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FEATURES OF THE COMMUNICATIVE APPROACH TO LEARNING IN THE ASPECT OF THE AGE PERIODS OF STUDENTS

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The article explores the application of a communicative approach to learning from the perspective of informational and cognitive interaction between a teacher and a student. The analysis of the main communicative schemes used for teaching different age groups is carried out. The features of educational communications by age periods of students are highlighted. Educational communications are considered as an information process in the information field, in which the properties, connections and relationships of the objects in the subject domain are displayed. The information field is considered as a model of the educational environment. The cognitive factor is noted as an obligatory factor of educational communication. The article shows that educational communications are transformed by age groups and consistently move from synchronous unidirectional transmission of information to asynchronous bidirectional form of information and cognitive interaction. In terms of the algebra of logic, examples of communicative schemes are presented that demonstrate the possibility of formalizing educational communications. Taking into account the age periods of students, formal rules of educational communications, can be used in the construction of code models of the electronic information and educational environment.

Keywords: the age period of students, educational communications, information field, information and cognitive interaction

ОСОБЕННОСТИ КОММУНИКАТИВНОГО ПОДХОДА К ОБУЧЕНИЮ В АСПЕКТЕ ВОЗРАСТНЫХ ПЕРИОДОВ ОБУЧАЮЩИХСЯ

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В статье исследуется применение коммуникативного подхода к обучению с позиции информационно-познавательного взаимодействия преподавателя и обучающегося. Проводится анализ основных коммуникативных схем, применяемых для обучения разных возрастных групп. Выделены особенности образовательных коммуникаций по возрастным периодам обучающихся. Образовательные коммуникации рассматриваются как информационный процесс в информационном поле, в котором отображаются свойства, связи и отношения объектов предметной области. Информационное поле рассматривается как модель образовательной среды. Отмечается когнитивный фактор как обязательный фактор учебного общения. В статье показано, что образовательные коммуникации трансформируются по возрастным группам и последовательно переходят от синхронной однонаправленной передачи информации к асинхронной двунаправленной форме информационно-познавательного взаимодействия. В терминах алгебры логики представлены примеры коммуникативных схем, которые демонстрируют возможность формализации образовательных коммуникаций. Формальные правила образовательных коммуникаций с учетом возрастных периодов обучающихся могут найти применение при построении кодовых моделей электронной информационно-образовательной среды.

Ключевые слова: возрастной период обучающихся, образовательные коммуникации, информационное поле, информационно-познавательное взаимодействие

Introduction

Information and communication technologies and information modeling are widely used in modern education. Information modeling is considered as one of the fundamental methods of cognition [1, 2]. The learning process from an information perspective can be considered as the process of the information field, which displays the properties of the objects of the subject area, their interrelationships, relationships, information flows between them [3]. The information field can be considered as a model of the educational environment. One of the main processes of the information field implemented in education is the process of information interaction between the teacher and the student. This process represents a certain form of communication and is called educational communication. The term "Educational communication" is widely used in the education system [4].

Educational communications (EC) from information positions are studied in information communication studies [5]. Communication studies investigate various problems of information exchange in the process of people's communication [6; 7]. It explores the increase in information of one of the communicants and the elimination of information asymmetry between them. Information communication studies the bidirectional process of information exchange without focusing on one of the communicants.

The transfer of information can be carried out in three communicative forms: 1) monologue, where such communicative actions as unidirectional transfer of information from the teacher to the student prevail; 2) dialogue, as a bidirectional transfer of information in which the subjects of communication interact and are mutually active; 3) polylogue – the organization of multidirectional communication, bidirectional communication. In educational communication, three forms of information interaction are distinguished: synchronous unidirectional transmission/reception of information (the level of assimilation, memorization); synchronous bidirectional interaction: request/response (the level of communication and information exchange); asynchronous bidirectional interaction with steps: goal – result – feedback (cognitive level).

For the age periods of students, certain forms and levels of communication or their combination and the degree of informational impact on students are appropriate, which is the subject of this study.

1. Educational communication as a special type of communication

Educational communication is a special type of communication used in education [8]. Educational communication includes two categories of communicants: a teacher and a student. In modern conditions of informatization, educational communication is a process in the information field. Educational communication in the information field can be considered as a kind of information interaction. From a didactic point of view, educational communication can be considered as a tool for teaching and obtaining knowledge by students.

