TEACHING REASONING: A COGNITIVE-CULTURAL APPROACH

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Abstract: This paper describes personal reasoning peculiarities of Russian undergraduate students viewed through the prism of their culture and their psycho-typical characteristics. The experimental study showed specificity of argument formation in the students' reasoning about their cultural values. Our experiment identified the respondents' poles within the cognitive style 'abstract / concrete conceptualization' based on their verbalization of the primary values. Four levels of concept abstraction were detected and proved by the students' verbal manifestations: the resulting students' texts showed remarkable differences between the poles concerning preferences of argument exposition, both in its construction schemes and in the choice of components of the arguments. We thus state that the degree of variability of the students' value assessment correlates with the degree of formation of the mechanism of differentiation in value orientations. Our recommendations for teaching reasoning concern: linguistically based principles of student cognitive differentiation which minimize distractive factors; choice of teaching tasks depending on the student specific conceptualization pole; and ways of activating differentiation and integration operations in reasoning. In a broader context of education, students' individual peculiarities and cognitive preferences should be focused on training which stimulate the students' learning interest.

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Introduction

The problem of improving the teaching of communication disciplines in schools and universities is connected with a wide variety of factors that must be taken into account. Among them are socio-pragmatic, socio-psychological, socio-cultural, socio-linguistic, pedagogical, and rhetorical aspects of both discourse and communicants as *personae linguales*. The present study applies methods of analysis used in those disciplines.

An important factor to be taken into consideration is the type of discourse that is used in proper communication, in teaching, or is taken for analysis in order to use the most promising techniques of efficient communication. The activity of the teacher in the "One-to-One" or the "One-to-Many" modes is persuasive by nature, and here the data of technical rhetoric is of great help for effective text production. This mode of speech interaction can be called a 'trigger-subject aspect'. This aspect needs to be studied by researchers who are professionals in the field, so operating it involves using a secondary subject factor – the analyst factor (Vasilyev, 2002).

We postulate that personal understanding of an idea is often culturally based, and in its subsequent exposition communicants usually use argumentation; the resulting text depends on the psycho-typical characteristics of the author of the text. Such peculiarities viewed from the pedagogical angle, it is only natural that the speech-influence activity of the educator should take into account the specificity of the construction of the argument by the students themselves (Akateva et al., 2020); otherwise teaching holistic and ground-based reasoning will not be productive.

Methodology

Two main approaches are used as a research basis in this article. They are taken from different scientific fields and do not overlap in any of their parts; therefore, they can be used together.

The first is the theory of cognitive styles (Adejumo, 1983; Armstrong, 2000; Broverman, 1960; Curry, 1987; Kholodnaya, 2004; Pacini, 1999; Riding & Cheema, 1991). Out of all the options of representation of cognitive-style systems, the system 'abstract conceptualization (AC) / concrete conceptualization (CC)' is taken as the basis for the analysis. The AC/CC system, among others

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possible, provides for formulating principal characteristics of the cognitive peculiarities of text-producers, which are supposed to be manifested in the specific (argumentative) activities: a person usually chooses to prove what he opines.

The second approach is the conception of argument functions (Toulmin, 1958; Crable 1976); which using it makes it possible to describe the semantic characteristics of arguments. The minimal number of functional elements in an argument is two (it is an enthymeme then), the nominal number is three (Claim, Evidence, and Warrant); there can also occur extended arguments containing Backing, Qualifier, and Reservation used either simultaneously or separately. The structural choice is a matter of preference of the communicant. In what follows we demonstrate that the preference is conditioned by features of the *persona lingualis*.

For concrete-pole individuals, the following psychological qualities are typical: the tendency towards black-and-white thinking, opinion dependence on an external status and authority, intolerance to uncertainty, stereotyped decisions, situational behavior, feeble ability to think in terms of hypothetical situations, etc. Abstract-pole individual discourse is characterized by independence on immediate properties of the situation, by orientation at a personal experience in explaining the physical and social world, by risk-taking, independence, flexibility, creativity, etc. (Harvey et al., 1961; Miller and Harvey, 1973).

The experiment: stages

For distribution of respondents into CC/AC poles O.J. Harvey's test "I believe that ..." (see: Litzke, 1978) was used. Respondents were asked to formulate in two or three sentences their beliefs about some Russian culturally relevant concepts.

Participants of the experiment: 234 first- and second-year students of Tsilokovsky Kaluga State University and of Sosensky Radio Engineering Technical School (Kaluga region), both sexes (approximately, 50 to 50 per cent) from 17 to 20 years of age.

The purpose of the study was to determine the linguistic features of the construction of a reasoning text by the respondents belonging to the CC/AC groups and to see the main differences between the two in the schemes of constructing argumentative text and in the choice of components of the inserted arguments.

