

DEVELOPMENT OF A METHODOLOGY FOR CREATING AN ON-LINE LAYOUT ASSISTANT FOR ELECTRONIC PUBLICATIONS FOR MOBILE DEVICES

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Abstract

The purpose of this study is to develop a methodology for creating an on-line assistant for electronic publications for mobile devices. The survey of experts is determined the basic requirements for an on-line assistant. Based on the results of the survey, the optimal functions and sub-functions of an on-line assistant for the layout of electronic publications for mobile devices are formed. The consistency of experts' opinions was checked. As a result, partial coherence of expert opinions was obtained, the corresponding indicator is 0.68. The main types of internal structure of the online assistant are reviewed and its hybrid structure is developed. QuarkXPress, Adobe InDesign, and Scribus were used as software tools for developing training videos in the structure of the online assistant. The structure of the online assistant for layout of electronic publications for mobile devices was designed. Training videos were created as components of the online assistant. The stages of creating a training video were: script development, development of text material, rehearsal, video recording, video processing, and uploading to a website. The design scheme of the online assistant was chosen in the form of «material design» style. A prototype of the on-line assistant was developed based on the use of a technical website script and text markup in HTML 5, CSS 3 and JavaScript. The practical result of the research is an online assistant with information on how to design electronic publications for mobile devices. The developed online assistant provides an opportunity to remotely contact a qualified specialist in the layout of electronic publications for mobile devices.

Keywords: on-line assistant, electronic publications, mobile devices, expert approach, training videos.

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1. Introduction

The distribution and sales of e-books are far outpacing those of paper books. First of all, buyers are attracted by the lower price of an e-book than its paper counterpart. In addition, readers find it much more convenient to read literature on a mobile device than to carry a pile of books with them.

However, the quality of most electronic publications for mobile devices is quite low, due to a number of reasons:

1) the lack of a full-fledged theoretical framework that clearly states what the requirements for an electronic publication should be and how much they go beyond those already established for print publications;

2) a variety of online training courses for creating electronic publications for mobile devices in non-specialized software.

Of course, there are also training videos on the Internet that are designed to create electronic publications in specialized software. However, the analysis of these videos showed that they lack completeness and do not disclose their completeness, for example, there are no links to the materials used during the lesson.

Experience also suggests that it is quite difficult to complete an electronic publication without contacting another specialist, as there are stages that require the help of a specialist, such as proofreading a manuscript. It usually takes a lot of time to find the right specialist on the Internet.

Therefore, it is necessary to ensure that such an appeal can be made at any time, i.e. online, to a firm that has a database of specialists who can perform work at any stage of creating an electronic publication. In other words, the client chooses or describes the type of service without leaving the computer, and the firm ensures its implementation.

The paper [1] offers a formalized presentation of the process of editing an electronic publication. The basis of such a formalized representation is the automatic transformation of requests according to the update of the scheme. However, this work does not take into account the specifics of restrictions for multimedia content of electronic publications.

Research [2] contains flexible development of requirements for software tools. However, this study does not provide an opportunity to determine the basic requirements for a software tool to support the process of creating an electronic publication for mobile devices.

The scientific work [3] provides an analysis of current trends in mobile technologies, which can be used as a theoretical basis for the design of an online assistant for editing electronic publications for mobile devices. At the same time, this study does not take into account the specifics of design solutions for creating an online assistant for the creation of electronic publications for mobile devices.

The method of automated balancing of a vector illustration and its software implementation are proposed in [4]. This method can be used to automate the process of drafting an electronic publication. But this method does not allow to process educational videos for creating electronic publications for mobile devices.

A general specification for storing and querying large collections of XML documents using a NoSQL database system is proposed in the study [5]. As a result, this study can be used as a basis for the automated design of an electronic publication for mobile devices. However, this study does not provide practical recommendations for the design of an e-edition for mobile devices.

Key challenges for innovative research are systematized in work [6]. These challenges can act as a theoretical basis for optimizing the structure and content of the online assistant for editing electronic publications for mobile devices. However, this work does not provide an opportunity to outline the structure of the technology for creating an online assistant for editing electronic publications for mobile devices.

The study [7] shows the results of a survey on the use of web data. However, this study does not include a check on the consistency of experts' opinions.

Interface features for navigation in a virtual environment are systematized in a scientific work [8]. These features should be taken into account in the process of creating the interface of the online assistant for editing electronic publications for mobile devices. At the same time, this work does not provide recommendations for creating a site prototype.

In [9], the specifics of XML navigation and transformation, which can be used to automate the development of an electronic edition for mobile devices, are considered. However, this work does not contain an analysis of software tools for creating electronic publications for mobile devices.

The development of the optimization model of the interface of the electronic edition is proposed in the scientific work [10]. However, the created optimization model does not take into account the features of the online assistant for editing electronic publications for mobile devices.

