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## DEVELOPMENT OF METHODS OF CREATING THE INTERFACE OF THE INTERACTIVE EDITION

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*The purpose of this scientific article is to develop a method of creating the interface of an interactive publication. This article analyzes the location and functionality of the user interface as a web design object. Signs of style in web design are revealed. Five levels of the user interaction experience with the site are analyzed in detail, which can also be attributed to the design stages. With the help of experts from the multimedia studio, a criterion base was formed with the calculation of weights for each criterion. The nano ranking of web design style selection criteria is performed. User requirements for interactive publications have been identified. The technological scheme of creation of the interface is developed. A UX map of the interactive edition has been created. The scientific result of the study is a method of creating an interface for users of interactive publications in accordance with the quantitative assessment of parameters that must be taken into account during development. The practical result is a user interface developed according to the proposed method.*

**Keywords:** *methodology, style, web design, interactive application, factor, criterion base, interface.*

**Formulation of the problem.** A visually appealing and user-friendly interface is a key indicator of the quality of an interactive publication. Combined with a competent structure and logical navigation through the sections of the resource, it attracts visitors and improves the functionality of the publication. The main task in such work as designing web interfaces is to simplify the work of the user as much as possible, to make him achieve the desired result, spending a minimum of effort.

The design of an interactive publication is a long and laborious process that takes place in several stages, one of which is the choice of style. This process of creative search takes almost the most time from a designer, and especially from a beginner who is not yet able to use experience and separate the essential from the secondary.

**Analysis of recent research and publications.** In studies [1–3] the mechanisms of information visualization in interactive applications are considered. Scientific articles [4, 5] are devoted to the creation of web-based information processing tools. The main aspects of the development of mathematical models for creating interfaces of interactive publications are considered in [6–9]. Support for the work of a press engineer with regard to the mechanisms of graphic image processing in interactive publications is considered in [10–14]. However, in the specialized literature there are no scientifically

sound recommendations for the development of methodological principles for creating an interface for an interactive publication.

**The purpose of the article.** The main purpose of the study is focused on the development of methods for creating an interface for an interactive publication.

**Presentation of the main research material.** The proposed method of creating an interface for an interactive publication consists of the following steps.

The first stage is the formation of many styles in web design and analysis of their structural parameters. At this stage, one needs to decide on a list of alternatives, namely web design styles. For this purpose, specialized literature sources were analyzed.

Among the necessary conditions for the selection of style can be identified as follows:

- 1) the unity of forms of expression, which can be traced in a sufficient number of sites;
- 2) a sufficient number of followers;
- 3) comparable consistency over a period of time, which allows you to identify and see the trend from the outside, from an objective standpoint.

Given these conditions, the following web design styles were identified in chronological order of their occurrence:

Motion Design;  
skevomorphism;  
Flat Design;  
Google Material Design;  
Flat 2.0;  
Card Design.

These web design styles were analyzed by features (Fig. 1).

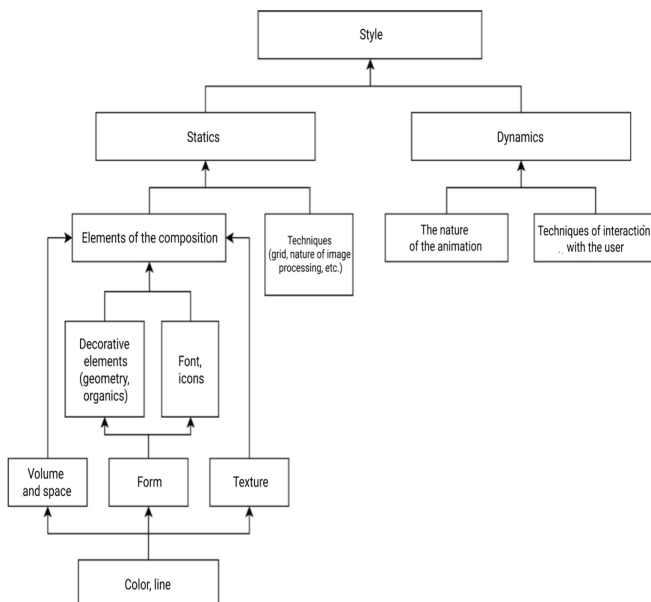


Fig. 1. Block diagram of style in web design

The second stage of the methodology is the analysis of the criteria for choosing a style in web design. At this stage, it is necessary to form a list of criteria for choosing a style of web design. Since the style of web design is chosen in the process of designing a site, it is necessary to analyze this process in more detail to identify factors or stages of the process of creating a site that may influence the choice of style.

