Visualization Practices in Training Pedagogy Students

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Abstract

The world practice of distance learning has updated the educational technologies that are adequate to the challenges of today and can effectively solve the problems of training competitive specialists in the new information society. Among them, visualization is singled out, which improves the quality of perception, understanding and assimilation of educational material and serves as a powerful motivator of the students’ cognitive activity. The study is aimed at characterizing the potential of visualization as a technology for teaching Pedagogy students, which allows using the tools of the digital environment effectively to achieve educational goals.

The main research method is the survey of 96 second-year bachelor-degree students of the subject area “Pedagogical Education” of the Faculty of Philology of the North-Eastern Federal University.

A quantitative and qualitative analysis of the results of the research on visualization as educational technology has revealed the interest of future teachers in using visual teaching methods and understanding the role of visualization in enhancing the cognitive activity of students. The respondents have demonstrated, on the one hand, knowledge of the basic means of information visualization (88%). Yet, on the other hand, not all of the respondents (55%) can clearly and consciously differentiate the concepts of “online platform”, “social network” and “visual means of transmitting information” (“visual communication”).
The results can be interpreted as the need of Pedagogy students to master the visualization technology for the further development of professional competencies for working in an educational environment of a mixed type (digital and traditional education) and the need to use visualization in teaching specialized humanitarian disciplines at a university. The practice of using the visual educational technology in the preparation of future teachers of the Russian language and literature in the learning process demonstrates the high interest of students in visual techniques for working with educational information and texts of different nature. Visualization has rich didactic potential and adequately meets the needs of students focused on solving professional problems in a digital educational environment. The participants of the educational process need to acquire the ability to master significant amounts of information, the ability to quickly transfer knowledge from generation to generation and the ability to communicate in conditions of e-learning.

Keywords

Liberal Arts Education, Professional Training of Teachers, Literature, Visualization Technology, Graphic Method.

Introduction

Modern culture, in particular, communicative culture, is developed in the space of transmedia technologies, expanding social networks and content diversity. Today’s huge flow and speed of information transmission create certain difficulties in its development, understanding and interpretation. It is well-known that there are two main languages for coding information: verbal and visual ones. Digital technologies in the modern socio-cultural situation, where “...texts are mainly carried not in the written form, but on the screen, make socio-cultural changes “visible” and satisfy the needs of the modern audience for non-linear narratives” and other creative and visual models (Glazkova, 2017). According to M. McLuhan (2003), the media researcher, the sequence finally gave way to simultaneity, hybridity and visuality.

The “visual turn”, which was initiated by the cinematography and in which “...the established relations of the visual and the verbal aspects of public life ended up in favour of the visual one”, has practically come true today (Maslov, 2019). The intensity of the visual emphasis of different messages is so high that visual practices, strategies and technologies nowadays are the key means of conveying any information. Moreover, visualization is so inclusive that society begins to visualize concepts that are not visual, for example, abstract and even scientific concepts. In general, this is caused by the modern design of social networks.
The media space is full of visual rhetoric, creolized texts, emotional and expressive images and various visual elements: slideshows, graphs, caricatures, illustrations, infographics, timelines, videos, memes, drawings, diagrams, logos, letterings, etc. The impact of modern communication channels is mainly visual, which technically expands the perception, thinking and consciousness of a person. “Modern people are in general visual thinkers, and the range of alternative communication possibilities is so wide that it is easier to quit halfway reading a complex text than to finish it. Only “reorganization” of the textual information into visual or audio-visual information will help to keep the reader’s attention” (Kiriya, 2010).

The huge amount of information that is stored in all channels and contents cannot be mastered today only with the help of traditional analogue thinking and linear perception; it is impossible to decode it using only verbal language. The advantages of visualization also include the fact that visual images are kept in memory for the longest time. Besides, “...it is worth noting that a person perceives 90% of information through the visual channel, and the brain processes 80% of the information in the form of images and 20% in the verbal form” (Tkachenko, 2014). Relying on a visual image, a person can “effectively study, reproduce and then develop one’s experience, thinking and activity” (Kabanov et al., 2020). Visual messages do not require an accurate and detailed text transferring, although the amount of information contained in a visual image is broader in semantic terms than any strict logical-conceptual thinking frameworks.

