

**ON THE METHODS OF TEACHING THE DISCIPLINE “UX/UI DESIGN”
IN PEDAGOGICAL UNIVERSITIES, WITH THE PURPOSE OF TEACHING
FUTURE TEACHERS TO DESIGN EDUCATIONAL RESOURCES
ORIENTED TO LEARNERS^{†††}**

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Abstract

Informatization of education has been one of the main trends in modern education for more than two decades. But despite this, many teachers are not yet able to professionally participate in the modernization of today's schools. The main obstacle to the effective work of teachers is the lack of digital competence and the lack of ability to use electronic teaching tools. To solve this problem, it is necessary to increase the level of digital competence among teachers and teach them the basic principles and technologies of designing and developing electronic educational resources. This needs to start from the stage of trainings in pedagogical universities. The article aims to show the need to train students of pedagogical universities in the basics of design and development of electronic educational resources, as well as to demonstrate the importance of introducing the “UX/UI Design” course into the educational process for training future teachers in the design of educational resources focused on learners.

The article presents some features of teaching the discipline “UX/UI design” in pedagogical universities, and various approaches leading to the development of creative thinking of students. Particular attention is drawn to

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presenting the capabilities of Figma technology, as well as the ease of its use in the design of electronic educational resources and learning-oriented mobile applications.

Keywords: *digital technologies, e-education, e-learning resources, UX/UI design, user experience, user interface, Figma, Prototype, plugin.*

INTRODUCTION

It is impossible to imagine the modernization of education without digital technologies and ICT-oriented trends, one of which is the development and application of e-education (Robert, I.V., 2014).

The basis of e-education is electronic educational resources (Bashmachnikov, A.I., & Bashmachnikov, I.A., 2003).

The functionality of electronic educational resources in the educational process is determined by their didactic features, such as interactivity, communicativeness, the ability to present educational materials (text, graphics, animation, audio, video) using multimedia, the application of computer modeling to study educational objects, as well as automation of various types of educational works. (Kirgintseva, N.S., Ivanov, A.S., & Larin, A.A., 2016).

Moreover, since the main essence of e-learning resources is its educational component, this concept is combined with e-textbooks, e-learning complexes and systems, electronic reference books, checking and evaluating learners' knowledge electronic tools, as well as learned-oriented mobile applications and educational websites.

When designing e-learning resources, it is necessary to possess the basic UX/UI design ideas, principles and software, because only easy to use and learner-oriented electronic educational resources, allowing for the implementation of the principles of an individual approach to learning will contribute to a significant improvement in the quality of education.

UX/UI design is the design of web interfaces and mobile applications (Sterljagov S.P., & Seljutina E.P., 2017), (Kim, V.YU., 2015).

Here both the appearance thereof and the ease of use are essential. The UI /User Interface/ specialist develops the physical characteristics of the interface, which determine what it will look like - button color and size, fonts and etc. While the UX /User experience/ specialist ensures the simplicity of the interface, the ease of use of mobile applications and websites.

LITERATURE REVIEW

Initially, a thorough literature review was conducted to establish a theoretical framework regarding the importance of teaching of basics UX/UI design in educational settings. This involved analyzing peer-reviewed articles, books, and current methodologies used in the industry to understand the role and impact of UX/UI design in enhancing the interactivity and effectiveness of educational resources.

In the digital age, the concept of “design” has changed a lot. Today the challenge of design is to create user-friendly interfaces. The main requirements are deemed to be practicality, intuitiveness and convenience. UX and UI design are called to fulfill those requirements (Vojtova N.A., & Kulev E.G., 2019).

D. Norman was the first to use the term “User Experience” and introduce the concept of “emotional attachment” to a product. Norman argued that for creating a product that would be successfully used by users necessary to consider aesthetic aspects, ease of use and the possibility of emotional attachment to the product (Norman, D., 2014).

Famous designer and author of a range of books on UX/UI design, D. Nielsen, has developed various methods and tools for assessing user experience and improving UX/UI of products. In his article “The Myth of the Genius Designer,” Nielsen argues that bringing a good designer to a project does not eliminate the need to systematically conduct usability tests (Nielsen, 2018).

