 27,8%). The largest percentage of fast inaccurate is among the field independence students with an average tolerance (100%) and among the field dependence students with low tolerance (66,7%).

Cognitive style of «slow accurate» is revealed only in the field dependent students. It is the most weight in percentage terms. So, among the first-year students with high tolerance the given style is presented at 45,6%, approximately the same number of students with average tolerance (47,2%), the percentage of students with low tolerance is bit less than them (33,3%).

Least of all is slow inaccurate field dependent students. Among with high tolerance there are only 14%, among the first-year students with average tolerance — 11,1%.

It is noteworthy that in the group of the field dependent students represented both poles — impulsivity and reflectivity are presented.

Thus, productive cognitive styles («fast accurate» and «slow accurate») use 59,2% of all the examinees (16,5% and 42,7% accordingly). And fast accurate are mostly field independence and high tolerance students (75%). Slow accurate are mostly students of field dependence of high, medium and low tolerance (45,6%, 47,2% and 33,3%).

40,8% of students (29,1% and 11,7% accordingly) are on the poles «fast accurate» and «slow inaccurate». This considerable part of sample lack of effective cognitive styles, and show the absence of involuntary intellectual control. Among the students of field independence fast inaccurate are all 100% first-year students with an average tolerance. Among the students of field dependence highest percentage (66,7%) of those who is inherent low level of tolerance. Least of all there are slow inaccurate field dependence students. Among the students with high tolerance there are 14%, among the first-year students with average tolerance — 11,1%.

As a result of the conducted research the following conclusions have been made:

1. 93,3% of first-year students inherent cognitive style «field dependence», 6,7% of students are characterized as a field independent.

2. 42,7% of the respondents have a cognitive style «slow accurate». «Fast inaccurate» are 29,1% of freshmen. Least of all 16,5% of students are fast accurate and 11,7% are slow inaccurate Thus, 59,2% of students use productive cognitive styles. 40,8% of students has not generated involuntary intellectual control.

3. 59,2% of students possess high level of tolerance to uncertainty, the average level — at 37,9%, low tolerance is inherent only to 2,9% of the sample.

In the of independent highly tolerant of students productive style of «fast accurate» (75%). No freshman with low tolerance and field dependence does not use this style.

4. The productive style of «fast accurate» is dominates (75%) among the field independent students with high tolerance. Not one of a first-year student with low tolerance and field dependence uses the given style.

5. Cognitive style of «slow accurate» is revealed only among the field dependent students. Among first-year students with high tolerance the given style is presented at 45,6%, with average tolerance — at 47,2%.

Acquirement by students productive cognitive styles will positively affect educational and learning, search and research, creative activity.

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Оқу-танымдық іс-әрекеттегі когнитивті стильдердің ролі

Мақалада студенттердің оқу-танымдық іс-әрекетіндегі когнитивті стильдерінің ролі қарастырылды. Берілген зерттеу бағыттың өзектілігі негізделген. Шетел және отандық психологиядағы когнитивті стиль түсінігі сараланған. «Өрістен тәуелді — өрістен тәуелсіз», «Импульсивтілік — рефлексивтілік», «шынайы емес тәжірибеге қатысты толеранттылық — интолеранттылық» когнитивті стильдерінің жалпы сипаттамалары берілген. Өрбір стильдің студенттердің оқу-танымдық іс-әрекетіндегі ролі көрсетілген. Аталған когнитивті стильдердің ара қатынасы анықталған.

Е.А.Лазарева, А.Ш.Насирова

Роль когнитивных стилей в учебно-познавательной деятельности

В данной статье рассмотрена роль когнитивных стилей в учебно-познавательной деятельности студентов. Обоснована актуальность данного направления исследований. Представлено понимание когнитивного стиля в зарубежной и отечественной психологии. Дана общая характеристика когнитивных стилей «Полезависимость–полнезависимость», «Импульсивность–рефлексивность», «Толерантность–интолерантность к нереалистическому опыту». Обозначены основные подходы к изучению когнитивных стилей — аналитический, интегративный и структурный. Показана роль каждого стиля в учебно-познавательной деятельности студентов. В проведенном исследовании выявлено соотношение указанных когнитивных стилей.

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