The feature of educational communications is the influence of cognitive factors of students on them. Cognitive factors [9] are a distinctive feature of EC, which distinguishes it from the most of precisely informational processes. That is why paralinguistic methods are used in the learning process [10]. Another feature of educational communication is that one of the communicants uses the reception of information [11], and not its mechanical memorization. This factor is especially important when perceiving information via the Internet, which is characterized by a large amount of misinformation and unreliability [12]. Educational communication is the main tool for eliminating the information asymmetry of the student and the teacher in terms of subject knowledge. In this regard, it is important to choose the form of communication and the way it is implemented in the learning process. When designing educational communications, the use of a systematic approach contributes to the creation of an integral system of information and cognitive interaction of subjects.

2. Models of educational communications

Educational communications are more streamlined compared to mass communications. Educational communications are earmarked. That is why they have a strictly unidirectional or bidirectional orientation. They can be modeled using vector or logical methods. Educational communication includes two categories of communicants: teacher (Tch) and student (St).

One-way Com1 communication can be represented as

$$Com1 \; (Tch \rightarrow St). \tag{1}$$

It consists in the transfer of educational material by the teacher, the issuance of answers to questions and an interview in order to assimilate the educational material by students. In primary education, most of the communications are one-sided. This is due to the fact that the students' logical inference apparatus is not sufficiently developed.

Com2 communications based on dialogue have a bidirectional orientation and can be represented by an expression of the form

$$Com2 \; (St \leftrightarrow Tch). \tag{2}$$

In high schools, secondary educational institutions and universities, bidirectional communication prevails. In the process of implementing the communications described by expressions (1) and (2), learning and knowledge acquisition takes place. In a simplified way, the task of training is to acquire knowledge, skills and abilities by students. Strategically, the task of training is to form a picture of the world among students [13; 14].

The processes described by expressions (1) and (2) are generalized. In the actual practice of training, they are detailed. From the informational point of view, expression (1) reflects the transmission of information using information units [15] and paralinguistic elements [16] or paralinguistic information units [17]. *EC* educational content is a collection of related information units, which can be represented by the expression

$$EC = F(UI1, \ldots, UIn; \; PUI1, \ldots, PIUm). \tag{3}$$

In expression (3) (UI1,..., UIn) are information units, PUI1,...,PIUm are paralinguistic information units. With this in mind, communication (1) is a sequence of communications of the form

$$(UI1, \; PUI1) \rightarrow St. \tag{4}$$

$$\ldots$$

$$(UIn, \; PUIm) \rightarrow St. \tag{5}$$

The simplest models of information units are symbols, words, sentences in written or verbal form.

In the processes of communication according to schemes (1), (2), (4), (5) cognitive processes are also implemented. Cognitive processes are associated with two factors: the use of paralinguistic units by the teacher; with the psychophysical state of the student. It should be noted that non-linguistic factors are called paralinguistic elements and, accordingly, units: the timbre of speech, the volume of voice, pauses, hand gestures of the teacher, and so on. The psychophysical state of the student includes concentration in the learning process, attention, the state of the mechanism of reception, perception and apperception of information [18].

3. Perception and associations

Perception and motivation are important factors in learning. There are many publications on the results of research that show that there is a dependence of the perception of educational information on age. There is also a dependence of learning motivation on age, the dependence of students' reasoning methods on age. There is a specificity of perception and reasoning of students which depends on age.

A number of studies have shown that elementary education serves as the basis for high-quality secondary and higher education [19]. The most of the teaching of elementary school students is based on communication and a smaller part on independent work. Primary school students do not perceive long associative chains of arguments of the teacher well. The leading place is occupied by unidirectional communication due to the fact that students have a high ability to perceive and a low ability to reason. At the same time, their perception is largely built on an associative and intuitive level than on a logical one. However, the development of this communication further influences and contributes to the effectiveness of the use of bidirectional communication.

The transfer of information by the teacher is based on logical or associative chains. At the same time, the chain is direct when the teacher makes a conclusion. The chain is reversed when students make a conclusion. The perceived chain of arguments can be represented as

$$P1 \rightarrow P2 \rightarrow \ldots \rightarrow Pn \rightarrow B. \tag{6}$$

Expression (6) is interpreted as follows: argument P1 entails argument P2 and so on. The argument Pn entails the result or final conclusion in. As experience shows, the maximum perceived chain has 5 links.