The creation of graphical user interface was also influenced by Steve Jobs, who argued that interface design should be simple and intuitive so that users can easily understand and use products. In her article, Savvina outlines in details the main ethical values that Steve Jobs was follow in design (Savvina O.V., 2017).

It is important not only to understand the basic methods and procedures that are associated with user experience design, but also how UX design fits into the overall product development process. This topic was analyzed in detail by R. Unger and C. Chandler in the book “UX Design. A practical guide to interaction experience design” (Unger, R., & Chandler, K., 2011).

One of the creators of the term UI (User Interface) is the founder of Adaptive Path, Jess Garrett. Jess Garrett defines UI as the realm of interface elements: color code tables, text, and buttons. Jess Garrett is also the author of The Elements of User Experience, in which he explains

the boundaries of what is possible are determined not by technological advances, but by how they achievements are put at the service of people (Garrett, J., 2010).

The authors of the article (Beloblockaja Ja.S., Iskrova A.A., & Novikova A.A. 2022) propose to introduce the concept of a systematic approach to UX/UI design. The authors believe that to make the product easy to use, the designer must understand UX and UI, human psychology, work with the project architecture and bring to perfection many of the smallest details.

All of the above must be taken into account when designing electronic educational resources, mobile applications and websites.

Due to the use of educational mobile applications and websites, developed through UX/UI design knowledge, will make the learning process more effective, interesting and easy to understand, due to ease and suitable of user interaction with this e-learning resource. Additionally, this will increase the students' interest in the whole learning process. Thus, there is a need to introduce "UX/UI design" course in pedagogical universities, develop its teaching methodology, discover the peculiarities of teaching the subject in pedagogical universities, and determine the final results.

METHODOLOGY

The methodology of this study is primarily focused on exploring the integration of UX/UI design courses into pedagogical universities to effectively teach future educators the design of educational resources. This approach involves a combination of literature review, surveys, and observational studies to gather comprehensive data and insights.

Survey

To directly assess the current skills and needs of educators in the field of design of electronic education resources, a structured survey was administered to over 86 lecturers and teachers from various educational institutions. This survey aimed to measure their experience and frequency of developing digital educational resources, as well as their perceived importance of UX/UI design skills in their professional activities. The survey included more than 20 questions.

Observational Studies

In conjunction with the survey, observational studies were carried out in several pedagogical university classes where UX/UI design principles were being taught. These observations were

geared towards understanding the practical challenges and successes in teaching UX/UI design, particularly using tools like Figma, Sketch, and Adobe XD. Observers focused on the engagement levels of students, the ease of tool adoption, and the overall integration of design thinking into their projects.

Data Analysis

The collected data from surveys and observations were analyzed using quantitative and qualitative methods. Statistical tools were employed to quantify. Qualitative analysis helped in understanding the nuanced feedback from participants about the usability and effectiveness of different UX/UI design tools and teaching approaches.

Tool Implementation

The study also involved a practical component where participants were trained to use Figma, given its browser-based accessibility and robust features suitable for collaborative projects. The effectiveness of this tool in educational design was specifically assessed, monitoring how quickly future teachers could incorporate UX/UI principles into their resource development after training.

Before studying the basics of UX/UI design, students were given the task of designing an electronic educational resource. They were given the same task after completing the UX/UI Design course.

The study aims to provide a detailed understanding of how course for study basics of UX/UI design and Figma can be structured and optimized for pedagogical universities to enhance the design and development of learner-oriented educational resources.

Key aspects of teaching Figma

Sketch, Figma and Adobe XD are some of the most used software in the field of UX/UI design. Despite the fact that all of these programs are widely used by industry experts, it should be noted that Figma also allows to work directly from the browser, and access projects from any computer, platform, without installing the program and buying multiple licenses. And Figma has the potential to support the entire design process. (Hvostenko T.M., & Veliksar D.S., 2019).

