

DESIGN AND INFORMATION COMPETENCE FORMATION OF FUTURE TEACHERS BASED ON DIGITAL STORYTELLING

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Abstract

One of the criteria for assessing the quality of education is its ability to adapt to the demands of the modern information society. Considering that, the need to implement changes in the modern educational process of a university occurs, primarily through revealing the potential of various digital technologies. Effective integration of educational and digital technologies gives the opportunity, on the one hand, to improve the educational process and, on the other, to take into account the interests of the younger generation formed in the digital environment. Digital storytelling is of particular interest for developing the professional competencies of a future teacher. This technology offers rich educational opportunities: it allows you to develop skills in dealing with different types of information, teaches analysis and assessment of given situations, selection of alternative and most rational solutions, forecasting and design techniques, allows you to correlate the learned theoretical material with practical experience, and develops professional skills in solving professional problems.

The aim of the study was to develop the design and information competencies of students using digital storytelling.

The methodological basis of this research was a competency-based approach, which aims to achieve the learning outcome by considering the ability to solve professional tasks effectively. The authors also relied on the project approach, which focuses on organizing a special type of educational and professional activity aimed at creating pedagogical projects.

The leading research methods used in this study were the analysis of theoretical sources, systematization of the key concepts, generalization, questionnaires, and quantitative data analysis.

In this paper, the authors systematize data on modern digital storytelling tools, stages of technology for creating stories, and possible forms of their presentation. The practical part of the research was a pilot experiment, which was carried out in stages:

To conduct the experiment, at the first stage, the educational standard of the teaching major for master students was analyzed. Based on that, the authors identified competencies that contained design and information components. Then, the questionnaires were designed for students to self-assess the impact of digital storytelling on the formation of these competencies. Next, a methodology for implementing storytelling was designed and tested based on the subject "Modern problems and innovations in education". Students were familiarized with storytelling, types, assessment criteria for story evaluation, and the algorithm of the story's construction. The tasks included an analysis of the theoretical sources on the topic, designing situations, and creating a story. At the final stage, students carried out a self-assessment of the effectiveness of digital storytelling to develop their information and design competencies.

Analysis of experimental data showed that the majority of respondents rated the influence of digital storytelling technology on the development of information competence at an average level. However, more than a third of them highly assessed its impact on the development of design competence. The findings allowed the authors to conclude that digital storytelling is effective in training future teachers in order to develop information and design competencies.

Keywords: digital storytelling, design competence, information competence, future teacher training.

1 INTRODUCTION

The current context for the quality of professional training requires the active usage of the potential of the digital educational environment during the educational process at the university.

The freedom to search for information in the global information network and the acquisition of skills in working with sources, along with the possibilities for personal customization to the needs and peculiarities

of each learner, interactivity, and active interaction between subjects, multimodality represent strong aspects of the digitalization of education.

Digital storytelling is of particular significance in shaping the professional competencies of future specialists. Its active application has been seen in advertising, where a compelling story motivates the listener toward specific actions. The distinctive feature of digital storytelling is the presentation of a story using multimedia tools. In education, digital storytelling is an "effective educational technology aimed at addressing pedagogical issues of upbringing, development, and learning by creating a story with a specific structure and engaging characters [1, p.14]."

Despite the considerable familiarity and widespread use of this technology in marketing, its methodology in educational settings remains insufficiently developed. Thus, the study is aimed to enhance the design and information competencies of students through the utilization of digital storytelling.

2 LITERATURE REVIEW

The methodological framework of this study is based on literature review of the following scholars and their contribution: A.I. Azevich in his research presents a systematic description of the theoretical framework of digital storytelling, provides practical recommendations for its implementation in the educational process at university [1]; V.Y. Grushevskya reveals the possibilities of active digital storytelling in the aspect of developing project management skills [2]; O.S. Nazarova's value for this study lies in systematization of the definition of storytelling, justifying its potential for developing pedagogical competencies [3]; D. Armstrong's books provide the methodology of teaching story writing and the concept "management through stories" was introduced [4]; R. Bernard provides an overview of digital technologies, explores the origins of digital storytelling, and justifies its potential for developing independent, engaged cognitive activities of students [5]; In the framework of his research, K. Fog reveals important structural elements of storytelling [6]; In B. Sally's books, the strategy of active learning through storytelling in the context of connecting science and art is presented [7].

