

## HANDBOOK OF WEB DESIGN

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**Abstract:** I am presenting to the audience an idea for additional preparation and support for the acquisition of knowledge and skills by students in Information Technology training, module "Web design" 12th grade, as a teaching aid in the form of a *Handbook*. In the learning process, students will build new digital competencies using modern techniques and software technologies. It is aligned with the curriculum of the Ministry of Education, key topics are included as snippets of the learning content, which are covered in detail. I have given a sample of the topics synthesized according to the curriculum in the Table of Contents of the guide as STAGES - algorithm. The main aspects, principles, standards and technologies necessary to build a website are presented. Key topics focus on practical guidance in planning, designing, building, testing, publishing, optimizing and securing a website. Each of the topics gives students an opportunity to "**stretch**".

**Keywords:** interactivity, optimization, web interface Natural and mathematical sciences

### 1. INTRODUCTION

The manual is built on the basis of experience in the WEBDESIGN group - interest activities this academic year at SU "Sofroniy Vrachanski", as well as with students from the schools NHG "Tsanko Lavrenov", MG "Acad. Kiril Popov", in my "WEBDESIGN" group under the project "Education for Tomorrow" 2020, I had classes focused on Web design. For almost 12 years I worked in this direction with different age groups. The articles: "Some methodological aspects of creating an interactive interface and teaching it at school" and "Selected software technologies for building an interactive interface" as well as the Handbook are related to the topic of my dissertation. In the Guide, I emphasize key points in building a website, supported by practical examples. I provide information on technologies as a basis for upgrading and ways to improve. It would be better than a classic textbook because it is more synthesized, cleared of redundant information and algorithmized. It can be continuously upgraded, updated and enriched. Security on the web is important and you can see more information in my next article: "*Raising the level of network and information security*" electronic collection of the Union of Scientists in Bulgaria-Plovdiv 2022. The manual can be used by beginners and advanced users.

### 2. OBJECTIVE OF THE RESEARCH

The main goal of Web design training is to develop key digital competencies, thinking, presentation, teamwork, etc. For its implementation, it is necessary to apply a variety of teaching methods, which the teachers will be able to use in the training. And the methods are one of the most important components of the educational process and their use in Web design training enables every teacher to achieve his goals, which is a prerequisite for building not only a good interactive interface, but also the building of digitally competent IT specialists. The main research thesis is that the knowledge obtained in pedagogical research can be presented as a basic tool in the development or *construction of the interactive interface*. The purpose of the tutorial is to present a sample idea to help anyone who wants to get into web design. This manual also dictated my idea for a *Teacher's Manual. (Presentation of the Handbook)*;

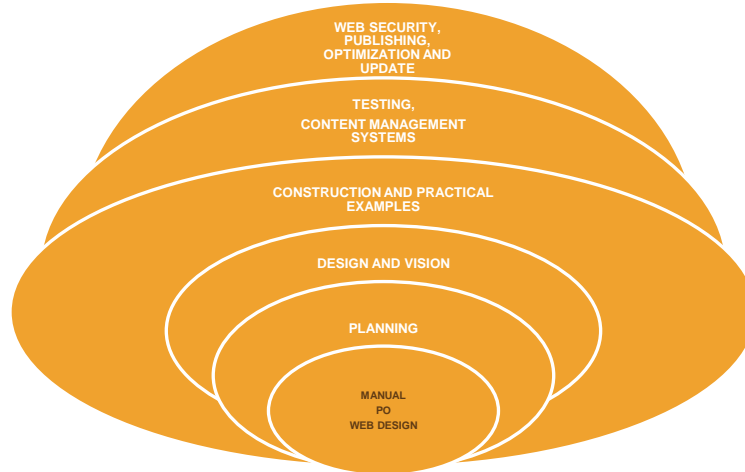
### 3. RESEARCH METHODOLOGY

The research methodology is based on a thorough review of many publications on the topic, studies and examples, assignments. An author's position is given after analysis, discussion and interpretation. The methods used in the study are analysis, synthesis, induction, deduction, etc. Key topics focus on practical guidance in planning, designing, building, testing, publishing, optimizing and securing a website.