This is the main reason why Figma has become favorite for both UX/UI design sphere and other professionals. For example, marketing professionals often use Figma to present their ideas to teammates, customers, and management in a beautiful and more comprehensive way.

Applying the fundamentals of UX/UI design is very essential in pedagogy, so a well-designed electronic educational resource will make the learning process more interesting and attractive.

Let us present the features of teaching the discipline “UX/UI design in pedagogical universities”.

First, students should be introduced to what UX/UI design is, what are the basic principles and fundamentals of UX/UI design, what is the main task of a UX/UI designer, it is necessary to introduce to students how extensive the User Experience designer`s area of responsibility is and how important is the harmonious and understandable design of the interface, which is included in the User Interface designer`s area of responsibility. Further, it is necessary to familiarize students with the importance of applying the basics of UX/UI-design in the development of electronic educational resources, to explain that only competent application of the basics of UX/UI-design will make it possible to develop learners-oriented electronic educational resources.

It is also important to explain to students some important principles of composition and color compatibility, to introduce the basics, tools and operating principles of graphic editors used in the field of UX/UI design.

Next, students need to explain that web resource design can be done both using the Figma program installed on a computer and through the Figma.com website.

Another convenient feature of Figma is that projects can be edited by the team in real time, be seen who has changed what, as well as the comments and feedback can be left directly in the design. All this becomes possible immediately after creating a team. On the team page, there can be found the projects related to the mentioned team. It is possible to add a new member to the team, to determine the entry level of the given team member, depending on which his / her function and role are being determined.

It should be introduced to students the New Project button for creating a new project, as well as the key elements of the resulting screen. These are: the menu bar (opens in the upper left corner), the toolbar (Toolbars); in the center of the screen there is a workspace, which allows to create a

project of any size. For a more convenient viewing of the project, it is necessary to familiarize students with the keys for changing the screen viewing scale.

The color of the workspace can be changed, as can many other settings. The property panel is on the right side of the screen, and it consists of Design, Prototype and Code sections. On the left side of the screen is the Layers panel. Depending on the type of layer selected, there are different sets of fields and buttons in the panel.

Students should be introduced to with tools of Figma`s toolbar.

The corresponding Move and Scale tools are available to move or move the specified object.

The Frame tool is used to install frames. The frame size is selected from the properties panel on the right. When selecting the Frame tool, in the Design section of the Properties panel, it should be specified the size of the workspace, as well as make other adjustments. In the Layout Grid block, the type of grid of layout and its basic settings are being regulated; in the Layer block - the layers are stacked, in the Background block - the background, in the Effects block - the shadows and blur, in the Export block - the export settings.

If it is necessary to split frames, the Slice tool should be used. For the purpose of drawing a rectangle, it is necessary to use the Rectangle tool, by dragging the cursor along the diagonal of the image being created. After releasing the mouse button, a screen appears rectangle. By pressing the Shift key while moving the pointer diagonally, a square will appear. The Corner Radius fields of the Design section of the Properties panel specify the relative magnitude of the rounding radius of each right angle.

In the Rotation field it is possible to enter the size of the rotation angle of the object.

Additionally, there are tools such as Line /for draw line/, Arrow /for draw arrow/, Ellipse /for draw ellipse/. The Polygon tool is used to build a polygon. The number of polygon angles is determined by the Count tool. If necessary, there is also an opportunity to build a star object. The Star tool should be used for that.

Students need to be made aware that after constructing a variety of geometric objects, it is possible to arrange, align, merge them; thus, performing the same operations with constructed objects that can be performed through objects with other editors of vector graphics (CorelDraw, Adobe Illustrator). To align the objects, the Align command in the Design section of the Properties panel shall be used. For example, to place objects at equal distances, those objects shall be marked

and selected by the Distribute Horizontal Spacing command from the Align section. To perform various "logical" operations with objects, the three buttons in the center of the toolbar on the right (Boolean groups) shall be used.