Stage 1 of the experiment

The respondents were given a form with a table-like task of 30 verbally formulated instrumental and terminal values that set the basis for the individual's worldview; the values were taken from the data of a social survey (Goryainov, 1996) and were arranged randomly. The students were asked to assess their degree of importance and of practical use at the immediate stage of the respondent's life. The assessment was asked to be based on a scale from 1 to 10 points.

Instructions: before the assessment, the respondents were told to give an instant assessment to each value without thinking it over. Additionally, students were asked to add their own relevant values that are not included in the list, if any.

Results: 11 primary value orientations were selected by the respondents (given here irrespective to the order of their significance): 'good and loyal friends', 'happy family life', 'health', 'honesty', 'cheerfulness', 'responsibility', 'love', 'religion', 'money', 'creativity', 'will'.

Conclusion: there is a direct correlation between the degree of variability of the resulting assessments and the degree of formation of the mechanism of differentiation of value orientations in students.

Stage 2 of the experiment

Diagnosing the respondents' poles of the cognitive style of CC/AC based on the choice of concept verbalization of the primary values (such a language orientation has not been used by scholars before).

Diagnostic methods. Each respondent received a form with a task of 11 unfinished sentences (O.J. Harvey's test "I believe that...") and was asked to complete the given statement with two or three sentences. The procedural restriction was formulated: "do not think your answers over but do it on the spot". After testing, the results were subjected to qualitative and quantitative processing. Language manifestations (responses) were evaluated and distributed by us, the authors, into four levels by their compliance with the initial partitioning parameters proposed in (Schroder et al., 1961), where, however, the features of verbalization were not specifically studied. The four levels are these.

Level 1 – "the highly concrete conceptualization": minimal manifestations of differentiation and integration of the concepts; any object is interpreted in one way only. Within this level, the verbalization contains: (1) a general idea (generally accepted rules, norms, general statements, p. ex.: 'I believe that honesty is the most important quality of all'; (2) emoticons in responses; (3) presence of hedge/concretization markers ('this', 'that', 'each', 'such', etc.), p. ex.: 'I believe that religion ... everyone has their own'; (4) a paroemia (p. ex.: 'I believe that money rules the world'); (5) minimally short definitions (p. ex.: 'I believe that money is evil'); (6) repetition of the defined concept or a part of it (p. ex.: 'I believe that health should be valued, since health is not everything, but everything without health is nothing'); (7) a personal example or relevant hedges (p. ex.: 'I believe that good and loyal friends exist. I have such friends, they will always support me in a difficult moment'); (8) errors in the definition of the concept (p. ex.: 'I believe that religion exists. Everyone should believe in some religion'); (9) presence of vague concepts (p. ex.: 'I believe that religion is necessary'); (10) the conjunction *when* with no relation to time (p. ex.: 'I believe that love is when you are happy to be with your loved one and when the time passes unnoticed').

Level 2 – "the moderately concrete conceptualization": the ability to use alternative estimates and rules, to link and generalize concepts. Used in the presence of: (1) choice in the general idea (more often with the help of opposites, p. ex.: 'I believe that good and loyal friends exit, but you should achieve everything yourself'; (2) ellipsis in the answers (p. ex.: 'I believe that creativity is necessary for a person ... a person should be creative'); (3) conditions (p. ex.: 'I believe that good and loyal friends ... I have. And if I suddenly have a problem, they will definitely support me and help me'; (4) the comparative phrase 'the ... the ...' (p. ex.: 'I believe that money is not the main thing in one's life. But when it is here, you feel confident and more independent. And the more money a person has at his disposal, the farther his needs grow'; (5) rank relations (p. ex.: 'first', 'second', etc., p. ex.: 'I believe that religion for some is a way to explain everything that happens in the world, for others – a way to know yourself, for still others – a way to find help and support in difficult times'; (6) general causal relationships (p. ex.: 'I believe that a happy family life ... is perhaps the most important thing in a person's life. Because we spend most of our time in the family'); (7) a large number of hedge markers for an abstract idea, which imposes restrictions on the domain of the concept (p. ex.: 'I believe that religion ... is a world stretched over the eyes of millions of people to hide the truth. This is a bit different from the fact that at the moment people need something different to advance and progress. But I do not give up God because he exists, though in energy matter').