Storytelling was first introduced in 1992 by David Armstrong, the head of Armstrong International (USA). He used this method to improve the performance of his company and to train new employees more quickly. For this study, the significance of applying his unique invention has special relevance which is awareness through personal experience and learning in an interesting form. The author considered an important psychological factor: "stories are more expressive, engaging, and interesting, easier to associate with personal experience, unlike logical arguments and lengthy reasoning. Storytelling is an effective method of informal learning [4]."

Following O.S. Nazarova's opinion, we consider digital storytelling in the context of understanding the concept of 'creative education,' which is based on the application of modern psychological techniques, a playful format, storytelling, modern information and communication technologies. For our research, the author's statement about the value of applying storytelling is considered valuable: "it implies independent analysis of various types of information, the use of narrative techniques, which in turn enhances student engagement in learning, simplifies the perception and memorization of academic content, and allows for a deeper study of a particular topic [3]."

Bernard R. Robin's statement that active use of multimedia technologies allows students to enhance their communicative and research skills, learn to evaluate the accuracy and quality of information is significant for our research. In the works of Bernard R. Robin, as well as Nezhad N. V. Shcheydayi, a range of skills that this technology is capable of developing were identified [5]; [8]:

- Information search and processing skills;
- Creating multimedia products;
- Formulating and solving educational tasks;
- Thinking creatively and critically;
- Drawing conclusions from reviewed material;
- Paying attention to details;
- Effectively using oral and written communication;
- Collaborating;
- Organizing group activities;
- Self and peer assessment;
- Gathering and selecting data;
- Creating project works.

Moreover, in the framework of our research storytelling is considered as an adaptive educational technology, creating conditions for a more conscious practice of the educational material based on individual student needs. Digital stories can serve as an effective means of self-analysis and personal development. And in that case connection of storytelling with the art of narration is significant [7].

There are different classifications and types of storytelling. For example, in terms of genre, social storytelling (information presented in a conversational style with reflection), cultural (stories about morality and moral choices), fantasy (a story that is difficult to verify but evokes strong emotions in the listener), etc. is distinguished. In terms of using technical means of expression, these stories can be created using virtual and augmented reality tools, mobile technologies, and etc. The technological stages of creating a digital story include: concept development, gathering and analyzing information, story creation while adhering to all the principles of plot development, selecting visual and audio elements, editing, project presentation, and publication (open presentation of the product, for example, on social media). In terms of using technical means of expression, these stories can be created using virtual and augmented reality tools, mobile technologies, and etc. The technological stages of creating a digital story include: concept development, gathering and analyzing information, story creation while adhering to all the principles of plot development, selecting visual and audio elements, editing, project presentation, and publication (open presentation of the product, for example, on social media) [1], [6].

Storytelling is often distinguished into traditional and active types. We share V.Y. Grushevskaya's opinion and believe that the model of active storytelling is more effective, "as this format of storytelling promotes communication and interaction within the group. The main goal of active storytelling is not only for students to acquire educational material, but also implicit knowledge, which leads to the development of practice-oriented skills and the enhancement of their personal skills. This is achieved through searching and analyzing information, modeling situations, and making decisions independently or within a group." At the same time, this type of activity fosters experience in project work [2].

3 METHODOLOGY

The methodological basis of this research is a competency-based approach, which aims to achieve the learning outcome by considering the ability to solve professional tasks effectively. The authors also relied on the project approach, which focuses on organizing a special type of educational and professional activity aimed at creating pedagogical projects. The leading research methods used in this study were the analysis of theoretical sources, systematization of the key concepts, generalization, questionnaires, and quantitative data analysis.

The practical part of this research involved a pilot study aimed at exploring the potential of digital storytelling technology in fulfilling its didactic function. Specifically, we investigated the impact of this technology on the development of information and design competencies. The research took place at the Institute of Philology and Intercultural Communication at Kazan Federal University. It involved master degree students, specializing in "Art Pedagogy and Information Technologies," "Teaching English in Higher and Secondary School," and "Foreign Languages in Professional Communication." In this paper, the results of the experiment conducted with 53 students is presented. The potential of digital storytelling was examined during the course "Modern problems and innovations in education " during one semester.