To merge objects, the objects should be marked, after which the Union selection command should be selected. For the purpose of subtracting an object from another object, the Subtract selection command should be used, while for leaving the whole part of two objects, the Intersect selection command should be used.

There are some interesting principles in Figma for marking identical objects. To mark objects of the same color from geometric bodies, it is necessary to activate the object the color objects of which shall be marked, after which the Edit-Select all with the same fill command from the main menu shall be selected. To mark objects with the same border, the Select all with same stroke command shall be selected, and for marking objects with the same properties or effects, the Select all with same properties or Select all with same effects commands shall be selected, respectively. Figma offers a variety of exciting ways to work with images.

The Place Image tool is being used to insert an image. After uploading the image, it is possible to insert it into any form of object by installing a mask. This is being done in the following ways: by using the Place Image command, place the image, build the preferred object, place the constructed object under the image / via the Send to back command /, mark those two objects: image and constructed object, and press Ctrl + Alt + M. It is also possible to group them /Ctrl+G/ after placing the object under the respective image, and place the pointer on the constructed object through a right-click and by selecting the *Use as mask* command. It should be noted that any image can be editing from Figma, and there is no need to switch to Adobe Photoshop for the image editing. After double-clicking on the image, the image editing window opens, in which the image contrast, color saturation, hue can be adjusted, or it is possible to add glitter and give the image other effects by using the features and effects of *Exposure, Contrast, Saturation, Temperature, Tint, Highlights, Shadows*.

It is possible to add a gradient filling to the image. To do this, click on the + sign next to the Fill command, then select the gradient fill shape (Linear, Radial, Angular or Diamond). Let us continue presenting the tools.

The Pen tool is used to build a curved object. Building a curve with a pen tool is a job with each node of the curve. The cycle starts when the tool pointer is placed in the future node.

The mouse button is then pressed, and by holding it, the user adjusts the position of the guide points by dragging one of them with the mouse. When the mouse button is released, the node type and the position of the guiding points is confirmed, after which the cycle to determine the next node begins. To exit the cycle, it is necessary to press the Space key.

For drawing in Figma, it is convenient to use a Pencil, and when working with a text - the Text Tool.

It shall be outlined that there is a very interesting idea in Figma, which should be discussed during the teaching process. This refers to the concept of the "component". The component is convenient to use when using the same object in several parts of the project. First, the object is being created, then it becomes the main component by right-clicking and selecting the Create component command, after which the main component is being duplicated by holding down the Alt key on the keyboard, and placing the duplicates in the required parts of the project. When making any changes to the main component, the same changes are made to all duplicates of the main component in the design. However, if one of the duplicates is modified, the connection to the main component will be lost. In other words, the main component is considered the parent component, and the duplicates are its heirs.

When developing a design, the designer often needs to show the client or team the resulting working model. The concept of Prototype in Figma is used in these regards. To work with Prototype, it is necessary to use the commands in the Prototype section of the properties panel on the right side of the screen, which can be used to add a drop-down menu to the project, create various transition effects, and allow the client to and evaluate the design of the future project.

In order to make the work more convenient and easier, Figma uses plug-ins that need to be installed in advance. To do this, select the Community command and the Plugins section is activated the frequently used plugins are being installed through the Install command.

Students need to present some frequently used plug-ins in detail:

1. Blobs plugin is needed to generate some complex, rounded element. This plugin has two main parameters: Complexity and Uniqueness, which help to determine the complexity and uniqueness of the object to be placed.

2. With the help of the Iconify plugin, different icons can be placed into the project, moreover, it is recommended to use icons taken from the same group on a specific site. Once the icon is selected, it can be easily moved to the required part of the project. This icon can be colored, outlined as wished, and it can be resized with the help of the Scale tool. If the user does not want to use this plugin, it is possible to use the following site link <https://www.flaticon.com/> to get more interesting icons.

3. Unsplash plugin has a large number of images that the user can take and use for free into the design.

4. In Stories by Freepik plugin it is possible to find vector images of any complexity, which can be easily modified and edited later in Figma.

