Research Article

Psychological Aspects Of Pedagogical Design Development In The Context Of Digital Transformation Of Education

[1]Nilufar Fayzullayeva, [2]Dilorom Ergasheva,

[1]Department of "Innovative Education", Tashkent State University of Economics, Tashkent, Uzbekistan, n.fayzullayeva@tsue.uz
[2]Department of "Innovative Education", Tashkent State University of Economics, Tashkent, Uzbekistan, d.ergasheva@tsue.uz

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Abstract: the article reveals the basic concepts of the psychological foundations of pedagogical design and the ways of its application in the structure of creating educational content on online platforms. Pedagogical design is considered as a field of science and practical activity in the development of digital educational content of an educational institution. Information and telecommunications technologies allow you to modify the nature of the development, acquisition and assimilation of knowledge, open up unique opportunities for updating the content of training and teaching methods.

Key words: visual content, principles of didactics, graphic design, online platform, emotions, thinking, digital transformation, goal-setting, pedagogical design, gestalt, perception, infographics, colors, the principle of grouping, mental processes, pedagogical goals, informatization of education.

Methodology: in the present work, we used an analysis of the methodological foundations of the work of designers, designers of educational content, the compilation of professional experience within the activity, discuss their practical activity in a digital environment, the analysis of positively and negatively influencing factors in the context of the style and technology of delivery of educational material, methods, systemic approach, comparative analysis, synthesis, classification and periodization of the studied material.

Analysis: With the advent of the digital economy, truly revolutionary changes are taking place all over the world associated with new technologies that are reorganizing all industries and production systems, including the educational environment, that is, a digital transformation of this area is taking place. Especially the digital educational environment has become relevant due to the COVID-19 pandemic, there is a need for social distance and quarantine throughout the world. For this reason, online education today is becoming more relevant than ever and is being introduced in all educational institutions of the world. The transition to the online space of even one readable discipline at a university is a huge work of a whole team of professionals. This requires knowledge of psychology, pedagogy, didactics, graphic design. And the preparation of online classes requires huge intellectual costs, mental stress, which will increase in proportion to the number of disciplines taught by the teacher.

These tasks are successfully handled by pedagogical design, which implies the creation of an educational process, its translation into an online format. Pedagogical design is a new trend in the educational sphere, which is gaining popularity every day in the context of online learning. Nevertheless, the term itself only partially entered into professional use. Therefore, everyone who first encounters this concept has many questions about its interpretation.

As a basis for the development of an online platform, the focus is on a quality learning process in order to assimilate the learning material and increase student motivation. Instructional design (ID) is the purposeful process of developing, creating, implementing and evaluating educational products. Educational products include online courses, tutorials, video tutorials.

The term "pedagogical design" itself appeared in the early 1940s and only by the 1950s. his postulates and principles took shape. In 1956, the American psychologist Benjamin Bloom proposed to the scientific world a theory called Bloom's taxonomy, which distinguished and described the already classical, academic levels of learning by students of educational material.

Another American scientist, Robert Gagne [9], in 1965 significantly expanded and improved this concept, introduced nine mandatory elements of the educational process that contribute to its effectiveness. These elements became the basic conceptual principles of pedagogical design and included such aspects as, for example, attracting the attention of students using various visual methods in the form of infographics, diagrams, various images; defining goals; layering knowledge on the base; fragmentation of information, etc.

As already noted, the technology of pedagogical design includes a team of developers in the person of IT specialists, practicing teachers, applied psychologists, experts. In tandem teams, they apply their knowledge at the stage of design, creation and evaluation of training materials.

The basis of pedagogical design is the systematic use of knowledge about effective work, competent, targeted building of an effective educational process and the creation of a competent learning environment in the digital space.

Despite the fact that pedagogical design is closely related to online learning, it does not always use digital or so-called digital tools. The main activities here are aimed at improving content and learning outcomes, increasing accessibility and understanding of curricula. While the use of technology can improve the curriculum, the end result of pedagogical design is effective teaching, not the production of technological materials for the sake of technology itself.

The key is to create engaging learning content that leads to concrete results. And since pedagogical design is focused on students and their needs, its projects are designed to facilitate the assimilation of knowledge, should be effective and liked by students. The developers (designers) of online platforms, in turn, are the designers of learning experiences. These experts apply various methodologies based not only on teaching theory and new technologies, but also on the knowledge of psychology.