The scheme in expression (6) can be characterized by information uncertainty and information fuzziness. This entails the need to take into account information uncertainty and fuzziness in educational processes of type (3). Information uncertainty is initially caused by information asymmetry between the student's knowledge and the teacher's knowledge of the subject. Information uncertainty is caused by possible polysemy of concepts, similarity of terms. Context or an additional explanation is used to eliminate uncertainty. As a rule, the teacher, based on the experience of conducting the discipline, prepares contexts for the educational material in advance.

The information fuzziness, the difference in the interpretation of the material may be due to the lack of experience of young teachers. A clear presentation of the educational material characterizes the oriented graph. To put it differently, an oriented graph is a sign of the clarity of the presentation of the material. The fuzzy presentation of the material characterizes the multigraph. The fuzziness decreases with the acquisition of teaching experience. It can be said that in the process of teaching, implicit knowledge is extracted [20] and transformed into explicit knowledge.

Elementary school students can argue their answers, but they use relatively short argumentation chains. They use either an implicative reasoning scheme or a simple associative scheme. An example of an implicative scheme is given in the expression

$$A \rightarrow B. \tag{7}$$

The arrow in expression (7) denotes an implication. Examples of simple associative communication schemes are given in generalized expressions:

$$A \wedge C \rightarrow B, \tag{8}$$

$$A \rightarrow C \rightarrow B, \tag{9}$$

$$\neg A \rightarrow C \rightarrow D. \tag{10}$$

An example to expression (8): the absence of errors (A) and the qualitative content of the text (C) entails a high rating (B). Example to expression (9): errors (A) in the text (C) entail a low score (B). Example to expression (10): the absence of errors ($\neg$A) in the text (C) entails a high rating (D).

Each reasoning scheme may contain errors. Scheme (7) is erroneous if the argument A* or A' is used instead of the argument A. The argument A* is synonymous, that is, there is a morphological correspondence between A * and A, but a semantic difference (onion – plant, bow – weapon)[1]. Argument A' has a low semantic (often verbal) difference. There is a weak morphological difference between A' and A and a weak acoustic difference (dog, dock). Scheme (8) is erroneous if the content of the text is incorrectly evaluated. Schemes (9, 10) are erroneous if the student confuses A and $\neg$A.

An important factor of educational communication is the semantic difference. On the one hand, the reasoning schemes should contain information correspondence, on the other hand, there should be criteria for semantic differences between the original arguments and similar expressions. The semantic difference is achieved by the correct use of terminological relations [21]. This circumstance should be taken into account when preparing educational material and projecting educational communications. An important additional factor of modern learning is multimedia technologies and virtual modeling, which contribute to reducing information uncertainty and fuzziness.

4. Self-regulated learning

Each student use self–regulated learning (SRL) to one extent or another [22]. Depending on the age periods of students, different forms of self-regulated learning can be used: explicit (evident, conscious, manifested), implicit (latent, non-manifested, unconscious), mixed form combining explicit and implicit forms to one extent or another.

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[1] In Russian language it sounds like *look* (translators note).

The analysis of forms of self-regulated learning shows that the use of information technologies is consistent with higher-order thinking skills according to the structure of Bloom's Taxonomy Revised. In the context of the use of e-learning, remote educational technologies, the most effective educational technology is an explicit form of self-regulated learning. In general terms, this refers to learning that is guided by metacognition (thinking about one's thinking), strategic action (planning, monitoring and evaluating achievements in accordance with requirements) and motivation to learn. Self-regulated learning is broadly similar to independent learning. In self-study, a person on his own initiative, realizing his or her needs in training, formulates learning goals himself or herself, determines the necessary resources, selects and implements appropriate learning strategies and evaluates the results obtained.

A self-regulated learner monitors, directs and regulates actions to achieve the goals of obtaining information, expanding knowledge and self-improvement. Thus, self-regulated learners control their learning environment. In this case, asynchronous bidirectional interaction of the student and the teacher with steps seems to be effective: goal – result – feedback. Students reach the cognitive level of communication. Metacognition is considered as a cognitive component of self-regulated learning.

Currently, the concept of "self-regulated learning" continues to develop intensively, becoming more widespread. Self-regulated learning has become an important new information structure in education [23]. A separate area of research is the development of an electronic information and educational environment that provides information and intellectual support for students.

Conclusions

The article analyzes the main communicative schemes used for teaching different age groups. The features of educational communications by age periods of students are highlighted. The article shows that educational communications are transformed by age groups and consistently move from unidirectional to bidirectional form of communication. Thus, unidirectional communication occupies a leading place in elementary education due to the fact that students have a high ability to perceive and a low ability to conversation. As the logical thinking of students develops, the transition to bidirectional communication is carried out. The upper cognitive level of communication is fully realized in a self-regulating form of learning.

