

Preparing Teachers to Use New Media Visual Communications in Education

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T.A. Yarkova

Tyumen State University, Tyumen, Russian Federation
tatyanyarkova59@mail.ru

I.I. Cherkasova

Tyumen State University, Tyumen, Russian Federation
irinka65@rambler.ru

A.M. Timofeeva

Tyumen Industrial University, branch in Tobolsk, Tobolsk
am_timofeeva@mail.ru

V.V. Cherkasov

Tyumen State University, Tyumen, Russian Federation
wladmir30@rambler.ru

V.G. Yarkov

Tyumen State University, Tyumen, Russian Federation
vyarkov@rambler.ru

Abstract—In recent years new media visual communications have become predominant in the built environment of today's children. This study sought to examine the pedagogical potential of visual communications and to find out how the traditional technology in children's training and education contradict the influence of new media technologies on the educational process. The opinions and attitudes of school teachers (N=150) towards the problem as well as documents and teaching materials were analyzed. The research demanded use of direct and indirect observations, questionnaires, self-analysis, and observation of the results of activity. A monitoring protocol, profiles, and materials for meaningful evaluation of products for teaching were developed. The obtained results showed that there is a narrowness of understanding of visual communications by teachers; uniformity in visual presentation of educational materials; lack of a system in multimedia application; and repetition in the creation and use of visual content. The results suggest that it is necessary to change not only the content and methods of training prospective teachers, but also their thinking.

Keywords—Educational technologies; New media; Teaching activities; Teacher training; Visual communications

1 Introduction

Currently, the Russian system of education is undergoing a very important and crucial period of development, characterized by a radical revision of stereotypes of the profession that exists in the minds of teachers. Concept of the Development Support of Teacher Education [1] describes new requirements for quality in school education, as expressed in the new Professional Standard of the Educator [2]. The approval of the professional standard for teachers suggests the need for changes in the organization, content, and technology of teacher training, as well as an expanded scale. In connection with this, the problem of change in this “visual age”, especially for teacher education, is increasing.

Since the powerful new context of this visual age has not yet been reflected in the system for the professional training of teachers, it is necessary to identify key problems in this area. The very process of professional training of prospective teachers to use new media visual communications in education is of great importance. Specifically, the target needs to be modified to relate to the content and technological components of the training process of the modern teacher, who needs to be prepared to create and use new media visual communications as a result of broadened understanding. In recent years, the context of education in Russia has changed considerably due to the state of society, the new role of education, especially for the modern child, and the accompanying new requirements for teachers and their acquired abilities. Therefore, preparing future teachers with the ability to construct new media visual communications is an important challenge. This concept should be certainly included in the conceptual framework of professional pedagogy as a component of basic professional teacher competence. Despite the growing interest in the problem of visual communications in teaching, studies in this direction are mainly presented in other areas of the humanities (including philosophy, cultural studies, and public relations technology, therefore there is a significant opportunity for further research into this problem. This study shows a potential of the Russian system of education for development including some guides on how to improve the content and methods of training prospective teachers.

In order to do so, this paper is structured as follows: section II describes factors and conditions that determine the need for visual communications in pedagogical activity, it also discusses the importance of training teachers to use visual communications; section III shows the necessity of changes in teacher thinking in the new situation of education, requiring the use of visual communications, and indicates the direction of the research; section IV introduces types of visual communications and outlines a possibility of teacher education to use them in teachers training; section V presents results of the investigation of teachers' experiences concerning the use of visual communications in the educational process; the final section draws the conclusions from the study and depicts ongoing avenues of research in this field.

2 Factors to Take into Account when Analyzing Visual Communications

Many investigators have examined the issue of context in solving social problems, including education [3]. This means that the solution of practical problems cannot be separated from the environment in which these problems are manifested. This leads us to analyze the context of the preparatory process of the modern teacher. The first context is determined by the complexity and ambiguity of the state of the society. The modern era is often characterized as an information society. The main medium of interaction and existence of people in the information society is media and virtual space, and the central element is a visual image. The visual image was traditionally regarded as the basis of artistic perception of the world (fine arts, performing arts), but now it is becoming a means of communication in the increasingly visual world in all spheres of life, including education. Many studies have investigated areas of scientific research in the study of visualization: visual anthropology, visual sociology, interdisciplinary area “visual and cultural studies”, visual programming languages, and visual simulation. Some investigators have carried out psychological and educational research and have examined different aspects of visual communication in educational practice. The appearance of new media has expanded the space of visual communications, including pedagogy [4], [5].