A student studying using an online platform, who has mastered the educational material well, may not even guess that this is not only the merit of his mental abilities, the functioning of mental processes, but also the merit of IT specialists armed with the knowledge of psychology. Its merits, as a science, are invisible to the student himself, but its laws and scientific postulates, nevertheless, can be used and taken as a basis when creating an educational site by designers and programmers.

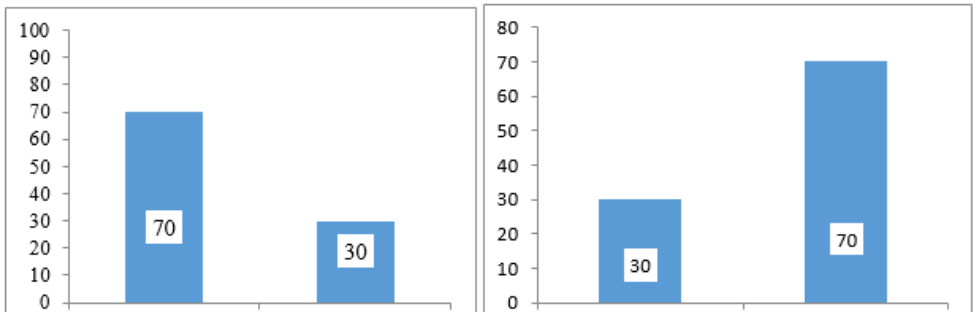
In fact, psychology is one of the main sciences that helps designers analyze the behavior of users of electronic platforms from different angles, better understand and influence them. In particular, the role of this science, its applied aspect cannot be overestimated, therefore, we will talk about what its fundamental principles are important and appropriate to take into account in the design process.

The site architecture, convenient or not perceived, devoid of logical meaning, or, on the contrary, structured, convenient or imperfect navigation, successful or not color design - all this is perceived and processed by mental cognitive processes, preparing the student for the assimilation of knowledge [1].

The connection and benefits of psychology with web design have long been proven. This is obvious, if only because the transmission of information through the means of Internet resources has clear laws and principles of perception (perception), based on the same laws according to which psychology is applied in practice in everyday life, in business, or in relationships between people. Color, text, font, graphic pictures, perception in general are the most direct psychological traps that will contribute to the achievement of educational goals [2].

So, during the pandemic, the Tashkent State Economic University attracted «Eco Texno City» LLC to the creation of an online platform, which developed and implemented two versions of it during a six-month training period. According to polls of teachers and students, the following picture emerged.

The first version of the platform at the very beginning of the academic semester was made in the classical academic style, that is, pastel colors predominated in restrained colors. It was this sample of design that suited 70% of teachers, whose average age is 45-60 years old, and they found it comfortable in their work. The developers calculated the second version of the platform and implemented it for the target, i.e. directly to the student audience, and it differed from the previous one in bright colors, with a predominance of blue, and was performed in 3D MAX 3D modeling. According to a student survey, the visualization of study assignments, the adjustment of textures and colors in this program is better for the assimilation of knowledge and, in general, makes the study site attractive on an aesthetic basis. That is, 70% of students preferred this particular option, in contrast to teachers (30%), who do not possess the so-called clip thinking typical of students (Fig. 1)



Option-1 of the online platform Option-1 of the online platform Option-2 of the online platform Option-2 of the online platform Teachers'perception Student perception Teachers' perception Student perception

Figure: 1. Differences in the perception of design by students and teachers.

Thus, when developing and creating a digital platform in design, one should first of all focus on the target audience, that is, students, their perception, mental processes and thinking, that is, the technologies for designing and implementing educational trajectories for the student audience should be used in modern models. We will consider this in more detail below.

A properly designed educational site can help a student not only master the information, but also consciously and sometimes subconsciously read and memorize educational information, even if it would be difficult for him to assimilate it in the mode of a traditional lecture. Because teachers do not always have perfect pedagogical skills. The emotions and feelings that awaken when using the training site are actually psychological reactions - they cause either positive or negative emotions, sometimes they just leave you indifferent. All these reactions can be predicted only by relying on psychological knowledge. Striving for a positive result of the final assimilation of educational information - it is possible to calculate, analyze, correct - for this you just need to know the derivatives of the mental cognitive process - perception, memory, thinking, attention [3].