Research [11] allows for analysis of data usage in web systems. This analysis can be useful for justifying the choice of programming language and software provision for creating a website. At the same time, this study does not allow to provide practical recommendations for the technology of creating an online assistant for electronic layout editions for mobile devices.

However, the specialized literature currently lacks a scientifically based methodology for the layout of electronic publications for mobile devices.

The aim of this study is to develop a methodology for creating an on-line assistant for electronic publications for mobile devices.

2. Materials and methods

In the context of the development stages of an on-line assistant for electronic publications for mobile devices, the research methods are as follows:

- 1) survey of experts to determine the basic requirements for an on-line assistant:
 - development of questionnaires for the survey → methods of analysis and synthesis;
 - interviewing experts and processing survey results → expert method, methods of mathematical statistics;
- 2) analysis of software for creating electronic publications for mobile devices:
 - analysis of software tools for creating electronic publications for mobile devices → methods of analysis and synthesis;
 - analysis of existing videos on the World Wide Web → methods of analysis and synthesis, empirical method (experiment);
 - identification of functional features of software → methods of analysis and synthesis, empirical method (experiment);
- 3) formation of a set of models of «thin» layout:
 - formation of a set of standard page layouts → methods of analysis and abstraction;
 - formation of rules for eliminating layout defects as a result of changing the page orientation of a printed publication → methods of analysis and abstraction;
 - formulation of a system of requirements and restrictions for each rule for eliminating layout defects as a result of changing the page orientation of a layout publication → empirical method (experiment);
- 4) development of the structure of the online assistant:
 - identification of the stages of the technological process of creating an on-line assistant → → methods of analysis and synthesis, modeling;
 - selection of tools and their justification → analysis and synthesis method;
 - development of layouts and design of an on-line assistant → induction method;
- 5) prototype testing → empirical method (experiment).

The stages of applying the method of expert evaluation in the framework of this work are:

- 1) formation of a group of experts and selection of the necessary evaluation criteria;
- 2) creating a list of the main functions of an online layout assistant for electronic publications for mobile devices;
- 3) creating a list of sub-functions of the online layout assistant for electronic publications for mobile devices;
- 4) checking the consistency of experts' opinions on the online layout assistant for electronic publications for mobile devices.

The survey involved 8 experts from TessLab multimedia web studio (Kharkiv, Ukraine). The surveys were conducted using the Google Forms application.

This application allows to create a questionnaire that can contain the following types of answers: open questions and closed questions – single and multiple choice, drop-down lists, matrix, Likert scale, semantic differential, etc.

There is also a «mandatory question» function, without answering which the respondent will not be able to complete the questionnaire.

The key concept in this work is the definition of «on-line assistant». For the purposes of this study, an on-line assistant is a website that serves as a workplace for a specialist in the layout of electronic publications for mobile devices. A specialist is an employee who remotely performs the duties of layout of an electronic publication specified by a client. This worker can be either a freelancer who provides the relevant services or an employee of the organization. The use of remote workers in an organization is a type of outsourcing.

Fig. 1 shows a general view of the methodology for developing an on-line layout assistant for electronic publications for mobile devices.

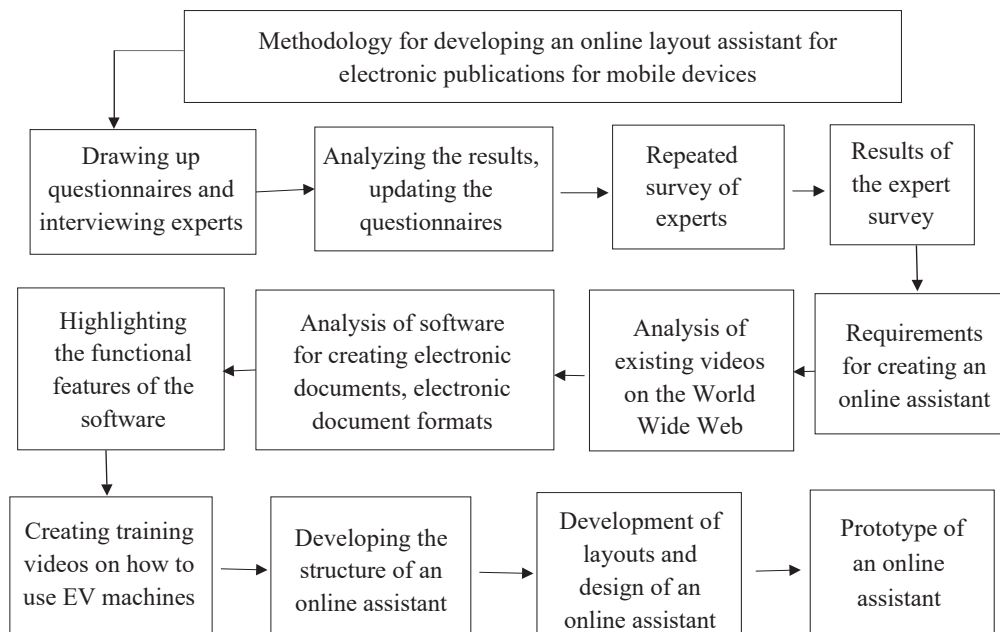


Fig. 1. Methodology for developing an online layout assistant for electronic publications for mobile devices