2.1 Visual communications in pedagogy

There has been an increasing spread of technologies of social media in vocational and general education: messaging and communication (blogging and microblogging: Blogger, LiveJournal, Twitter), creation of teacher and student communities and groups (social networks: Facebook, vK, YouTube), sharing of photo and video materials (YouTube, Instagram, Flickr, Picasa), creation of bookmarks (Memori, Del.icio.us), cooperation and joint activities (Letopisi, Wikipedia, Wiki-dictionary), and virtual worlds (Second Life, Lively). However, there have not been any studies of new media visual communications in the field of vocational education of teachers; in particular, this concept has not yet been assimilated by pedagogical science. As a consequence, this, in turn, strains the conflict between the prevalence of visual communications in the constructed environments of today's children and traditional technologies in the system of training and education.

More than that, one more context is determined by the new role of education. In order to promote education as a development factor in society and as a guarantor of its stability it must ensure a new higher level of erudition. This suggests fluent understanding of ways to search, process, perceive, and create information for new media visual communications through mature visual literacy [6]. These requirements need to be fully incorporated into the professional standards for teacher development.

2.2 The child and the visual environment

The modern child is a product of this new context. Now children develop in a visually rich environment and perceive the world through visual communications from birth. It is hard for a child to become accustomed to the traditional educational process, which often ignores particularities of perception and learning. Many studies show that the modern child, and people in general, have changed recently. According to research, children's creativity has decreased; their emotional discomfort has increased; the need for screen stimulation of cognitive processes has appeared; and the so-called “file” memory is developing [7], [8]. The increased need to interpret information is another characteristic of the modern childhood [9]. The child has a greater volume of long-term memory and a higher scale of operational memory, which allows children to perceive and process a large amount of information per unit of time [10]. These skills enable them to navigate the high flow of information in this high-tech computer age. In simple words, we can see the contradiction between the cognitive style of learners and the style of information presented in a textbook or by the teacher. The imaginative and emotional clip style of thinking of students, formed and maintained through constant communication with mass media, is contrary to the predominantly verbal, declarative style of presentation in traditional education. The priority in the triad of emotional-rational-intuitional of the learning process belongs to the rational, which ignores the modern context again. Therefore, it is clear that mass media are winning in the confrontation described above, because the information obtained from the Internet, television, and other mass media is characterized by greater motivation due to its being chosen independently, and to its emotional background and imagery.

It must be pointed out that these changing features in children suggest that there is a new type of consciousness, one that distinguishes these children from children of the past century. This requires a modern, distinct approach to education and training, with greater use of technologies that are based more on children's daily lives and communications. Generally speaking, major changes in the approach to learning include an increase in the rate of learning; a system that uses visualization (“a picture is worth a thousand words”); an increase of multitasking and high motivation for learning; a wider application of the system of rewards and positive reinforcement; and motivation for independence of thought and for solutions for educational and life tasks – for something new, for changes. The following section explains why it is necessary to change thinking of teachers for them to use visual communications, it also shows the progress of the research.

3 Research Challenges, Steps and Methods

The analysis of the examined contexts suggests that a visual image and visual communications are powerful factors, without which it is impossible to determine strategic directions for education, including teaching. This section focuses on the need of further study of the problem. Challenges of our time extend to changing the content and tools of teaching activities as well as the teacher thinking [11]. The reason for