In order to arrive at the planned educational result, called goal-setting in pedagogy, it is advisable for site creators to use the knowledge of psychology and apply it in practice in order to influence the mood and behavior of students, that is, to manage and control the learning situation [1].

In web design, there are only four main components that significantly affect the psychology of the student: content, space, text design and the chosen color scheme.

The psychology of color in web design is generally an immense and inexhaustible topic, since color can convey everything: feelings, emotions, convey the most important thing, highlight the necessary and important aspects of the topic being taught. then using color is one way to harness the power of visual tools.

Studies have shown that 80% of the information that the brain of the Internet user processes comes through sight, and people are extremely sensitive to visual cues when learning. This is why visual content is a key factor in e-learning and should not be underestimated, and the correct application of graphical techniques can improve learning. Color can help reduce boredom and passivity, thereby improving concentration. When students pay more attention to learning materials while learning, the speed of memorization and reaction time increase.

Numerous studies have shown that when developers use colors to highlight a specific function or piece of content, student attention levels increase.

Neutral warm, pastel colors best accomplish this goal. When used carefully, red stands out and immediately grabs attention, stimulating visual perception and helping students remember facts and numbers.

When starting to create an online platform or educational site, weighing and choosing a color solution, the designer, the creator of the software product must take into account the theory of the famous psychologist M. Lucher [7] on the perception of color, as well as the results of experiments by Thomas Sanocki and Salmen (Noah Sulman) [6], who investigated the psychology of color behavioral factors of various categories of users.

Modern designers, taking the theory of M. Luscher as a basis, rarely (especially when it comes to educational projects) experiment with colors, for most cases they have already been selected and work successfully. High tech sites tend to use blue - reliable and confident.

When developing a website, a designer must take into account the fact that there are many aspects that affect how a person perceives information: someone processes visuals more easily; it is better for someone to hear once; and someone perceives phenomena exclusively tactile. But with all this, the psychology of the influence of color works approximately the same for everyone, which is associated with the world around us, natural phenomena that have the same color in all corners of the world.

For example, in certain cases, psychologists interpret red as a danger, sometimes it causes rejection and is perceived aggressively and intrusively, on a training site it can be perceived as an indication of an error, white is associated with purity, sincerity, causes positive aesthetic feelings, orange with warmth, brown with stability, blue with poise, relaxation.

The importance of choosing the right, psychologically supported color palette can be economically viable, especially if you also build on the results of the experiment of Sanocki and Noah Sulman (2011), who proved that the layout and design should be made uniquely contrasting. First of all, because the contrast attracts attention and helps to focus on the text, any single element [6].

The studies of Sanoki and Salmen prove that the choice of color should be approached as responsibly and consciously as possible, primarily for an economic perspective, since through the creation of a website an entrepreneur ultimately seeks to conquer the consumer [6].

The psychologically verified color scheme of the web page works for an educational perspective, that is, the main task of developers is to assimilate knowledge. Having analyzed the design of many online projects, we can safely say that they are basically designed in certain colors, convey a special message from the creators, and position the design conceptology using the chosen color that dominates the site [2]. A correctly selected color palette on an online learning platform contributes to greater interest of students, increases the level of trust in its resource and, accordingly, contributes to better assimilation of knowledge.

Thus, since every shade has an emotional color, we can safely say that the psychology of colors in web design is not an empty phrase, but a working scheme for implementing the implementation of a site, entrepreneurial plans to win a client.

The designer should study the functioning of mental cognitive processes in order to understand how a person reacts to color signals, etc. And only then start developing the site design, taking into account the psychology of a specific target audience [6].

Another psychological aspect of creating a website is the use of the theory of gestalt (in the translation from it. "Gestalt" - form), which is based on the theory that the human psyche perceives an object as an integral structure even before it begins to distinguish between individual components. That is, a holistic image is not just a sum of separate parts, but a uniquely independent object [4].

This concept works thanks to the unique design of the brain, which naturally tends to create order out of general chaos. Laws work in most cases, because they are innate for every person. Their psychological knowledge is a prerequisite for a designer, as it helps to organize, group visual objects effectively for the perception of a potential client, studying the information on the site and ultimately making a decision.