Visual practices are based on visual-figurative or just visual thinking (Rubinstein, 2000; Arnheim, 1994). In modern digital aesthetics, it is visual thinking that becomes increasingly dominant. In this regard, the ways, methods, forms and techniques of transferring textual information and meaning in the space of communication between teachers and schoolchildren, and teachers and students change in many ways. In the conditions of an uncontrolled information flow, the most effective ways of processing and mastering information are visual teaching practices that provide access to quality education (Morozova et al., 2021). Visual practices contribute to the rapid assimilation of information in a concise form of images and a visual format.

The relevance of the research of the possibilities of referring to a variety of visual practices in the educational process is also confirmed by modern ideas about the text multimodality, including the use of not only the verbal method of transmitting information but also other semiotic channels: audio and visual formats, body language and others (Kibrik, 2009). Understanding the phenomenon of the text in modern
pedagogical discourse is marked by multimodality, nonlinearity and cultural ambivalence (Galaktionova, Kazakova, 2016).

Methods

To determine the attitude of students (future language teachers) to visualization in education as a technology for analysing literary text, we carried out a survey on March 1, 2021. It involved North-Eastern Federal University students of the subject area 44.03.05 Pedagogical education (with two specialisations), from the department of the Russian language and literature. In total, 96 respondents out of 102 students took part in the survey.

The survey included six questions:

1. Are you the active participants of the media environment?
2. What visual means of conveying information are you familiar with?
3. Which of them can be used in teaching literature?
4. What other visual means for text analysis can you offer a literature teacher?
5. During what classes at the university do you master information visualization technologies?
6. What disciplines, in your opinion, can contribute to the development of visualization as a learning technology?

The answers to the first question show that 73% of the respondents who answered positively are constantly present in the media environment, processing a significant amount of information. It is obvious that most of the means of communication in social networks have been mastered by them during their school years, and today students are no longer just users and consumers of medical products, but active participants of the communication process. At the same time, 23% of the respondents answered “I don’t know”, and only 4% of the respondents do not consider themselves to be active participants of the network culture.

Table 1 shows the results of a quantitative analysis of the students’ answers to the question about visual means that are familiar to them as active participants of the media environment, who are at the centre of intense information flows and who use similar means to transmit information and draw attention to it.
Table 1 Answers to the question “What visual means of conveying information are you familiar with?” (%)

<table>
<thead>
<tr>
<th>No.</th>
<th>Answer options</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E-mail, ICQ, Skype, Zoom, Google Meet, Discord, YouTube, TikTok</td>
<td>37%</td>
</tr>
<tr>
<td>2</td>
<td>Instagram, Vkontakte, WhatsApp, Telegram, Facebook, Twitter, etc.</td>
<td>16%</td>
</tr>
<tr>
<td>3</td>
<td>Videos, animations, presentations, flash animations, gif-animations, slideshows, photos</td>
<td>14.5%</td>
</tr>
<tr>
<td>4</td>
<td>Tables, graphs, charts, maps, infographics, schemes</td>
<td>12%</td>
</tr>
<tr>
<td>5</td>
<td>Billboards, signboards, booklets, posters, leaflets and brochures</td>
<td>4%</td>
</tr>
<tr>
<td>6</td>
<td>Online libraries</td>
<td>2%</td>
</tr>
</tbody>
</table>

According to the table, the majority of the students (37%) first of all named services, video hosting and online platforms that are important for students and are used for various purposes, including storage, delivery, creation and viewing of video information of different genres. The most popular and the largest social networks, which allow watching and uploading one’s “stories” (short videos), photos and documents were named by 16% of the respondents. These respondents also named WhatsApp, the most used in their region of residence free instant messenger for mobile phones and other platforms, which support voice and video messages. It allows sending text messages, images, video, audio, electronic documents and even software via the Internet. All this attracts users who often have problems with the fast transfer of information with the help of a computer due to unstable and expensive communications.