establishing new education is the need to develop common generic abilities and acquisition of universal ways of thinking, leading to commensurate activity. Many investigators are convinced that competence of an expert in the twenty-first century should be judged by highly developed integrative and analytical abilities, which include professional pedagogical thinking. Nevertheless, tendencies to stereotype teachers' activities in the practice of education are greatly disturbing. On the one hand, the growth of freedom and capabilities of a particular teacher in determining the content and methods of training and education require a high creativity level on the part of the teacher – his or her panoramic thinking. On the other hand, online resources give an opportunity to “borrow” practices, but perhaps without the necessary theoretical understanding. The technological component of the educational process is often offered to settle the contradictions. However, in our view, the key position in their settlement must be the change of thinking by the teacher. Attention is drawn to the required shift in the teacher's thinking. There should be research with methodological components, open-mindedness, and clarification of the position. Teachers need the ability and opportunity to design and to reflect, to develop a holistic and systemic vision of required phenomena and processes, to build a dialog in communications, including visual ones, and overall, to be responsible for their decisions. The main features of teacher thinking, while being responsive to the needs of the contemporary school, should encompass the unity of methodological, theoretical, and practical components of thinking, including its panoramic, critical, dialogical, and reflective characteristics, humanistic orientation, project integration, productivity, and innovation [12].

The multi-faceted nature of the research problem identified the logic and the selection of methods. Organization of the study included several stages. At the first stage we analyzed literature on the stated problem and developed diagnostic tools. The second phase included collection, analysis, and interpretation of the empirical material, including the study of views and experiences of teachers, and of documents and teaching materials that reflect the content of education. At the third stage we summarized the data and determined a plan for changes in the preparation of prospective teachers. Research methods were direct and indirect observation, questioning, introspection, and the study of documents and teaching materials.

4 State of the Problem

The scientific literature represents classifications rather well and gives characteristics of various types of visual communications, including visual texts. As an example, we will describe briefly the following classification that might be useful for educational purposes.

1. Visual texts

- basic – text message, rendered using font solutions
- combination – reports based on combining two or more different elements (text + image, text + link to some resource, text + graphics, text + video and others)
- integrative – complex visual system of objects that integrate and interact with each other

- alternative – creation and use of non-traditional channels of transmission, utilization of unusual and unexpected materials
- 2. Representational visual content
 - photographs – portraits, photos of objects, report photos
 - illustrations – black-and-white drawings, reproductions
 - videos and animations – documentary video, video presentation, flash animation
- 3. Decorating content
 - logos
 - elements of corporate identity – brand decorative graphic compositions, brand fonts
 - ornamental and decorative elements – ornaments, copyrights, emblems, and others
- 4. Official content
 - hyperlinks in the body of the text
 - any other hyperlinks – any object can work as a hyperlink: illustration, logo, video and others;
 - special symbols of social networks.

What problems exist in the use of visual communications? After this review of diverse aspects of visual communications, here is an outline of some of the problems. Assessing the problems, we followed the standards reflected in the official policy documents of the Ministry of Education and Science of the Russian Federation, including [2], governing qualification requirements for the modern teacher. According to the subject-pedagogical component of the professional standard, a teacher should be able to:

- use digital technology for visual art, including animation, three-dimensional graphics, and prototyping (art, technology, literature);
- design virtual and real devices with digital control (technology, science); and
- formulate and carry out experiments in virtual labs on various subjects (natural and mathematical sciences, economics, ecology, sociology).

Perhaps the biggest concern lies in the fact that the contemporary educational situation falls short of regulatory requirements, in part due to narrow understanding of visual communications, aborted special skills to create new media visual content because of the time-consuming effort required, and unwillingness to integrate a broad arsenal of techniques from different disciplines. These include: visual arts (graphics, drawings, illustrations); photographs (including art collage); web design; modern technologies (including digital photography, holography, video art); and modern computer technologies (special programs).

5 Experimental Results and Discussion

The process of the experiment included more than 150 secondary school educators of Tobolsk and Tobolsk district, working in grades 5- 11, they are specialists in different subjects: Mathematics, Native and Foreign languages, Literature, Physics, Chemistry, Biology, History, Social studies, etc. The teachers were offered to answer a number of questions relating to the use of visual communications in the classroom. We studied the opinions of teachers about how they understand visual communication in general, effort was focused on the forms of visual communications used in classes, there were questions about methods and techniques of using visual communications, the existing problems in the use of visual communications. The choice of teachers taking part in the experiment was of a random nature, they were both beginning teachers, and teachers with some experience. The findings indicate there is current awareness and use of visual communications by almost all teachers. They are aware of the importance and need for visualization in the learning process, but their understanding tends to focus on the use of a traditional presentation.