Level 3 – "the moderately abstract categorization": the person takes into account many features of perceived objects, uses of alternative interpretations, and is able to observe her own behavior from different points of view. It takes place in the presence of: (1) an abstract idea with a general conclusion ('I believe that health is the most important thing in our life. You can't buy it. But in a sense you can sell it') or a general idea with an abstract conclusion (p. ex.: 'I believe that money is not the main thing in a person's life. Though in our country, lack of finance is in most cases a lack of cultural, educational and physical development of a person'); (2) defining one concept by means of the same concept, but with a specified meaning (p. ex.: 'I believe that responsibility is an important quality and significant. A person should be responsible for the task that he has taken on'); (3) two unrelated ideas, one of which is general and the other is abstract (p. ex.: 'I believe that a happy family life is important. After all, you cannot be a philosopher, an Aristotle all your life'); (4) an unfinished statement (p. ex.: 'I believe that money is not just pieces of paper that govern the world through the greed of people').

Level 4 – "the highly abstract categorization": the highest possible differentiation and integration of concepts; transition to a theoretical level of comprehending what is happening; independent generation of new rules and schemes for interpreting incoming information; flexibility and adaptability of behavior in difficult situations (Harvey et al., 1961). It takes place in the presence of: (1) an abstract idea without any additional restrictions (p. ex.: 'I believe that honesty < ... > is an important component of personal health'); (2) a conscious attempt to transform the proposed task (p. ex.: 'I believe that "cheerfulness" consists of 12 letters'); (3) a choice of several seemingly contradictory definitions of the same concept (p. ex.: 'I believe that will is the ability of a person to freely give himself to nature without anyone's intervention and it is a solution of all his desires'); (4) a complex sentence with several non-subordinate clauses (p. ex.: 'I believe that responsibility will give law enforcement agencies less work. And save all the students').

As a result of expert evaluation of the statements, 214 people who were involved in the main group of the experiment were divided into three groups: the group "concrete pole" respondents ($\approx 42\%$ of the total), the group "abstract pole" respondents ($\approx 50\%$), and respondents who were in the area of uncertainty ($\approx 8\%$) – those who did not complete the form in full, those who had two or more assessments 'concept is not defined', and those who were not placed in any of the first two groups by the expertizing authors.

Stage 3 of the experiment

Establishing the features of argumentation by carriers of the CC/AC style. The respondents were asked to express and justify their opinion of the value-targeted statement 'I believe that good and loyal friends do not exist'. On the basis of the received texts, the linguistic manifestations of respondents' arguments were studied in terms of the use and expression of argument schemes and their components.

Results and Discussion

The results of the experimental study are as follows.

The Cognitive Pole of the Concrete.

1. Constructing a clear chain of schemes. The text of the argument consists of several elementary arguments (Steps) (most often, they are 5-6 in number), in which the Claim of the final Step, as a rule, sums up everything said before.
2. Preference given to Declarative Claims (here and further the names of the terms are as in (Craib, 1976)).
3. For Evidence, preferential use of Unplanned Occurrences and Personal Beliefs.
4. Preferential use of Authority Warrants.
5. The use of Backing in the form of proverbs, sayings and poems.
6. Large number of Qualifiers and Reservations.

The respondents of this group most often used personal belief Qualifiers 'because I think', 'we think that' and Reservations of the conditions for the validity of the Claim 'if this is the case'.

The Cognitive Pole of the Abstract.

1. The structure of the argument is more amorphous than that given by the respondents of the CC group. Here it is quite difficult to trace the inter-step connections from Claim to Claim, and it is often difficult to establish inner relationships within the Steps. Some arguments are used in isolation, and some are associated with most of the Steps in the argument text. There is a wide variety in the choice of correlated topics for arguments (often not even related to the statement formulated in the title); incomplete arguments and single statements are also often used. Texts-arguments are longer than those of the CC due to greater number of Steps to defend a textual macro-Claim.
2. Claims are mostly Evaluative and those of Policy.
3. Evidence is mostly Reports on Spontaneous, Hypothetical, Contrived, and Reported Belief Situations.
4. Warrants are mainly of the Comparison and Grouping types.
5. There is small number or complete absence of Qualifiers; there is also presence of incomplete arguments and single statements.
6. Many incomplete judgments are used, leaving in the implication what, in the respondents' opinion, is already obvious: hence the rare use of Evidence.

Here are the statistics of the use of the main components of the argument (Claim, Evidence, Warrant). The first figure in each pair stands for the CC pole, the second – for the AC pole

The semantics of the Claims. Declarative: 58 VS. 37; Policy: 18 VS. 43; Classificatory: 8 VS. 9; Evaluative: 5 VS. 19.

The semantics of the Evidence. Unplanned Occurrences: 23 VS. 33; Contrived Occurrences: 48 VS. 20; Unplanned Occurrence reports: 0 VS. 27; Contrived Occurrence reports: 3 VS. 13; Hypothetical Occurrence reports: 2 VS. 18; Personal Beliefs: 87 VS. 25; Reported Beliefs: 17 VS. 32.