In the initial stage, we reviewed the Federal State Educational Standard for the teaching major at master's level and identified the relevant competencies. The authors intended to determine the didactic potential of storytelling to develop the identified competencies. Considering the aforementioned theoretical foundations and the analysis of the standard, we selected particular information and design competencies along with indicators of their achievement (Table 1).

Table 1. Competencies and indicators of its achieving

Competency and its code	Competency Achievement Indicator and its code
GPC-6. (general professional competency) can design and use effective psychological and pedagogical technologies in professional activities.	GPCI 6.1 (general professional competency indicator) designs and uses psychological and pedagogical technologies in the process of professional activities
PC-1 (professional competency) can create an educational environment and implement professional knowledge and skills in solving the objectives of innovative educational policies, including the usage of information technologies.	PCI 1.2. (professional competency indicator) applies professional knowledge and skills in solving the objectives of innovative educational policies, including the usage of information technologies.

Next, while studying the topic "Modern educational technologies" students were introduced to storytelling. Various types, forms, and criteria for assessing stories were considered, with particular emphasis placed on the algorithm of constructing a narratively connected tale based on principles of dramaturgy. During an experiment, our focus was on active storytelling, which presupposed the presence of a certain initial template for the plot.

As templates for developing the storyline, students were presented with prospective directions in educational development formulated by the Agency for Strategic Initiatives: the spread of network culture values, the development of the cognitive enhancement industry, the pragmatization of education, a new model of cognition, etc. [9]; [10]; [11].

The students' task involved, analyzing the given literature, designing situations based on a template, creating a narrative and analyzing the achievement of learning objectives in the form of professional knowledge on the selected topic in the framework of the course "Modern problems and innovations in education". An essential condition for project creation was the usage of online services and software products. The projects were presented as outcomes of autonomous work and were used during practical sessions while studying relevant topics in the course program. The table below provides examples of storylines suggested by students for designing stories in the direction of trends in development of innovations in education (Table 2).

Table 2. Plots of stories on the trends in development of innovations in education

Formats for presenting digital stories include videos, podcasts, comics, texts, and quests	Trends in development of innovations in education	Plots used by the students
	The spread of network culture values	At a parent-teacher conference in one of the schools, the principal announced the imminent launch of the "My Achievements" project within the framework of the state information system "My School." They intend to record data from the kindergarten: grades, certificates and diplomas from competitions, Olympiads, achievements from extracurricular activities, letters of appreciation. An example of such a project in real life could be Cloudwatcher - a platform aimed at establishing a resource allocation system where the more a person does for the benefit of society, the more opportunities and resources, such as money, orders, subsidies, they should receive. However, one parent's statement that such a digital portfolio could become something like a bad credit history or a mark of an outsider prompted parents to strongly oppose it. What should be done in this situation?
	The development of the cognitive enhancement industry	At the meeting of one of the institutes, information about the start of the "Student Startup" competition for master's and postgraduate students was announced. It is being conducted in connection with the federal project "University Technology Entrepreneurship Platform." Having heard of this, students decide to start a business in the field of cognitive enhancement industry. However, they discover that things are not so simple, as there are already commercial organizations in Kazan implementing these ideas: the International Network of Mental Arithmetic Schools, the Speed Reading and Memory Development Center "MegaBrain" etc. What should the students do? The students decide...
	The pragmatization of education	During a class, students learn about new professions in the field of education: educational online platform coordinator, gamification specialist, knowledge validator. They decide to analyze the job market and observe that these professions are indeed in demand. Having investigated that, the students decide to propose the realization of new majors and profiles of education at the university during the meeting of the academic council...
		During a class on the topic of "Pragmatization of Education," students were assigned to study experiences in organizing school education. They were surprised to discover schools such as: hub schools, immersive schools, and distributed schools etc. This led to questions about what competencies modern young teachers should acquire, possess and what new disciplines are needed in higher education...?
New model of cognition	Following the popularity of the artificial intelligence driven technology known as ChatGPT, humanities students have actively started using its services to prepare for classes. It has become a habit, even in writing course papers. To prevent such incidents, the university administration sets an objective to develop an anti-plagiarism program capable of tracking such actions of students and preventing misuse of the abovementioned AI...	