Generally speaking, there is a range of aspects that characterize visual communications, the main thing for them is comprehension.

5.1 How do teachers understand visual communications?

For reference, figure 1 shows that the majority of respondents (61%) considered visual communications to be represented as an image (charts, tables, illustrations, photographs, pictures); 27% included in the content the concept specifics as perceived by students (in addition to illustrative material); and 12% of the teachers interpreted visual communication more broadly, understanding it as a tool of development of the cognitive processes of students.

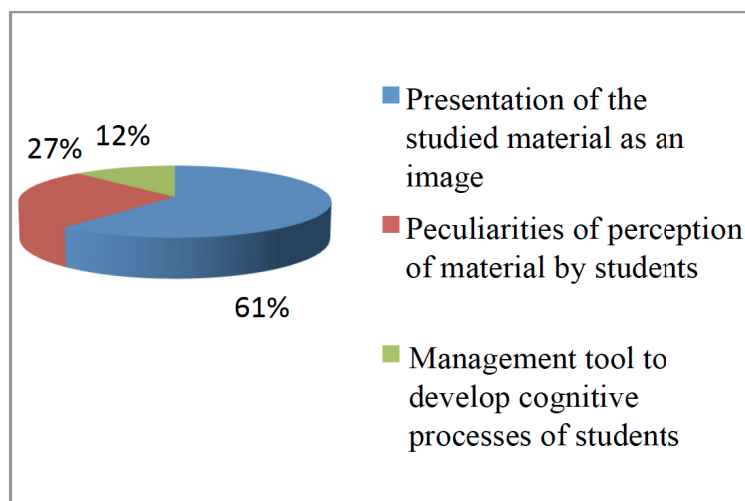


Fig. 1. Understanding of the essence of visual communications by teachers

The general description of the responses as a whole reflects the new requirements for teachers as presented in [2], in which visual communication is understood as the use of obvious objects to aid communication, plus, at times, including the related conceptual aspects. At the same time, such understanding seems to be quite narrow, because means of communication are developing so rapidly. It is worth noting that it lags behind the modern national and international research in the field of new media visual content.

We also focused our work on *types* of visual communications. As you can see from figure 2, 100% of respondents use visual presentations of educational materials. However, the quality of presentations varied: a presentation that includes some text, at best visualized with a catchy font or color (32%); an image used in combination with some text (53%); a dynamic graphic with visual content (12%); and others, 3D graphics, logos, and hyperlinks (3%).

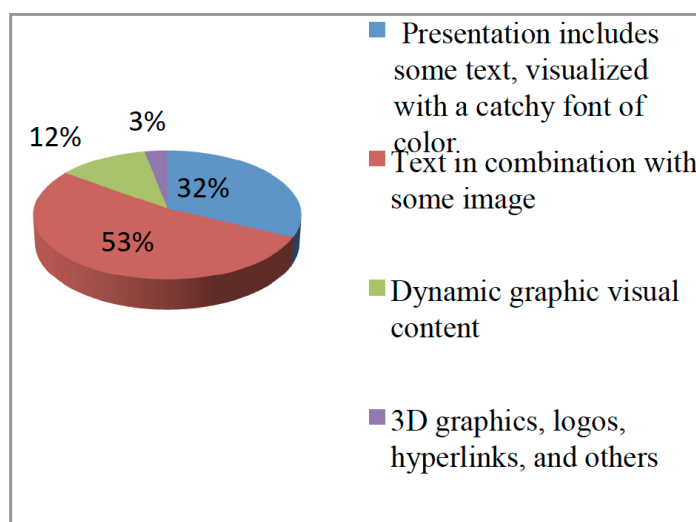


Fig. 2. Ways of presentation of material

The results of the interview showed that the requirements for submission of a text are not always followed. As it turned out, a text is not considered by teachers to be significant to visual communication. At the same time, the scientific literature represents classifications rather well and gives characteristics of various types of visual communications, including visual texts. As an example, we will describe briefly the following classification that might be useful for educational purposes.