Images, vectors can be taken from the following sites too:

www.freepik.com/home

www.vectorstock.com

5. Vectary 3D Elements contains a set of 3d mockup. Mock-up (in English) - a specially made file in which the necessary design on real objects may be placed.

To select the preferred plugin, it is necessary to right-click on the project, select the Plugins command, and then select the plugin needed.

When submitting of plugins capabilities, students need to be told that there is a large database of plugins, and the user is the one who decides which plugins he/she wants to work with. It is also desirable to show students the convenience of using plugins through concrete examples.

There is also a special Prototype plugin that aims to extend the existing Prototype functionality.

Quite a few actions in the design can be done with the help of quick keys.

To get acquainted with the quick keys of the program, students are recommended to use the main menu of the program Help and account - Keyboard shortcuts

/Ctrl+Shift +?/ command.

It should be highlighted that there are other interesting features of Figma that need to be addressed during teaching (working with Wireframe, creating MoodBord, etc.) (Litvinenko A., 2021).

It is very important to constantly develop students' creativity, to develop their design ingenuity. One way is to regularly review projects on Behance, Dribbble, Pinterest, analyze them, and come up with new creative and exciting ideas.

Students can also be offered an interesting approach for developing creative thinking and imagination to achieve faster and more effective problem solving. It is necessary to create conditions for new thoughts to pass freely from the subconscious to the consciousness. For this purpose, for example, after designing their educational resource, students can be given a few minutes to be instructed to criticize their own work, to identify the shortcomings of the project, suggest new ideas, ideas to improve the work done, to make the educational resource more convenient in terms of teaching, after which to assign the same project again for the purpose of correcting all the already identified shortcomings.

Students can also be divided into two groups, the first of which will be called as the Instructor Group and the second one - the Learner Group. The first group will include students, who in this process will try to view the project from the perspective of the teacher, and the members of the second group will view it as learners. In 20-30 minutes, the members of the two groups, each based on their role orientation, will offer dozens of new ideas, making the project more beautiful, more convenient for the teacher and the learner.

Each member of the group can put forward any assumption hypothesis and idea, even the most fantastic and seemingly absurd one and ways to solve the problem several times in a row.

After that, the educational resource should be designed once again, by already considering the ideas suggested by the instructor's group and Learners group. As a result, the educational resource is being designed to be more convenient, interesting, usable and easy to understand.

Numerous experiments conducted have demonstrated the productivity of both the above methods for developing students' creative thinking, as well as other methods that are being used in the teaching process.

RESULTS

This study uses a mixed research method including literature review, observations and polls.

We conducted a survey, the purpose of which was to determine how important it is for teachers and lecturers to possess the skills of developing electronic educational resources, whether

they have any experience in developing electronic educational resources, and how often in their professional field of activity the need to develop electronic educational resources arises. More than 86 lecturers and teachers have taken part in the survey. The selection of lecturers and teachers from various educational institutions provides a comprehensive understanding of the issue. The survey showed that lecturers and teachers often need to develop electronic educational resources for their disciplines (86% of respondents stated it as such). It should be noted that many of the respondents claimed that they had either never developed electronic educational resources themselves /25.6%/, or had a little experience in developing electronic educational resources /38.4%/. Lecturers and teachers were asked more than 20 questions as part of this study. Many of the respondents highly value and consider it important the beautiful and understandable interface of an electronic educational resource, as well as its ease of use, which means that they are aware of the importance of applying the fundamentals of UX/UI design for designing an electronic educational resource.

Analysis of the responses received showed the need to deepen the knowledge and skills of lecturers and teachers in the field of developing electronic educational resources. To do this, it is necessary not only to train students of pedagogical universities the technologies of developing electronic educational resources, but also to introduce the discipline “UX/UI design” into the educational process. This will lead to that the future educators will not only be able to independently develop electronic educational resources, but also, they, by possessing the basics of UX/UI design and owning the appropriate software, will be able to design easy-to-use, convenient, learner-oriented electronic educational resources.