3. Results and discussion

3. 1. Surveying qualified experts to determine the basic requirements for an online assistant

The purpose of the survey:

- 1) identify a common idea for the development of an online layout assistant for electronic publications for mobile devices;
- 2) define a set of functions for the content of the website for the layout of electronic publications for mobile devices.

First, the experts were asked to answer the following questions:

1. In your opinion, a «mobile device» is...
2. Have you created an electronic publication for mobile devices?
3. If so, for which diagonal devices?
4. When creating the electronic edition, did you refer to any sources? Which ones exactly?
5. What stages of editorial and publishing processing of the electronic publication did you perform?
6. Was the help of a specialist needed at one of the stages? (for example, proofreader)?
7. In your opinion, «on-line assistant» is...
8. In your opinion, is there a need to create an online assistant for editing electronic publications for mobile devices?
9. If so, what functions should it carry?
10. What, in your opinion, hinders the development of creating quality electronic publications for mobile devices?

Therefore, the questionnaire contains questions of an open nature, the answers to which were processed manually. The main idea of the majority of experts was that this website was educational in nature, namely, at first, users were offered to learn how to create electronic publications for mobile devices on their own.

The next step was to identify a set of functions that a website could contain. The result of processing the questionnaires allowed to identify the following:

- 1) the ability to view introductory videos;
- 2) the ability to download your own electronic publication, which will act as a portfolio;
- 3) the ability to contact a team of specialists at any stage of the editorial and publishing development of an electronic publication for mobile devices.

Also, as a result of the first survey, experts answered the question «What hinders the development of high-quality electronic publications for mobile devices?» and received the following answers (**Fig. 2**).

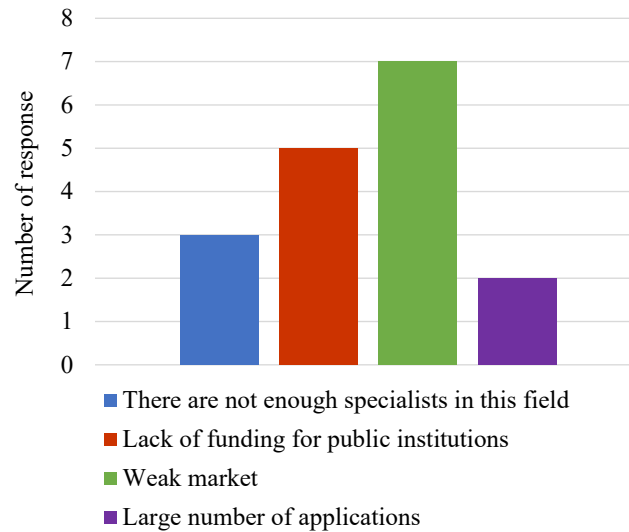


Fig. 2. Results of the expert survey

There are many factors that influence the state of the book market, traditionally ranging from prices for resources and market conditions to socio-psychological aspects of society. However, the prevailing opinion in the professional circle is that the main factor of development is still the lack of buyers of electronic publications.

To identify the most important criteria (sub-functions) of the functions obtained in the first survey, a second survey of experts should be conducted.

The purpose of the survey is to identify the most important criteria (sub-functions) of the functions obtained in the first survey.

Each function was described by an expert from a different point of view, and in order to identify the most important sub-functions, a second questionnaire was created, namely, a list of all the criteria proposed by the experts.

Next, the experts were asked to rank the sub-functions of each function, with the most important sub-function being assigned the first rank, followed by the most important sub-functions in descending order of importance.

Then, using the methods of mathematical statistics, a generalized opinion of experts is obtained. The average rank, the average statistical value s_j of the j -th subfunction is determined by the formula:

$$s_j = \frac{\sum_{i=1}^{m_k} a_{ij}}{m_{kj}}, \quad (1)$$

where a_{ij} is the order of preference of a given subfunction over another; m_{kj} is the number of experts evaluating the j -th subfunction ($m_k \leq m$); i is the number of the expert $i = 1, \dots, m$; j – number of the subfunction $j = 1, \dots, n$.

The average value of s_j means the following: the lower its value, the higher the importance of the subfunction.

The results of the ranking of each of the functions are presented in **Tables 1–3**.