1. Visual texts (basic, combination, integrative, alternative);
2. Representational visual content (photographs, illustrations, videos and animations);
3. Decorating content (logos, elements of corporate identity, ornamental and decorative elements);
4. Official content (hyperlinks in the body of the text, any other hyperlinks, special symbols of social networks).

5.2 How do teachers use visual communications?

The *technology* that teachers utilize in visual communications is very important to describe, the results of the analysis are given in figure 3. Evaluation of systematic application of visual communications revealed the following: teachers use visual communications systematically (including all areas of the educational process; in training and development at all stages) – 12%; occasionally – 73%; depending on the situation (open lessons, certification for improved category, the presence of a finished product that does not require any development and application of efforts) – 15%.

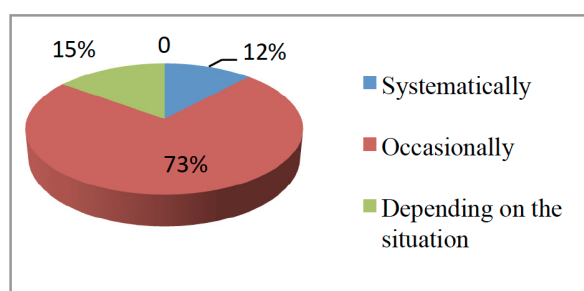


Fig. 3. Systematic application of visual communications

As seen in figure 3, though teachers use visual communications in the teaching process most often, visual communications have not yet become an integral component of the educational activities for the main part of the teaching corps, they are not carefully considered, and the efforts do not provide the expected improvement in the results of the educational process.

We now turn to the *subjects* of visual communications. The survey showed that the most active developers and supporters of visual communications are young teachers. They used a wide range of visual context, including the integrative and alternative visual text, Web 2.0 and 3.0, and they were good at using decorative content, creating videos and animations. The teachers with extensive teaching experience, in general, used elementary and combined visual texts, illustrations, and reproductions. There were also differences in the process of creating of visual content. Young teachers are mostly creators of new elements, while teachers with more experience are mainly consumers who prefer to use available products. In addition, experienced teachers are more likely to ask students to prepare home assignments, while younger teachers utilized more complex tasks, developing clips, animations, and interactive projects in social networks.

5.3 What must be done to prepare a prospective teacher to work in the visual environment?

To improve the quality of training for prospective teachers, the requirements in the professional standards must be met and there must be efficient use of new media visual communications in education. To ensure a rich and varied outcome, we ana-

lyzed the content of training as reflected in curricula and educational programs. Realistically, curricula provide little guidance with respect to the new media visual communications. The variable part of the curriculum, in particular, appears to rely upon a possible university component. The analysis showed that some universities now include in their curricula elective courses aimed directly at creating these skills: “Audiovisual teaching technologies”, “Integrated multimedia in education”, “Visual content of modern public relations text”, “Introduction to visual communications”, “Media-orientated approach to education”, “Use of modern information and communication technologies in education”, and “Information technologies in design and modeling of social and educational activities”. However, there is still no systematic and consistent approach to teaching prospective teachers to use new media visual communications, including integrated courses in pedagogical activity. It must be stressed that the lack of concurrence of basic subjects and elective courses in time and in content prevents students from having a holistic understanding of the content and methods of using visual communications in the educational process.

Another aim of our research was to analyze educational programs, the main part of which is the program of a discipline. We analyzed these educational programs using the content analysis method and tried to highlight some typical tasks related to the problem of training prospective teachers to use visual communications. Most often, teachers use such types of tasks as preparing an abstract, making a presentation or a synopsis, or filling in a table. It is apparent that all of them fall short of the task of creating meaningful visual content. Perhaps, the only exception is the task of creating a presentation on an individual topic. To understand the cause of the problem, we assessed the sufficiency of textbooks and teaching aids on the problem of new media visual communications. We wanted to learn how well teachers are being prepared to use and create new media visual communications. As a result, we note that there is lack of orientation to the problem in the literature and in the educational programs used in training of prospective teachers.