We came to this conclusion thanks to the following experiment. Before studying the basics of UX/UI design, students were given the task of designing an electronic educational resource. They were given the same task after completing the UX/UI Design course.

Electronic educational resources designed by students before and after studying the basics of UX/UI design and the Figma program were assessed according to a 100-point system assessment. The main evaluation criterion was the degree to which the electronic educational resource was focused on the learners.

The result of the study showed the feasibility of taking the course “UX/UI design” by students of a pedagogical university. Students improved their results (the average score rose from 82 to 94), were able to demonstrate certain skills and creative thinking, the process of designing an electronic

educational resource itself became more interesting, the resources became easy to use and learners-oriented.

So, knowledge of the basics of UX/UI design, as well as the capabilities of the Figma program, will allow students to design electronic educational resources oriented to learners.

DISCUSSION

The integration of UX/UI design into the curriculum of pedagogical universities, as discussed in this study, has significant implications for the development of educational resources. The findings from our literature review, surveys, and observational studies provide a robust foundation for discussing the effectiveness and necessity of such courses in teacher education programs.

Relevance of UX/UI Design in Education

The importance of UX/UI design in the creation of digital educational resources cannot be overstated. As our study suggests, knowledge of the basics and principles of UX/UI design to help to develop resources that are not only functional but also engaging and user-friendly. This is particularly crucial in an era where digital learning tools are becoming increasingly central to education. The ability to design intuitive and appealing interfaces directly correlates with enhanced learning outcomes, as students are more likely to engage with well-designed educational content.

Adoption and Skill Acquisition

One of the key findings from the survey was that a significant portion of educators currently lacks robust skills in electronic educational resources, which hampers their ability to create effective digital resources. However, the data also indicated a strong interest among educators in learning these skills, highlighting a clear gap in existing teacher education programs. By incorporating UX/UI design courses, pedagogical universities can address this gap, teaching future teachers to produce more effective digital learning materials.

Impact of Tools like Figma

The observational studies within classrooms where Figma was introduced showcased its potential as a teaching tool for UX/UI design. Figma's user-friendly interface and the ability to collaborate in real-time were particularly beneficial in a learning environment. Students were able to rapidly apply theoretical concepts in a practical setting, which enhanced the learning process. The

ease of access to Figma, being a browser-based tool, allowed for greater flexibility in how and where students could work on their projects.

Challenges and Considerations

Despite the positive outcomes, several challenges were noted during the implementation of UX/UI design courses. These include the steep learning curve associated with mastering design software, the need for continuous updates on software and design trends, and the integration of these courses within the existing curricula. Overcoming these challenges requires ongoing support from educational institutions, such as providing training for instructors, updating course materials regularly, and ensuring that there are adequate resources for students to access the necessary technology.

Future Directions

Looking forward, it is essential for educational institutions to consider not only the inclusion of UX/UI design courses but also the continuous improvement of these courses to keep pace with technological advancements. Additionally, further research could explore the long-term impacts of such courses on teaching efficacy and student engagement across various disciplines. Collaborative projects with industry professionals could also enhance the practical relevance of UX/UI design education, ensuring that future teachers are well-prepared to contribute to the evolving educational landscape.

In conclusion, the discussion around the incorporation of UX/UI design into teacher education highlights its potential to significantly enhance the quality and effectiveness of educational resources. By addressing the current skills gap, pedagogical universities can empower future educators to meet the challenges of modern educational demands.

CONCLUSIONS

Thus, solving the problems facing the education system is impossible without the introduction of new disciplines into the educational process, the development of interesting approaches to teaching, the development of understandable, interesting, convenient electronic educational resources, and the use of modern methods and means of informatization. These are promising and highly effective tools, thanks to which the learning process becomes more complete and the learning of educational material becomes easier and more interesting.

To conclude, Figma is a promising tool for modern web designers, as well as it is a convenient toolkit for teachers involved in the design of electronic educational resources. That is why it is deemed as highly effective and necessary to teach the discipline “UX/UI design” in pedagogical universities.

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