It becomes obvious that more than a half of answers (53%) indicate that students of the Internet generation have a good knowledge of electronic platforms for the exchange of various kinds of information, and point out to their unwillingness to differentiate the concepts of “online platform”, “social network” and “visual means of transmitting information” (“visual communication”). They use visualization every day, but do not realize that it is an independent tool for working with information. This category of students can also include 2% of the respondents who consider online libraries to be visual means.

Let us single out 26% (14% and 12%) of the respondents who indicated in particular means of visual communication which are used to “transmit information to a person in a format that can be either read or viewed”. We also include in this group 4% of the respondents who noted advertising means of conveying information, including visual information.
The next question of the survey is “Which of them can be used in teaching literature?”. It is related to the previous one, so the students’ answers had the same percentage as in the first question. Convenient platforms for the transfer of knowledge were mentioned by 33% of the respondents due to the distance learning format in the 2020-2021 academic year, when video lectures, screencasts, meetings and conferences were organized at the North-Eastern Federal University through visual channels. Here are the examples of students’ argumentation: “ZOOM is a very convenient and accessible platform: the installation is simple, mobile version is available, it is free and has clear and necessary options for communication (screen sharing, chat, rooms, video and audio communication)”; “YouTube provides users with video storage and viewing services. It is possible to view, rate and comment videos, save them to the playlists and share video links. For example, a literature teacher can arrange live broadcasts, invite students, record and post lectures on the channel and send links to educational programs and accounts of literary figures”.

Only a third (31%) of the participants prefer diagrams, drawings and presentations, in other words, the visual presentation of information during literature lessons. They argue that “in the classroom, it is possible to launch a prepared in advance presentation and work with it, show a film based on the work, include an audio recording of a poem performed by the famous actors”; “Usually, during literature lessons, preference is given to informational presentations and videos. It is easier for children to perceive information through colourful presentations with all kinds of diagrams and pictures, which present the information accurately and on the topic”.

The fourth question of the survey gave the students another opportunity to think about the concept of “visual means”, but in terms of text analysis. The question specifies the type of activity for using visualization. This contributed to the actualization of the respondents’ knowledge, which is reflected in the results of the survey.

Table 2 Answers to the question “What other visual means for text analysis can you offer a literature teacher?” (%)

<table>
<thead>
<tr>
<th>No.</th>
<th>Answer options</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Videos, animations, multimedia presentations, slideshows, photos, schemes, tables</td>
<td>40%</td>
</tr>
<tr>
<td>2</td>
<td>Infographics</td>
<td>23%</td>
</tr>
<tr>
<td>3</td>
<td>Book trailers, videos, trailers</td>
<td>19%</td>
</tr>
<tr>
<td>4</td>
<td>Tag cloud, Serendip</td>
<td>4%</td>
</tr>
<tr>
<td>5</td>
<td>Pinterest</td>
<td>2%</td>
</tr>
<tr>
<td>6</td>
<td>I don't know</td>
<td>12%</td>
</tr>
</tbody>
</table>
Answering the third question, 40% of the students named the most traditional means widely used in teaching. The broader concept of “infographics” was mentioned by 23% of the participants. They spoke in favour of the use of visual aids in text analysis, while the main advantage of infographics was called “accessibility”, “comprehensibility”, “consistency” and “colourfulness”. “With the help of infographics, complex information is explained by simple and understandable images, the transfer of information in a compressed form looks more interesting and easier to understand”.