Thus, it is important for an online assistant to have the following sub-functions:

1) training videos on how to create electronic publications for mobile devices should be only for specialized software, such as Adobe InDesign, QuarkXPress;

2) training videos of the lesson should be supported by text, the download of which will allow to complete the lesson offline;

- 3) training videos should be supported by lesson content (graphic and textual material), i.e. each video lesson should have a hyperlink to download the material;
- 4) the most convenient way to contact a team of specialists is to fill out an application form, where the client chooses the type of service and the list of necessary work;
- 5) the website administrators must publish their own electronic edition for mobile devices, so it is sent to the specified e-mail address, the size of which must not exceed the specified standards.

Table 1
Ranking results of the «Training videos» feature

Subfunction, n	Experts, m									The average value, s_j
		1	2	3	4	5	6	7	8	
For specialized applications only		1	2	1	1	1	2	1	1	1.25
Provides for downloading the lesson text for offline work		3	3	4	2	4	1	3	3	2.875
It should be supported by the lesson content (graphic and textual material)		2	1	2	3	2	3	2	2	2.125
Allows to leave a comment under the video		4	4	3	4	3	4	4	4	3.75

Table 2
The results of the arrangement of the function «Request to the team of experts»

Subfunction, n	Experts, m									The average value, s_j
		1	2	3	4	5	6	7	8	
Fill out the appropriate form		1	3	1	1	1	2	1	1	1.375
Write to the specified e-mail address site		2	4	4	2	2	1	3	3	2.625
Contact via social networks		4	2	2	3	2	3	2	2	2.5
Write to the e-mail address of a specialist		3	1	3	4	3	4	4	4	3.25

Table 3
Ranking results of the feature «Publishing your own electronic edition for mobile devices»

Subfunction, n	Experts, m									The average value, s_j
		1	2	3	4	5	6	7	8	
The electronic edition is sent for consideration by the administration		1	3	1	3	2	1	1	1	1.375
The author of the electronic publication is registered on the website		2	2	3	2	1	3	3	3	2.375
The size of the electronic should not exceed of the specified standards		3	1	2	1	3	2	2	2	2

Let's check the consistency of experts' opinions using the results of the ranking of the «training videos» feature.

The average rank of a set of criteria is determined by the formula:

$$\bar{S} = \frac{\sum_{j=1}^n s_j}{n}. \quad (2)$$

According to the calculations, the average rank of the set of criteria is 0.313.

Next, let's calculate the deviation d_j of the average rank of the j -th criterion from the average rank of the aggregate using the formula:

$$d_j = \bar{S} - s_j. \quad (3)$$

The deviation of the average rank is 2.19.

Let's determine the number of equal ranks assigned by the experts to the j -th criterion – $t_q = 3$.

The concordance coefficient K is determined by the formula:

$$K = \frac{12 \sum_{j=1}^n d_j^2}{m^2(n^3 - n) - m \sum_{i=1}^m T_i}, \quad (4)$$

where d_j is deviation of the average rank of the j -th criterion from the average rank; m – number of experts; n – number of subfunctions; T_i is calculated using the following formula:

$$T_i = \sum_{q=1}^Q (t_q^3 - t_q), \quad (5),$$

where q – number of ranks assigned by the experts to the criterion.

The coefficient can take values ranging from 0 to 1. In the case of complete agreement of experts' opinions, the concordance coefficient is equal to one, while in the case of complete disagreement it is zero. The most realistic is the case of partial agreement of experts' opinions, as in our case, which is equal to ≈ 0.68 .

The analysis of software tools for creating electronic publications for mobile devices should be based on the definition of criteria for choosing a program for creating an e-book (**Table 4**).

Table 4
Criteria for choosing a program to create an e-book

Software	Name of the criterion				
The main criteria for choosing a program					
Criteria	Cross-platform compatibility		Accessibility		
Programs					
QuarkXPress	Microsoft Windows, Mac OS		Paid		
InDesign	Microsoft Windows, Mac OS		Paid		
Scribus	Linux, Mac OS X, Haiku, Microsoft Windows		Free		
Criteria	Complex layout	Complex graphics	Layer support	Style sheet	
Programs					
QuarkXPress	+	+	–	+	
InDesign	+	+	+	+	
Scribus	+	+	+	+	
Support for audio and video formats					
Criteria	Support video	Support audio	Support for animations	Popup Window	Import from MO
Programs					
QuarkXPress	+	+	+	+	+
InDesign	+	+	+	+	+
Scribus	+	+	+	+	+
Support for interactive elements					
Criteria	Hyperlinks	Slide show	Buttons	Panorama	3D-attributes
Programs					
QuarkXPress	+	+	+	+	–
InDesign	+	+	+	+	+
Scribus	+	–	+	+	–
Support for e-book formats					
Criteria	PDF	EPUB	HTML5	EPS	SWF
Programs					
QuarkXPress	+	+	+	+	+
InDesign	+	+	+	+	+
Scribus	+	–	+	+	–

From the analysis in the table, it is possible to conclude that each software tool has quite extensive capabilities and supports a variety of functions. From the point of view of choosing a tool, Adobe InDesign will be an advantage for users of Adobe Systems programs, as it interacts with other Adobe products, such as Illustrator, Photoshop, which have almost become standards in their field and have a similar interface. For some, Scribus will be an advantage, although it is somewhat weak compared to QuarkXPress and Adobe InDesign, but it is free.