The article highlights the factors of information uncertainty and fuzziness, considers examples of their elimination due to the correct use of terminological relations.

Examples of various communicative schemes in terms of logic algebra are given. Taking into account the age periods of students, formal rules of educational communications, can be used in the construction of code models of the electronic information and educational environment.

References

1. *Maksudova L.G., Tsvetkov V.Ya.* Information modeling as a fundamental method of cognition // News of higher educational institutions. Geodesy and aerial photography. – 2001. – No. 1. – P. 102–106. [In Russian]

2. *Raev V.K.* Information models as a method of cognition // Slavic Forum. –2020. – No. 2 (28). – P. 84–93. [In Russian]

3. *Tsvetkov V.Ya.* Information Space, Information Field, Information Environment // European researcher. – 2014. – No. 8-1 (80). – P. 1416–1422.

4. *Valentine K.D., Kopcha T.J., Vagle M.D.* Phenomenological methodologies in the field of educational communications and technology // TechTrends. – 2018. – Vol. 62, No. 5. – P. 462–472.

5. *Ratheeswari K.* Information communication technology in education // Journal of Applied and Advanced research. – 2018. – Vol. 3, No. 1. – P. 45–47.

6. *Tsvetkov V.Ya.* Information communication studies // Slavic Forum. – 2017. – No. 3 (17). – P. 89–96. [In Russian]

7. *Goncharova L.M.* Communication studies-2021: results and prospects // Scientific research and development. Modern communication studies. – 2021. – Vol. 10, No. 6. – P. 5–10. [In Russian]

8. *Dautova O.* Educational communication. Traditional and innovative technologies. – M.: Infra-M, 2018. – 176 p. [In Russian]

9. *Bolbakov R.G.* Cognitive entropy as a characteristic of educational processes // Distance and virtual learning. – 2016. – No. 2. – P. 11–17. [In Russian]

10. *Sixl-Daniell K., Williams J.B.* Paralinguistic discussion in an online educational setting: A preliminary study. – 2005.

11. *Tsvetkov V.Ya.* Reception of information // Educational resources and technologies. – 2016. – No. 1 (13). – P. 121–129. [In Russian]

12. *Wahyono S.B., Wirasti M.K., Ratmono B.M.* Audience Reception of Hoax Information on Social Media in the Post-Truth Era // Jurnal Komunikasi Indonesia. – 2020. – P. 110–124.

13. *Butko E.Ya.* Personal picture of the world as a result of education // Distance and virtual learning. – 2017. – No. 1 (115). – P. 87–94. [In Russian]

14. *Tsvetkov V.Ya.* Informational description of the world picture // Prospects of science and education. – 2014. – No. 5 (11). – P. 9–13. [In Russian]

15. *Kudzh S.A.,* Tsvetkov V.Ya. Informational educational units // Distance and virtual learning. – 2014. – No. 1 (79). – P. 24–31. [In Russian]

16. *Cadic D., Segalen L.* Paralinguistic elements in speech synthesis // Ninth Annual Conference of the International Speech Communication Association. – 2008.

17. *Tsvetkov V.Ya.* Paralinguistic information units in education // Prospects of science and education. – 2013. – No. 4 (4). – P. 30–38. [In Russian]

18. The apperception approach for stimulating student learning motivation / L.H. Puteri et al. // International Journal of Education, Training and Learning. – 2018. – Т. 2, No. 1. – С. 7–12.

19. *Bai H.* Preparing teacher education students to integrate mobile learning into elementary education // TechTrends. – 2019. – Vol. 63, No. 6. – P. 723–733.

20. *Tsvetkov V.Ya.* Analysis of implicit knowledge // Prospects of science and education. – 2014. – No. 1 (7). – P. 56–60. [In Russian]

21. *Tikhonov A.N., Ivannikov A.D., Tsvetkov V.Ya.* Terminological relations // Fundamental research. – 2009. – No. 5. – P. 146–148. [In Russian]

22. Determinants of self-regulated learning practices in elementary education: a multilevel approach / V. Thomas et al. // Educational Studies. – 2022. – Vol. 48, No. 1. – P. 126–148.

23. *Koryakina Ya.V., Lomteva T.N., Kamensky M.V.* Self-regulated learning in the conditions of digitalization of education // Bulletin of the North Caucasus Federal University. – 2019. – No. 2. – P. 141–148. [In Russian]