It is interesting, that 19% of the respondents indicate that the use of such visual means for analysing a work as book trailers, videos and trailers are the motivational component of learning: “book trailers raise schoolchildren’s interest and the desire to read a book”. There were several cases (4%) of examples of infrequent visual practices in the literary text analysis in the answers. It was proposed to use tag clouds during the lessons, which helps to structure keywords and phrases taken from the text and depicted on a plane; while “the plane itself is depicted in the form of some kind of drawing (a map of Russia, China; a star, a stack of books, etc.)”. The tag cloud is created with the help of the Serendip system, which emphasizes hidden topics of the text and highlights words in the text with colour. Also, 2% of the respondents named the social service Pinterest: “it allows finding photographs of writers and illustrations for works quickly”.

The professional activity of future teachers requires the skilful use of modern communication technologies, including visualization. The fifth and the sixth questions of the survey allow us to assess the possibilities of forming information and communication competencies of students in the educational process of studying pedagogy.

Table 3 Answers to the question “What disciplines, in your opinion, can contribute to the development of visualization as a learning technology?” (%)

<table>
<thead>
<tr>
<th>No.</th>
<th>Answer options</th>
<th>%</th>
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<tbody>
<tr>
<td>1</td>
<td>Information technology</td>
<td>41%</td>
</tr>
<tr>
<td>2</td>
<td>Mathematical information processing basics</td>
<td>33%</td>
</tr>
<tr>
<td>3</td>
<td>Pedagogy</td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>Introduction to project activities</td>
<td>9%</td>
</tr>
<tr>
<td>5</td>
<td>Life safety basics</td>
<td>7%</td>
</tr>
</tbody>
</table>

Thus, the majority of the respondents (41% and 33%) quite logically indicated professional disciplines (Information technology and Mathematical information processing basics) as the main ones in the formation of information competence, where a large amount of educational information is visualized with the help of the appropriate software. 10% of the students mentioned Pedagogy, 9% – Introduction to project
activities, which is also justified by the specifics of academic disciplines. 7% of the respondents noted that the largest number of tests and various kinds of cards have been developed during the Life safety basics classes concerning the introduction of information technologies into the educational process.

Answering the question “What disciplines, in your opinion, can contribute to the development of visualization as a learning technology?”, students named the following disciplines: Electronic and information environment in literary education (40%), Theory and methods of teaching literature (35%), Philological text analysis (11%), History of Russian literature (10%). Quite a large number of the respondents (35%) chose the Theory and methods of teaching literature, which is the main important discipline for future teachers of the Russian language and literature. According to the participants, in the process of studying it is necessary to pay significant attention to the practice of using modern visual aids in humanitarian education. Visualizing educational information and texts, students create their creative media products, revealing the author’s concept of the text.

Results

The research results showed that the students (future teachers) in general understand what visual teaching aids can be used in literature lessons (88%). However, they are mainly familiar only with those that are widely used in educational practice. At the same time, 12% of the respondents could not give examples of such means, which may indirectly indicate that, for one reason or another, they have no experience of using visualization in the literary text analysis.

In the modern digital society, schoolchildren and students develop a mindset where visualization is not only a means of communication but also a way of presenting information. Pedagogy students (future teachers of the Russian language and literature) are familiar with the most basic means of visual communication, from reading with labelling to creating a digital product (Marcus et al., 2021). Yet, at the same time, there remains a need to form stable skills in the process of their professional training for the practical application of a wide range of visual aids, adequate to the goals and specifics of literature lessons. Reasonable use of visual practices in humanitarian education develops the students’ thinking activity, increases the efficiency of perception of the sign systems, pushes the boundaries of what is accepted, creating a new digital world.
Summing up, in general, the quite high level of interest of future teachers of the Russian language and literature in the problems of visualization as a teaching technology, and their understanding of the effectiveness of the use of visual methods of text analysis when working with a new generation of readers, adapted to the peculiarities of information flows of the Internet, actualize the need to master this technology. The mastering process occurs during the professional training of teachers, who are also language specialists, in the process of studying academic disciplines that form the following general professional competence: “the ability to use psychological and pedagogical technologies in professional activities, necessary for the individualization of training, development, education, including students with special educational needs” (Federal state educational standard of higher education..., 2018). We believe that in the pedagogical educational programs for the teachers of the Russian language and literature, the above-mentioned discipline is, first of all, Theory and methods of teaching literature, the historical traditions, educational potential and technological tools of which allow introducing visualization into the educational process of the university and school.