3. 2. Experimental part of the development of an on-line assistant for layout of electronic publications for mobile devices.

The next step in the methodology is to develop training videos for creating electronic publications for mobile devices.

The most popular way to record training videos while working in software is to record from the monitor screen using special programs. In this work, let's use the Movavi Screen Capture program.

Fig. 3 shows the stages of developing training videos for creating electronic publications for mobile devices.

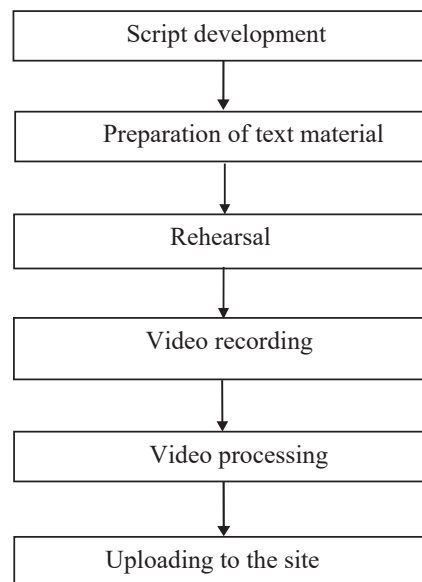


Fig. 3. Stages of developing training videos

Fig. 4 shows a list of processes for creating an online layout assistant for electronic publications for mobile devices and their authors.

Building a website is a complex process, and there are situations when a delay in one stage delays the timely completion of the entire project. To avoid such situations, a work schedule was developed using a Gantt chart (**Fig. 5**).

The graphic shows that there are many stages that are performed in parallel, but the correct distribution of work allows the project to be completed on time.

According to the proposed methodology, the following steps should be taken to design the structure of an on-line assistant for the layout of electronic publications for mobile devices.

When a user visits a website for the first time, they first look around, familiarize themselves with the navigation system, and search for the information they need. It's very important to get the customer interested from the first page, because the likelihood of a repeat visit to the website is reduced to zero.

Fig. 6 shows the structure with page titles. A hybrid structure was chosen for the development of an online layout assistant for electronic publications for mobile devices.

The advantages of using this structure are that all pages have links to the home page, section pages are interconnected and link to lower-level thematic pages.

Task name	Resource names
Web site development and promotion	
Planning	
Analysis of the potential audience and design area	Project Manager
Developing a creative idea and concept for a web site	Creative Director
Domain selection and registration	Domain; Creative Director
Planning is complete	
Engineering	
Web site structure design	Creative Director
Preparing layouts	
Designer	
Home page layout design	
Designing interior page layouts	
Page design development	Designer
Creating graphic elements	Designer
Design completed	
Coding	
Page layout	Layout designer
Programming the functionality of the website	Programmer
Coding completed	Programmer
Testing	
Hosting and setup	Programmer; Hosting
Testing	Tester
Initial content filling	Content Manager
Bug fixing	Tester; Programmer; Layout designer
Testing completed	
Documentation	
Development of an instruction manual	
Web site development completed	