To create an interface, one should consider each of the levels of user experience with the interactive publication. Consider each level in terms of its impact on the choice of web design style.

**Level of strategy.** At this level, users and their goals are considered and, depending on them, the goals of the interactive publication are defined. That is, at this level it is necessary to first determine the characteristics of the target audience.

**Opportunity set level.** At this level, the functionality of the interactive publication and content are considered. From the point of view of style choice, the following factors are important:

- reference (news and information resources, blogs);
- communicative (social networks; audio, video, text messengers);
- navigation (applications that use hourly users);
- applied (diaries, calendars, notes);
- professional (internal and external applications of organizations);
- entertaining (games of all types);
- educational (foreign language courses, development).

Content:

- a) the type of content that predominates (text / graphic);
- b) number (many / few);
- c) quality (high / low).

**The level of structure.** At this level, user interaction and information architecture are designed. That is, it is important that the chosen style does not distract from the interface and does not interfere with the understanding of the interactive publication, but, on the contrary, helps. Therefore, it will be useful to highlight a separate criterion for choosing a style as “consistency with UI / UX”.

**Layout level.** At this level, the information design of the future interactive publication is being developed, namely the interface design and navigation design. At this level, you should choose the type of design, namely:

1) interface (or unified) design. Characteristic features of the stylistic model of the interface design: the functionality of the website, the homogeneity of the graphical solution and pattern, which is based on the desire to bring the graphical interface of the site to the already familiar to users of software shells;

2) author's (or alternative) design. The model of author's design is characterized, first of all, by non-standard decision of both functional, and graphic parties of the interactive edition. This model uses all software innovations and experiments with the user interface.

**Surface level.** At this level, the visual design of the interactive publication is developed, as well as the style of its design is chosen. An important criterion for choosing a style is the impressions it carries, namely:

- 1) workload / simplicity;
- 2) volume / flatness;
- 3) obsolescence / modernity;
- 4) accuracy / chaos;
- 5) artificiality / naturalism.

In real conditions, the designer still needs to take into account some factors that can significantly affect the choice of design style, namely:

- 1) budget:
  - a) fixed;
  - b) floating.
- 2) terms:
  - a) concise;
  - b) comfortable.
- 3) the complexity of the layout:
  - a) high;
  - b) satisfactory.

The third stage of the methodology Formation of the criterion base with the calculation of weights for each criterion

At this stage, one needs to rank the criteria for choosing a web design style, which were identified and described in the previous stage. In order to highlight the most important criteria, a survey of experts was conducted.

Designers of the multimedia studio «Tess Lab» were chosen as experts. Experts were asked to rank the list of criteria to consider when choosing a web design style. The full list of criteria is given in table. 1.

Table 1

### Criteria for choosing a web design style

№	Criterion	Symbol	Possible values
1	2	3	4
1	Type of interactive publication	k1	Internet representation; information resource; web service
2	The focus of the interactive publication	k2	informational; functional
3	Content of the interactive edition	k3	the predominant type of content; number; quality
4	Type of design	k4	interface; authorial
5	UI / UX consistency	k5	yes; no
6	Development	k6	level of difficulty

Cont. of table 1

1	2	3	4
7	Relevance to the target audience	k7	age; design views; place of residence
8	Impression	k8	workload / simplicity; volume / flatness; obsolescence / modernity; accuracy / chaos; artificiality / naturalism
9	Customer (budget and terms)	k9	Budget, terms

Ten experts from of the multimedia studio «Tess Lab» took part in the survey. The results of the expert survey are given in table. 2.