Let us give some examples of the practical application of visualization in the study of the methods of teaching literature, which began to apply the visual method of teaching in the 20s of the 20th century (Petrovich, 1927). The early experiences of visualization in teaching literature gave birth to the mind maps, clusters, and even sketchnoting that exist today. Let us consider the example of Marina Tsvetaeva’s poem. Here, the graphic visualization helps students to work with a concept or form of text, and readers can discover the meaning of the work. The conceptological approach to the text analysis based on visualization makes it possible to present the concept as the semantic core of work in volume, in the context of different semantic facets. We visualize the semantic field by constructing a “concept map” in the process of analysing Tsvetaeva’s poem “Dawn on the Rails”, in which the concept of “Homeland” is the artistic and semantic centre (Sosnovskaya, 2017; Tsvetaeva, 1979). The stages of work on it will determine the course and strategy of the conceptological analysis. The semantic field of the concept of Homeland in the poem is presented by images, feelings, ideas, thoughts and actions, which constitutes the general cultural and value content of the concept. The work with the associations with the concept brings students first to their ideas about their homeland, then helps to compare them with the author’s ideas. Through the “metaphorical portrait” of emotions, feelings and states, as well as a series of images, the reader gradually comprehends the emotional picture of the poet’s world (Mishatina, 2017). The system of questions and tasks on the analysis and interpretation of the text allows presenting it spherically and constructing a semantic “concept map”:
Such visual communication with the text develops the conceptual thinking of the student (reader), forms “...the skill of orientation in the complex internal and external dialogical connections of fiction...” (Sosnovskaya, 2017). It also develops the analytical ability to see the features of the form of a literary text and adequately find the meanings of the text.

Also, practical application in the educational process can be found in the art of visual notes, which is called sketchnoting. It is a graphic expression of the author’s thought with a combination of words, pictures and hand-drawn typography, shapes and design elements. V.S. Bratash proved the didactic use of the texts of the “new nature”, proved their flexibility and variability due to the possibility to put a verbal statement in the format of texts, the structure of which includes codes of various semiotic systems (Bratash, 2020). Its source capabilities include support for creative comprehension of information, group work and the importance of emotional response. These characteristics make sketchnoting (a form of the functional drawing) promising for teaching literature, since “a
A sketch can become a way of interpreting a literary work or an educational text, as it captures information as a result of its analysis, activates emotions, develops creative thinking, visual thinking, graphic skills, and encourages self-realization of the reader. Sketchnoting includes the choice of a title and the main topic, the choice of a model (structure) of the sketch, the drawing process and the presentation of the finished work. The use of the technique may differ. Thus, the students presented a supporting graphic scheme for the organization of the meaningful home reading by ninth-graders of the chapters of the novel by A.S. Pushkin “Eugene Onegin” (Pushkin, 1981). The scheme includes putting down quotes necessary to describe the characters, plot, composition of the work.

The visual techniques in the process of working with literary texts are aimed at their interpretation, and the development of special methodological sources by students (chapters of monographs, journal articles, videos, podcasts, etc.) is aimed at processing information and expanding the professional worldview and methodological tools, gaining self-actualization, self-assessment and self-reflection. The relevance of this educational activity became especially obvious in the context of distance learning when students need to independently study a significant range of methodological problems based on the educational materials proposed by the teacher and expand their methodological portfolio, as well as present the results of the work to the teacher for control.