Fig. 4. List of processes for creating a online layout assistant with MS Project

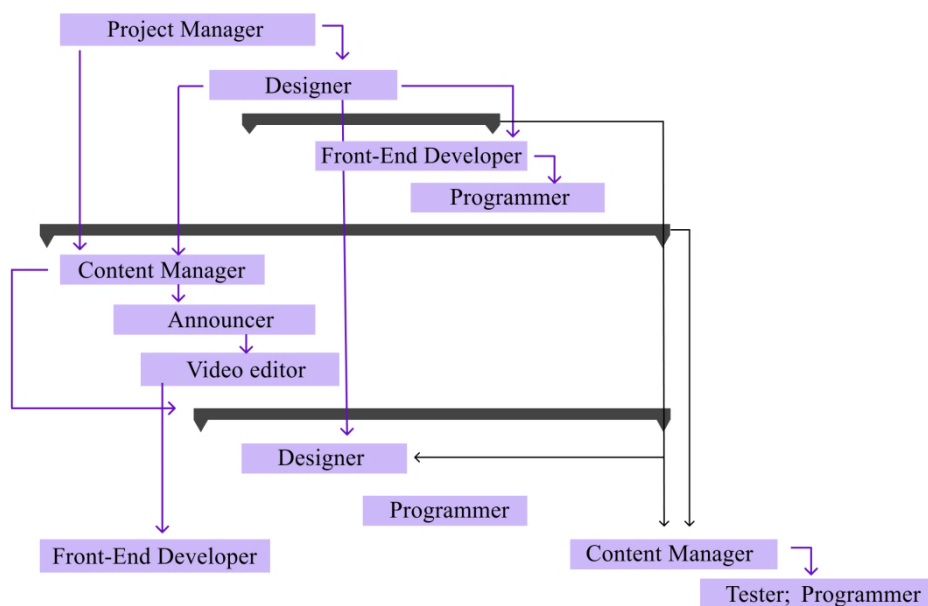


Fig. 5. Gantt chart

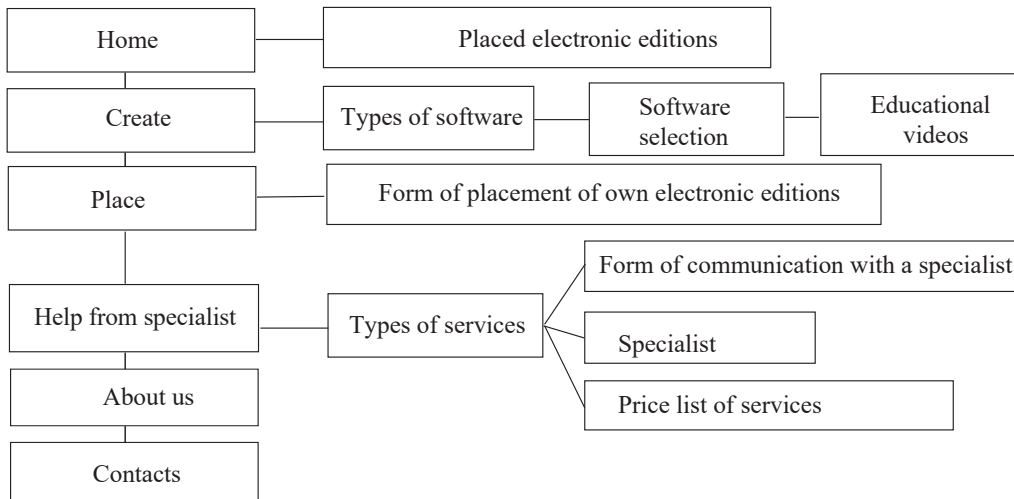


Fig. 6. Structure of the website of an online layout assistant for electronic publications for mobile devices

The layout of the main page of the online electronic publication layout assistant for mobile devices is shown in **Fig. 7.**

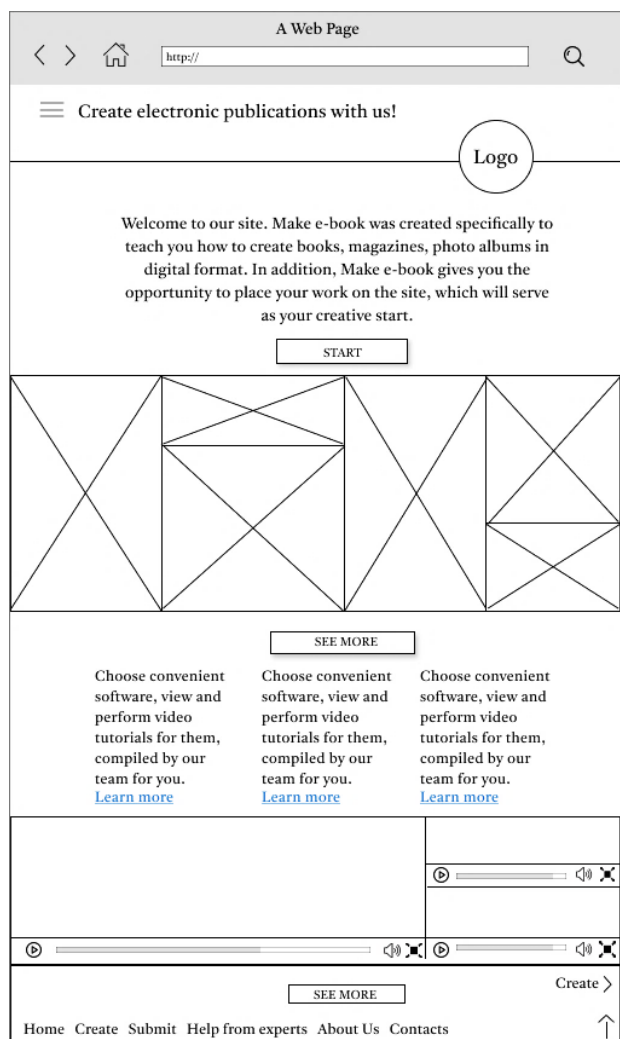


Fig. 7. Layout of the main page of the website

Designing the layout of the home page is the most important thing, because it is the «face» of the site and it determines the further viewing of other pages. First of all, the home page should be informative - it should reflect the essence of the website's thematic focus, describe the main directions of its activities, tasks, etc.