4 RESULTS

We developed a questionnaire and conducted a survey to ask master students to evaluate the effectiveness of digital storytelling in shaping their information and design competencies. The students were asked two closed-ended questions and given three answer options each. To assess the impact on the formation of the competence "can create an educational environment and implement professional knowledge and skills in solving the objectives of innovative educational policies, including the usage of information technologies", the question posed was: "Evaluate the effectiveness of digital storytelling on developing your competency to apply information technologies in teaching." The answer options were:

- 1 Digital storytelling did not affect my level of competency in applying information technologies in teaching.
- 2 Digital storytelling had a slight effect; it could have been done without it.
- 3 Digital storytelling helped to improve my abilities and skills to work simultaneously with information of various types: textual, audio, video, and graphical (Figure 1).

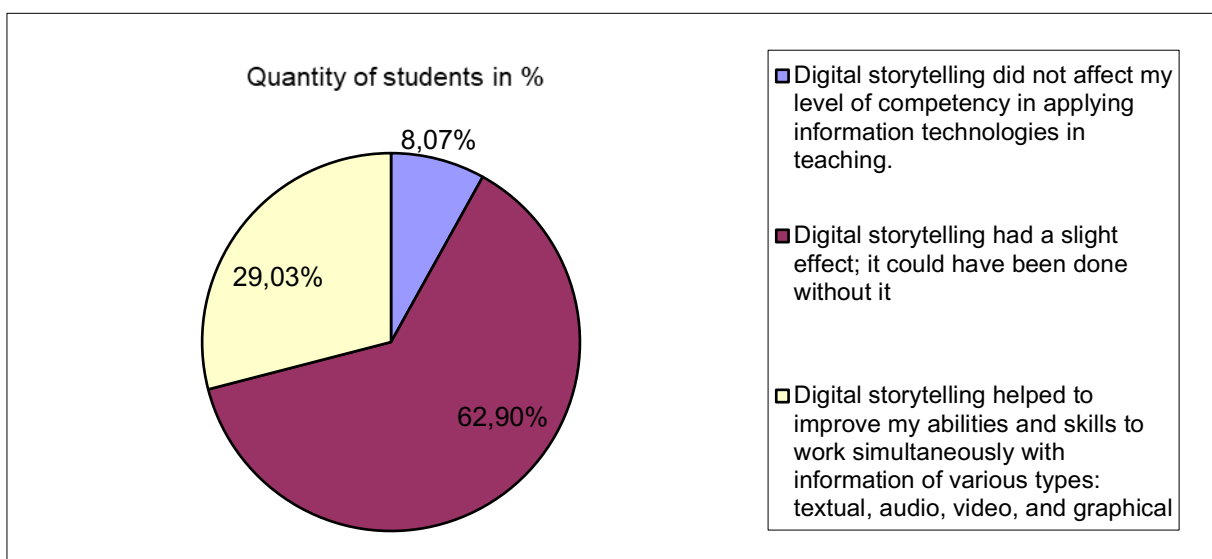


Figure 1. Distribution of students based on their selected answers to the first question as a percentage of the total number of participants.

The second question "How effectively did the storytelling technology impact the development of your ability to design a pedagogical project?" addressed the effectiveness of using storytelling in shaping the design competence "can design and use effective psychological and pedagogical technologies in professional activities". The answer options were:

- 1 The result of developing my ability to design a pedagogical project would have been the same without using digital storytelling.
- 2 Developing the project based on digital storytelling was more interesting than in the traditional format, so I remembered more information about the technology of pedagogical design.
- 3 Designing a digital story is very effective because it involves a deeper analysis of knowledge in the discipline and helps understand their connection with modern project-based pedagogical technologies (Figure 2).