The classical dominant form of recording educational information of a scientific or professional nature is voluminous abstracts of articles and monographs. In the digital age, visualization means significantly changing the educational situation. To organize meaningful reading, as well as selecting, systematizing and compressing information, students are experimentally invited to present the result in a given format with a choice of presentation method when performing a specific task on a topic. The presentation methods include supporting synopsis, essay, table, diagram, word cloud, glossary, infographics, mind map, etc. Such a transformation of educational texts “leads to the emergence of new forms and methods of putting down the information while preserving the content of the text. The modern stage of transformation of the educational text is characterized by the inclusion of visual elements in the structure of the text, which not only complement the text with content and information but also become an integral part of it” (Bratash, 2020). The methods of compression, structuring and visualization of
methodological material are graphic organizers of information, which include diagrams, word clouds, intelligence maps and clusters, known from the technology of critical thinking, which presupposes the allocation of semantic units of text, connections between them, a hierarchy of significance and their graphic design. Thus, for example, students transform into the scheme the slow reading technique, the structure of the composition for the unified state exam. Having read the article on the method of mastering the genre of essays at school, the students can present in the form of a cloud of words the semantic context of D. Dragunsky’s essay “The Dark Side of Freedom” (Dragunsky, 2012):

Another form of presentation of the results of independent work with a significant number of methodological sources can be the design of a press review, which allows the author to summarize and highlight the most interesting publications, emphasizing the key quote in each of them.
Figure 3 Press review “Let us learn how to teach!”

The use of visual methods of transformation of educational information makes it possible to put a verbal statement in the format of texts, the structure of which includes codes of various semiotic systems. Such texts of the “new nature” are flexible and variable due to the possibility to combine existing formats of text transformation (diagram, scheme and table), support creative comprehension of information and a group format of work, involve the reflection of an emotional response to the text” (Bratash, 2020).

Conclusion

The study of the practice of using visualization technology in the educational process in a university when Pedagogy students work with various kinds of texts fits into the context of acute and relevant psychological and pedagogical problems associated with the search for new effective means of professional training of digital humanitarians who are competent in graphic tools for understanding, analysing and interpreting information, generating and broadcasting new ideas and meanings, creating “texts of a new nature”.
Researchers consider such texts to be “a thought recorded on a carrier, for the viewing of which a linked sequence of symbols (signs of a verbal and non-verbal nature) is used” (Kazakova, 2016). The main trends in text changes are distinguished: they are the rejection of linearity in the construction and perception of the text; compression of text with an increased amount of information within one unit; orientation towards overlapping nature of various sign systems in the reflection of the content; the growth of interactivity, the development of feedback forms, the emergence of “new forms of authorship” and several others (Kazakova, 2016). In a learning situation, texts of a new nature include presentations, diagrams, notes, clusters, tables, concept maps, mind maps, infographics, etc.

Rapid changes in the media landscape, within which the volume of data visualization increases, intensively affect the characteristics of the consumers’ perception of information, and force educational content to be stored in a new way. Therefore, the modern educational environment requires teachers who are able not only to help the development of knowledge and to present educational information but also to illustrate it in a bright, attractive and colourful way with the help of visual forms, the number of which in the media space is increasing and which are trendy among young people who feel comfortable in virtual reality.

Visual educational techniques for future teachers of the Russian language and literature have a rich history of application. In particular, the methodology of teaching literature as a science in the last century drew attention to the significant didactic, emotional and aesthetic potential and the cognitive effect of multi-format visualization, the use of which as one of the tools for mastering educational content has become a traditional phenomenon. The methodologists have identified the fundamental principles of visualization as an educational technology, which are gaining special relevance today: variability, dosage, relevance, the reasonableness of use. The pedagogical practice has shown that visualization in teaching is fruitful in combination with audio materials and, most importantly, with verbalization. Then it becomes visual communication based on the principles of humanism (Angulo, Pardo, Canossa, 2020). It is enriching the dialogue of a person who reads, thinks and creates with the surrounding reality.

References


Federal state educational standard of higher education. Bachelor’s programme. 44.03.05 Pedagogical education (with two specialisations). Order No. 125 of the Ministry of Education and Science of the Russian Federation. https://omgpu.ru/sites/default/files/files/basic/programmy-bakalavriata-fgos-3/44.03.05_pedagogicheskoe_obrazovanie_s_dvumya.pdf