The material design style was chosen for the website design. This type of design was developed by Google and presented at the Google I/O 2014 developer conference. The developed design of the main page is shown in **Fig. 8**.

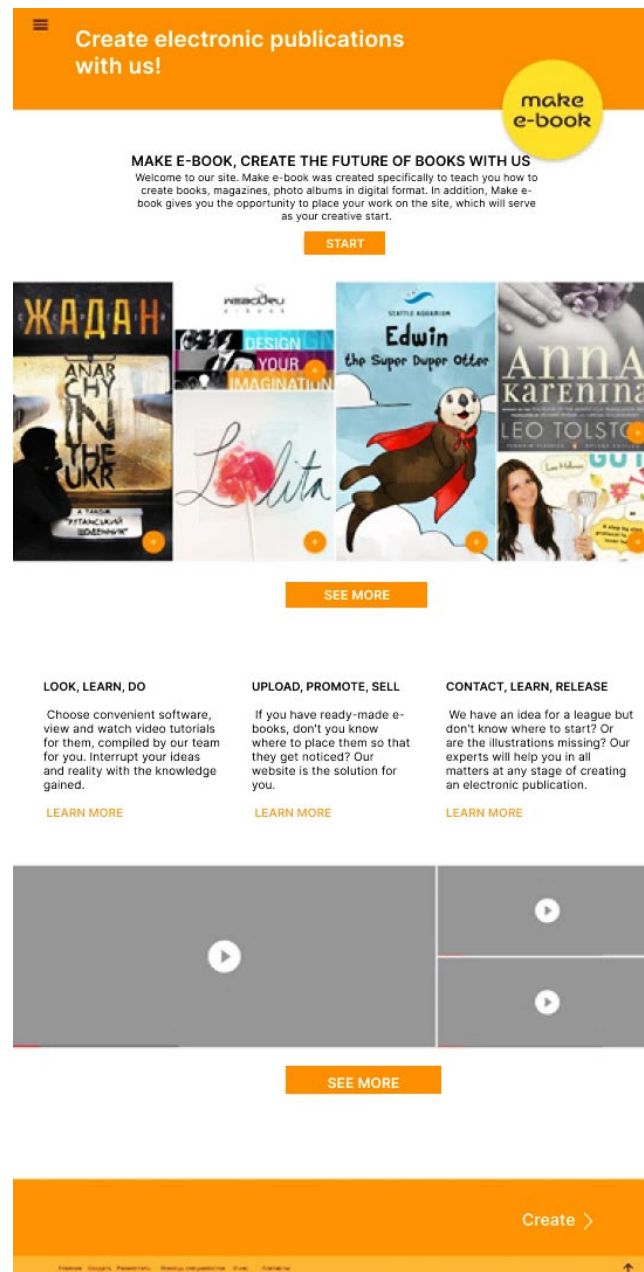


Fig. 8. Design of the main page of a website

The information resources for creating the prototype of the online assistant are the technical script of the website and the text markup languages HTML 5, CSS 3, and JavaScript.

It is important for the developed online assistant to have the following sub-functions:

1) training videos on how to create electronic publications for mobile devices should only be for specialized software, such as Adobe InDesign, QuarkXPress;

2) training videos of the lesson should be supported by text, the download of which will allow to complete the lesson offline;

3) training videos should be supported by lesson content (graphic and textual material), i.e., each video lesson should have a hyperlink to download the material;

4) the most convenient way to contact a team of specialists is to fill out an application form, where the client chooses the type of service and the list of necessary work;

5) the website administrators have to publish their own electronic edition for mobile devices, so it is sent to the specified email address, the size of which should not exceed the specified standards.

The technical basis for creating a prototype of an online assistant is a computer with the appropriate software, namely the Nodepad++ text editor.

3.3. Discussion of the results

The article proposes a methodology for developing an on-line assistant for electronic publications for mobile devices. The basis for the development in this direction were the results of a theoretical and analytical study on the creation and layout of electronic publications for mobile devices. The study revealed the lack of materials, recommendations and relevant resources on the World Wide Web on the creation of quality electronic publications for mobile devices.

The proposed methodology is a continuation of the authors' research on information support for multimedia publishing. Possible areas of practical application of the proposed methodology are:

- management of multimedia publishing processes;
- evaluation of the quality of preparation of electronic publications;
- information support for multimedia publishing.