At the same time, it is advisable to group only those that support the general logic of the infographic. The subconscious mind is arranged in such a way that it groups all the elements that are close to each other. According to this principle, objects located closer in space are connected. Objects "scattered" in space are perceived as distant and different, therefore, attention to the necessary information is scattered, which is explained by the natural characteristics of the brain, and more specifically by the unwillingness to spend extra energy.

The brain is easier to process one small piece of information, that is, one visual stimulus is easier to perceive than several (albeit small) stimuli, so it avoids tedious and unnecessary overloads and combines related elements with each other. Thus, the highest degree of psychological background of the site is its development and implementation of the software product through the prism of taking into account the laws of the functioning of mental processes [4].

It is also important to take into account the theory of visual assumptions of psychologist Richard Gregory (1978) when developing a site, who believed that human visual perception is primarily based on processing according to the principle of "top-down". That is, top-down processing, also known as conceptual processing, occurs when a person forms their mental perception starting from the big picture. According to Gregory, users are usually correct in these assumptions [8].

Internet users are accustomed to the fact that a number of key blocks (for example, menu, search bar, contacts) are at the top. When a visitor visits a site, then, as noted above, he evaluates it on a “top-down” basis and subconsciously clicks on the places where he expects to see what he is used to seeing. That is why the content must be placed on the site in a certain visual hierarchy, which, in turn, is natural and psychologically justified, predictable. For example, if information is offered in the form of an article, the psyche is tuned to the fact that the heading in the font must be placed on top. Then, as a rule, there follows a short description, which may be accompanied by an illustration, and, finally, the text itself, divided into paragraphs [8].

Understanding how people perceive visual information opens up many opportunities for creating information-rich and aesthetically sophisticated content within pedagogical design. Based on Gregory's theory of visual hypothesis, it is possible to endlessly and with successful results improve the design of online learning platforms to attract students as educational subjects [8].

Thus, to create pedagogical design, which also includes analysis, design, development, and other aspects of it, specific scientific psychological knowledge is needed and, which is very important, the teacher's readiness for their knowledge and practical application. Psychology itself is becoming an effective tool for a designer who creates educational content that can make the learning process more productive, increase intellectual tension, and more focused results.

The digital environment allows a teacher of a higher educational institution to use a wide range of modern information technologies, which requires a radical and global rethinking of the pedagogical design of the virtual educational process in terms of changing the practice of its organization, where one of the priorities becomes the task of developing and implementing a new approach to its goal setting.

The use of modern Internet technologies gives the teacher the opportunity to conduct an online lecture or practical lesson at a higher technical level, saturate with information, make it easier for students to master complex topics, contribute to the achievement of higher quality learning outcomes, activate the cognitive activity of students, and form the competencies necessary for continuing education ...

The main pedagogical goals in the construction of pedagogical design, taking into account psychological knowledge in the framework of digital information technologies, are the development of the student's personality, his constructive-search thinking, and the improvement of research skills.

Consequently, the teacher himself also wins in this two-way process, because he receives new professional development in the context of acquiring new skills and competencies in the digital educational environment.

Thus, the informatization of education objectively entails the reorganization of educational and methodological work; increasing requirements for the teacher and changing his role; the growing role of the student's personality and his individual characteristics; a sharp increase in the volume of available information resources.

Conclusions and recommendations:
Considering the above, when designing and implementing pedagogical design on digital platforms, it is recommended to:
- study the academic foundations of psychology, the general principles of the functioning of the human psyche,
- take into account the laws of mental perception (perception) when placing educational information,
- take into account the functioning of the mental cognitive processes of students, their clip thinking when creating educational content,
- when creating educational material, it is advisable to rely on the theoretical and practical principles of Bloom's taxonomy,
- learn to clearly algorithmize and determine the structure of the educational online platform,
- plan learning outcomes using pedagogical design principles,
- to pay detailed attention to the development of the technical stage, at which the logic of the course is checked, the connection between topics, tasks,
- to study, including for IT specialists, teachers, modern approaches in the development of pedagogical design of educational content,
- to learn, relying on goal-setting, to choose a method of designing educational programs to achieve the desired result,
- to develop digital methods for assessing the effectiveness of online learning,
- use modern approaches to the presentation of educational information in accordance with the requirements of a particular educational institution,
- to involve specialists and experts with practical experience in the field of education in the development of pedagogical design.

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