Table 2

**Expert assessments of style criteria in web design**

Sequence number i-th criterion	Answers of the j-th expert										Σ <sub>i</sub>	Δ <sub>i</sub>
	e1	e2	e3	e4	e5	e6	e7	e8	e9	e10		
k1	8	7	9	9	5	8	9	8	8	3	74	24
k2	1	3	2	1	2	1	1	2	5	4	22	-28
k3	4	6	4	5	6	5	3	7	7	5	52	2
k4	5	4	3	4	4	4	5	4	6	2	41	-9
k5	2	1	5	2	1	2	2	6	1	1	23	-27
k6	3	2	1	3	3	3	4	1	4	7	31	-19
k7	7	9	8	7	7	9	8	9	3	6	73	23
k8	6	5	6	6	9	6	7	5	2	8	60	10
k9	9	8	7	8	8	7	6	3	9	9	74	24

The sum of the squares of the deviations from the mean:

$$S = (24)^2 + (-28)^2 + (2)^2 + (-9)^2 + (-27)^2 + (-19)^2 + (23)^2 + (10)^2 + (24)^2 = 3740.$$

The concordance coefficient is equal to:

$$K = \frac{12 \times 3740}{10^2 (9^3 - 9)} = \frac{44880}{72000} = 0,623 \approx 0,62.$$

The concordance coefficient is equal to, which indicates a sufficient agreement of expert opinions.

The next step is to calculate the weights of the criteria according to formula (1):

$$W_i = \sum_{j=1}^m W_{ij} / \sum_{i=1}^n \sum_{j=1}^m W_{ij}, \quad (1)$$

where  $W_{ij}$  is the place where the  $i$ -th criterion is set by the  $j$ -th expert;

$m$  – number of experts;

$n$  is the number of criteria.

Substituting the data into formula (1), we find the coefficients of weight of all selected elements. The result of the calculation is given in table. 3.

Table 3

### Calculation of weighting factors of criteria

Sequence number i-th criterion	Answers of the j-th expert										$\Sigma_i$	$W_i$
	e1	e2	e3	e4	e5	e6	e7	e8	e9	e10		
1	2	3	4	5	6	7	8	9	10	11	12	13
k1	8	7	9	9	5	8	9	8	8	3	74	0,165
k2	1	3	2	1	2	1	1	2	5	4	22	0,049
k3	4	6	4	5	6	5	3	7	7	5	52	0,116
k4	5	4	3	4	4	4	5	4	6	2	41	0,091
k5	2	1	5	2	1	2	2	6	1	1	23	0,051
k6	3	2	1	3	3	3	4	1	4	7	31	0,069
k7	7	9	8	7	7	9	8	9	3	6	73	0,162
k8	6	5	6	6	9	6	7	5	2	8	60	0,133
k9	9	8	7	8	8	7	6	3	9	9	74	0,164
Всього:											450	1

After calculating the weights of the criteria, the next step is to determine the most important criteria, based on the obtained weights, for which condition (2) is fulfilled:

$$W_i > 1/n. \quad (2)$$

Since 9 criteria were selected for analysis, then  $W_i > 0,111$ . After analyzing the previously calculated weights, the following criteria were left: k9, k1, k7, k8, k3. Moreover, the sum of  $W_i = 1$ , so after excluding the least important criteria, the weighting factor of others is recalculated by formula (3).

$$W_{i0} = W_i^* / \sum_{i=1}^n W_i^*, \quad (3)$$

$W_{io}$  – weighting factor calculated after fulfilling the condition given in formula (1);

$W_i^*$  – the weighting factor of the element for which the condition given in formula (1) is met;

$n$  is the number of the most important criteria.

The resulting criteria and their weight are given in table 4.

Table 4

**Calculation of weighting factors of criteria**

Sequence number i-th criterion	Answers of the j-th expert										$\Sigma_i$	$W_{io}$
	e1	e2	e3	e4	e5	e6	e7	e8	e9	e10		
k9	9	8	7	8	8	7	6	3	9	9	74	0,22
k1	8	7	9	9	5	8	9	8	8	3	74	0,22
k7	7	9	8	7	7	9	8	9	3	6	73	0,22
k8	6	5	6	6	9	6	7	5	2	8	60	0,18
k3	4	6	4	5	6	5	3	7	7	5	52	0,16
Всього:											333	1

The next step in the methodology is to create an interface for an interactive publication. It is recommended to use two categories of user interaction schemes with the program interface:

1) Gestures: tap, swipe, double tap, pinch, zoom – all this has long been familiar to the user;

2) Revival: this refers to the animation that will make the application more alive. We recommend combining animation with gesture control.