The semantics of the Warrants. Comparison: 12 VS. 43; Grouping: 4 VS. 12; Causal: 8 VS. 6; Authority: 67 VS. 23.

In teaching, it is advisable to get and use these data about conceptualization.

1. Diagnosis and identification of features of cognitive style. Existing methods usually used to distribute a group of respondents to the AC and CC poles need to be supplemented. Those methods (including Harvey's) have two significant drawbacks: (a) they are cumbersome and take a considerable amount of time and effort to prepare, organize, conduct, and interpret the results; (b) the testing process is easily identifiable, i.e., the experimenter explains the test procedure and restrictions to the respondents, so they are aware they are being tested; hence, since they rationalize that they are evaluated their verbal behavior can differ from the usual. As our practice shows, the (b) drawback is no less significant than the (a), since the students try to show themselves in 'a more favorable light' and often ignore some of the important terms of the experiment (for example: the pre-test setting "you should not think your answers over, you ought to write down what first comes to your mind" is sometimes ignored, and the respondents fail to be in time to finish writing). To overcome those problems at least two methods are possible.

For the (a) problem we suggest this. The data received in our experiment show that diagnostics of the CC/AC poles can be done without holding a specific psychological experiment; instead, the linguistic features of the results of any previous limited-time restrictional reasoning activity about cultural values can be analyzed by a teacher to divide the students into the CC/AC groups to make the teaching easier and more productive.

For the (b) problem we suggest this. To have additional access (or without having the previous access) to reasoning peculiarities of the students, the teacher can give a culturally oriented assignment, p. ex.: "Here is a text for you. Read it attentively and then put it aside. <Pause for reading the text>. I want you to understand better what the author means to say in the text. Retell the text and record it simultaneously on your mobile phone; then send your recording to me". Here the results of exposition can come together with some reasoning. Since no other restrictions, especially possible evaluation, are formulated, the students' immediate memory reproduction reflects with minor distortions of their cognitive peculiarities. This task makes the processes of perception, processing and production of the received information flow in a compressed form, with practically no time for constructing and choosing options; therefore, all the three processes will take place almost naturally, in accordance with the cognitive style that is characteristic of a particular person. The teacher must have the initial version of the text in order to be able to assess the degree of transformations of the text and the ways of reasoning the students employed.

2. The use of the results obtained for training is mainly expressed in the way the assignment is formulated. For AC students the teacher can give a briefly formulated task like "Reproduce the text". For CC students, it is necessary to give more detailed formulations, p. ex.: "Give a summary of the text you have just read, with no more than 30 words. List the main dates (events, etc.)."

3. The development of the conceptual sphere also goes through the variation of tasks. For CC students, they are given in the usual (detailed) form with gradual omission of details and increase of the level of abstraction. For AC students, tasks are gradually given in a more specific form, in order to develop attention to details.

4. Since reasoning assignments in curricula can call for diversity, specific tasks should be formulated to get better results in elements of proper reasoning. Thus, the teacher needs to focus on the development of poorly expressed skills in the formation of the components of the argument: for the CC students – the proposed Claims (Modal and Evaluative); Evidence (Reported); Warrants (Comparison, Causal and Grouping); for the AC students – Claims (Declarative and Modal); Evidence (Factual and Personal); Warrants (Authority and Causal).

Conclusion

Cognitive styles theory claims that polar-different peculiarities of thinking do not necessarily mean that one of the poles is good and the opposite is deficient (Kholodnaya, 2004). That means that there must be some compensatory mechanisms in thinking which enable opposite pole bearers to productively cope with their tasks. Consequently, there is little need to try to 'improve' a pole.

The situation in education places the problem in a somewhat different context. When a teacher aims at developing reasoning capacities in her students, she must take the students' cognitive peculiarities into account and make use of them – because in that case, the teaching process does not hamper the students' natural thinking habits. The problem is how to co-ordinate using the peculiarities in question with the pedagogical requirement according to which the teacher in most cultures must normally move from the simple to the complex – what if the student is already a bearer of the abstract pole? The answer appears to lie in viewing the cognitive style poles as instruments and not as capacities. Therefore, the teacher can use correct (i.e. cognitively preferred) instruments to improve target capacities (reasoning techniques).

From birth, a person in any culture has the simplest schemes of assimilating knowledge. However, the ability to form inter-conceptual connections is an acquired characteristic that will depend on a variety of age, social and cultural factors. Thus, students who have received special training will be able to improve their skills of differentiation and integration as mechanisms of reasoning. That can apply to a broader context of education: training should take into consideration students' cognitive peculiarities and focus on the development of insufficiently developed skills making use of the students' cognitive preferences. That will result in strengthening students' learning interest.

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