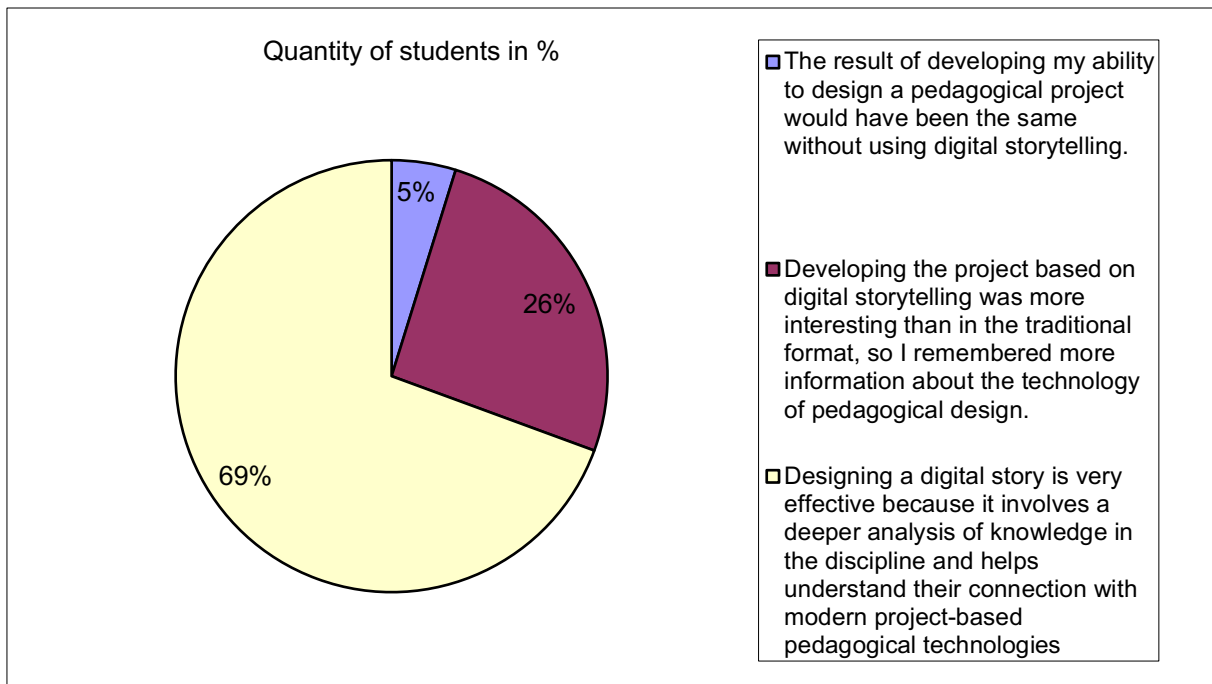


Figure 2. Distribution of students based on their selected answers to the second question as a percentage of the total number of participants.

The analysis of responses to the first question showed that the majority of respondents, precisely 62.9% of the sample (39 students), believed that storytelling technology had only a slight impact on their competence in applying information technologies in teaching. This is likely due to the widespread use of information technologies in the educational process, and most students were already quite proficient in them before taking the course "Modern problems and innovations in education". However, a different scenario emerged when students answered the second question regarding the effectiveness of storytelling on the development of the competence to design a pedagogical project. Here, 69% of students (43 individuals) gave it a high assessment of its effectiveness.

5 CONCLUSIONS

The aim of this study was to study the impact of digital storytelling on the development of students' information and design competencies. Based on the literature review, the skills that this technology can develop were summarized; types of storytelling, digital tools, and services for creating stories were highlighted. The results of the pilot study showed that most students believe that digital storytelling had only a slight impact on their ability to use information technologies. However, they highly evaluated its influence on the development of their design competence, believing that digital storytelling contributes to a deeper understanding of the subject and helps to acquire modern project-based pedagogical technologies more effectively. Thus, as shown by the results of the research, digital storytelling can be considered as an adaptive pedagogical technology that creates conditions for a more conscious acquisition of educational material. It can also be seen as an effective tool for developing design and information competencies and enhancing students' educational and cognitive interests. The research results can be recommended to university teachers for use in their practice.

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