Schemes of user interaction with the program interface determine its structure and individual elements. For example, the on-navigation buttons at the bottom of the program are more familiar to users than the buttons at the top of the program.

The technology of mobile application interface development is based on the basic principles and principles of the waterfall model, namely it follows its sequence and involves the following stages:

- 1) collection of requirements and their analysis;
- 2) design;
- 3) programming;
- 5) testing;
- 6) implementation and support.

Each of these stages begins only after the completion of the previous stage.

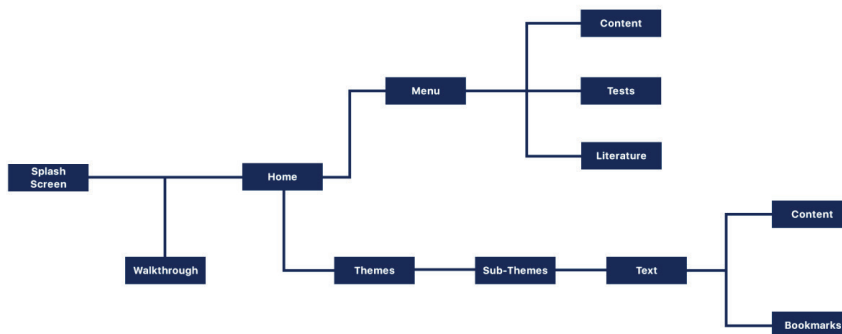


Fig. 2. UX map of the online edition

The proposed block diagram of the technology in terms of quality of the production process of interfaces of interactive publications has the following advantages:

- 1) automation of existing production actions of employees;
- 2) the progress of the work can be easily tracked, as the completion of each phase is a checkpoint;
- 3) progress in the process of software product development is traced;
- 4) high reliability of the final product.

**Conclusions.** Thus, as a result of the work carried out, the requirements of users for the interactive edition are identified. Based on these requirements, a user interface is developed and a design solution for a mobile application is created. The end product is a mobile application with an implemented user interface that implements the technique of choosing a style in web design.

The direction of further research of this article can be an estimation of the efficiency of the development process of interactive editions.

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## РОЗРОБКА МЕТОДИКИ СТВОРЕННЯ ІНТЕРФЕЙСУ ІНТЕРАКТИВНОГО ВИДАВАННЯ

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*Метою цієї наукової статті є розробка методики створення інтерфейсу інтерактивного видання. Проаналізовано місце та функціональне значення користувальницького інтерфейсу як об'єкту вебдизайну. Виявлені ознаки стилю у вебдизайні. Детально проаналізовані п'ять рівнів досвіду взаємодії користувача із сайтом, які одночасно можна зарахувати і до етапів проектування. Акцентовано увагу на тому, що рішення щодо вибору стилю приймається на останньому рівні поверхні, проте на вищих рівнях приймається безліч проєктних рішень щодо компоновки, поведінки та функцій сайту, що значною мірою впливають на кінцевий вигляд сайту. У дослідженні розглянуто кожен етап з погляду його впливу на вибір стилю вебдизайну. Також у статті запропоновано додатковий набір факторів, які дизайнеру необхідно враховувати в реальних умовах мультимедійного видавництва і які можуть значно вплинути на вибір стилю дизайну. На основі цього розроблено структурну схему параметрів стилю у вебдизайні, проаналізовано*

існуючі методика вибору стилю для інтерактивних видань. За допомогою залучення експертів мультимедійної студії проведено формування критеріальної бази з розрахунком вагових коефіцієнтів за кожним критерієм. Виконано ранжування критеріїв вибору стилю вебдизайну. Виявлено вимоги користувачів для інтерактивних видань. Розроблена технологічна схема створення інтерфейсу. Створено UX mapу інтерактивного видання. Науковим результатом проведеного дослідження є методика створення інтерфейсу для користувачів інтерактивних видань згідно з кількісною оцінкою параметрів, які треба враховувати під час розробки. Практичним результатом є користувальницький інтерфейс, розроблений за запропонованою методикою.

**Ключові слова:** методика, стиль, вебдизайн, інтерактивний додаток, фактор, критеріальна база, інтерфейс.

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