A further object of our analysis was the operational activity component of the education process: technology, methods, techniques, and forms of vocational training. It has been proven by numerous studies that students transfer their own participation experience to their future pedagogical work. Today the most widespread forms of work at universities are lectures and related presentations, which, unfortunately, are reduced to the presentation of a text, and, at best, charts and tables, perhaps on a projection screen. Attendance of classes by university teachers (during training, refresher courses, or to share experiences) and conversations with colleagues, as well as the results of special studies, show that there is no coherent system in vocational education for incorporating new media visual communications in the educational process. Accordingly, transfer of visualization experience to schools is not promoted. Nevertheless, the results of observation and questioning show that today's students are able to create a range of modern visual communications. These skills are, however, often obtained during extracurricular activities, through hobbies and outside school interests. Therefore, students cannot always evaluate and predict the visual perceptions by other children. Generally speaking, the pedagogical potential of visual communications is not fully recognized. Having analyzed the matter, we conclude that the prob-

lems of preparing students for creation and use of new media visual communications require the design of curricula, programs, and teaching aids that take into account the new context of education and the changes in technology of pedagogical training and education.

6 Conclusions and Ongoing Work

As discussed, new media visual communications are studied today in different ways, including a sociocultural one, advertising, economic, and public relations spheres. However, they have a powerful pedagogical potential, which requires its own analysis and interpretation. Modern children interact with too many visual images on a continual basis through mass media, so the teacher needs to form visual literacy of learners, to provide adequate perception of visual information and some critical attitudes toward it, to be able to create visual content and teach children with it, and to master the visual language.

The main objective of this study was to show the need for changes in the quality of training of future teachers so that they could work in the contemporary visual media environment. The results of our research suggest that to master the pedagogical potential of visual communications we need to change the content and technology of teacher training. In order to improve the quality of preparation of future teachers for them to be able to work in the contemporary visual media environment we can offer the following measures: They are as follows:

1. Add the topics "Modern children and visual medium", "Impact of visual communications on training peculiarities of the modern child", "Creation of visual content in the classroom", etc. to the contents of psycho-pedagogical disciplines.
2. Enter elective courses "New media visual communications in education", "School visual medium", "Impact of new media visual communications on cognitive processes", and others in the curriculum.
3. Overcome reproduction in creation and use of visual content, changing the system of assessment of educational achievements of students within the classroom, out of the classroom, in research and self-study work (use creative tasks: create integrative and alternative visual text, carry out projects using Web 2.0 services and 3.0, create videos and animations, etc.).
4. Develop a system of incentives for university teachers to support active use of new media visual communications and expand the repertoire of implemented pedagogical technologies;
5. Prove theoretical and methodological necessity of formation of a new type of pedagogical thinking of teachers ready to use pedagogical potential of new media visual communications.

It has to be emphasized that this range can be extended (adjusted) depending on the capabilities (human, material, technical, informational, and others) of the university that train teachers. Finally, we must say that further research of influence of visual communications on the quality of comprehension of the studied material is needed; in

addition, this research should be accompanied by examination of University abilities to develop readiness of future teachers to use visualization technologies.

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8 Authors

T.A.Yarkova is with Tyumen State University, Tyumen, Tyumen region 625003 RF (e-mail: tatyanayarkova@mail.ru).

I.I.Cherkasova is with Tyumen State University, Tyumen, Tyumen region 625003 RF (e-mail: irinka65@rambler.ru).

A.M.Timofeeva is with the Tobolsk branch of Tyumen Industrial University, Tobolsk, Tyumen region 626150 RF (e-mail: am_timofeeva@mail.ru).

V.V.Cherkasov is with Tyumen State University, Tyumen, Tyumen region 625003 RF (e-mail: wladmir30@rambler.ru).

V.G.Yarkov is with Tyumen State University, Tyumen, Tyumen region 625003 RF (e-mail: vyarkov@rambler.ru).

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