Limitations to the practical application of the results of this study are:

- possible reduction of information when displayed on mobile devices;
- long loading time if there are heavy elements on the site.

As a disadvantage of this study, it should be noted that the use of an expert approach to develop an on-line assistant for the layout of electronic publications can lead to the subjectivity of the results obtained.

Further areas of research may be:

- evaluation of the ergonomics of the online assistant for editing electronic editions for mobile devices;
- development of a decision-making support methodology for improving the quality of electronic editions for mobile devices with the help of an online assistant.

The practical implementation of the specified further directions of research may cause the following difficulties:

- in the course of evaluating the ergonomics of the online assistant for editing electronic editions for mobile devices, there may be a difficulty in determining a generalized indicator of such ergonomics and quantitative measurement of its components;
- in the process of developing a decision-making support methodology for improving the quality of electronic editions for mobile devices with the help of an online assistant, it may be difficult to identify factors for overcoming uncertainty.

4. Conclusions

1. Based on a generalization of the results of a survey among qualified specialists in the field of layout of electronic publications, optimal functions and subfunctions of an online assistant for layout of electronic publications for mobile devices were formed. The consistency of expert opinions was checked, resulting in partial agreement of expert opinions; the corresponding indicator was 0.68.

2. Designed a hybrid structure of the online assistant and created prototypes of web pages. QuarkXPress, Adobe InDesign and Scribus were chosen as software tools for developing training videos.

3. A technical design diagram for the online assistant was developed, on the basis of which a prototype of the online assistant was created using the site's technical script and text markup

in HTML 5, CSS 3 and JavaScript. The sophisticated design of the online assistant allows the user to quickly find the necessary information and become familiar with the main functions.

Conflict of Interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

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Data availability

Manuscript has no associated data.

References

- [1] Akazawa, G., Matsubara, N., Suzuki, N. (2022). An Algorithm for Transforming Property Path Query Based on Shape Expression Schema Update. *SN Computer Science*, 3 (3). doi: <https://doi.org/10.1007/s42979-022-01086-0>
- [2] Schön, E.-M., Thomaschewski, J., Escalona, M. J. (2017). Agile Requirements Engineering: A systematic literature review. *Computer Standards & Interfaces*, 49, 79–91. doi: <https://doi.org/10.1016/j.csi.2016.08.011>
- [3] Saylor, M. (2012). *The Mobile Wave: How Mobile Intelligence Will Change Everything*. Vanguard Press, 281.
- [4] Al'boschiy, O., Dorokhov, O., Hrabovskiy, Y., Naumenko, M. (2022). Automated balancing method of vector Illustration and its software implementation. *Bulletin of the Transilvania University of Brasov. Series III: Mathematics and Computer Science*, 2 (64 (1)), 177–192. doi: <https://doi.org/10.31926/but.mif.2022.2.64.1.12>
- [5] Bao, L., Yang, J., Wu, C. Q., Qi, H., Zhang, X., Cai, S. (2022). XML2HBase: Storing and querying large collections of XML documents using a NoSQL database system. *Journal of Parallel and Distributed Computing*, 161, 83–99. doi: <https://doi.org/10.1016/j.jpdc.2021.11.003>
- [6] Martin, B. R. (2016). Twenty challenges for innovation studies. *Science and Public Policy*, 43 (3), 432–450. doi: <https://doi.org/10.1093/scipol/scv077>
- [7] Tekli, G. (2021). A survey on semi-structured web data manipulations by non-expert users. *Computer Science Review*, 40, 100367. doi: <https://doi.org/10.1016/j.cosrev.2021.100367>
- [8] Vultur, O.-M., Pentiuc, S.-G., Lupu, V. (2016). Real-time gestural interface for navigation in virtual environment. 2016 International Conference on Development and Application Systems (DAS). doi: <https://doi.org/10.1109/daas.2016.7492592>
- [9] Engelfriet, J., Hoogetboom, H. J., Samwel, B. (2021). XML navigation and transformation by tree-walking automata and transducers with visible and invisible pebbles. *Theoretical Computer Science*, 850, 40–97. doi: <https://doi.org/10.1016/j.tcs.2020.10.030>
- [10] Hrabovskiy, Y., Fedorchenko, V. (2019). Development of the optimization model of the interface of multimedia edition. *EUREKA: Physics and Engineering*, 3, 3–12. doi: <https://doi.org/10.21303/2461-4262.2019.00902>
- [11] Brahmia, Z., Grandi, F., Oliboni, B., Bouaziz, R. (2018). Supporting Structural Evolution of Data in Web-Based Systems via Schema Versioning in the tXSchema Framework. *Handbook of Research on Contemporary Perspectives on Web-Based Systems*, 271–307. doi: <https://doi.org/10.4018/978-1-5225-5384-7.ch013>

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