### 4. LEARNING OUTCOMES

Students manage to acquire the knowledge and skills and complete the tasks of building the interactive interface. They distinguish between responsive and responsive web design, as well as between static and dynamic websites. They decide for themselves when what technologies to use in terms of whether to use CMS systems or build unique and clean websites with all modern software technologies. The algorithm by construction stages is presented in figure 1.

*Fig. 1 Stages in the construction of the interactive interface*



*Fig. 2 Cover of the manual*



**First stage.** Determine the Topic, Purpose and Target Group of your project - a website with an interactive interface. Having a clear goal makes it easy to formulate tasks. The thematic content, structure, vision, type and target group are selected with surveys, questionnaires, interviews, statistics. The most important thing is to have different levels of access, to provide the possibility of simultaneous visits by more than 1000 users, to be presented in different languages, dynamic and interactive.

**Website name and registration.**

A domain is selected, depending on its type: .org, .au, .bg, .edu, .net, .com, etc. One of my sites: [ucd.bg](http://ucd.bg). It should be short, easy to remember and pronounce, related to the site's topic, organization, and intriguing. Hosting is required. Hosting services are shared, email, file, dedicated, virtual and cloud. Its characteristics are: speed - affects how quickly the website loads, data connectivity - amount of data that can physically be sent over the respective network, cable from the site to the end users for a certain period, data storage - the more information there is, the more space you need, scalability - increasing the resources of the web server at, control panel - managing the web hosting and admin support.

**Main stages in building the structure.**

**Second stage:** Designing is related to the creation of information architecture and the design of means for program implementation. This is a process in which a sketch is made - the appearance and architecture of the site. Now is the time to choose appropriate languages and technologies – HTML, CSS, JavaScript, PHP, MySQL, etc. The website must be supported by different OS - Win, Linux, macOS, Unix and browsers. Other elements of the website are the homepage = home = index, main

internal levels, internal resources, site map, search engine, contacts, etc. All links between pages of different levels, as well as the overall functionality of the site, are "drawn" and staked in advance. This can be seen with a block-diagram=diagram ([www.diagrams.net](http://www.diagrams.net)). The other option is to have a link to the home page on each page, which is achieved with CSS technology on the site logo. *It is a powerful tool that, by editing one or several parameters, can change the appearance of the entire site and is applied in three ways:*

Built-in (inline) – through style attributes of a specific element, applies only to it; Internal – as a block of styles enclosed in the <style> tag, affects elements only in the current page; External (external) - the styles are described in a separate text file with the extension .css. The link to it is specified with a <link> element in the <head> section. This makes it possible to apply a selection of styles to multiple other pages, as well as set combinations of several .css files.

Here is an example task:

```
<!Doctype html><html><head>  
<link rel="stylesheet" type="text/css" href="styles.css">  
</head><body>.....</body></html>
```

**How the home page is designed, graphic model.** From the first page it should be visible what the next ones will look like. An example of a clean web design - click to see!

**Software technologies for choosing fonts, color schemes and more.**

Professional programs can be used for the website's design: CorelDraw, Adobe Illustrator, Adobe Photoshop, etc.

**Principles, standards and basic web technologies.**

**Third stage:** Web design principles, web standards, and use of basic web technologies must be followed.

**Specialized software tools for creating websites.**

Adaptive and responsive design appears, to see a site on all mobile devices, tablets, computers, browsers in the same way or displays of any size.

Example:

```
<!doctype html><html><head><title> ... </title></head>  
<body>.....</body></html>
```

**"Invisible table"** - no common background color and no border around the fields or by code - bgcolor is missing, but border="0" is present.

```
<table border="0"> cellpadding="10"><tr><td valign="top"> here is the content of column 1</td><td valign="top">  
here is the content of column 2</td>  
<td valign="top"> here is the content of column 3 </td></tr></table>
```

**Audio player code:** <audio controls><source src="music.mp3"/><source src="music.ogg"/><source src="music.flac"/></audio>

**Video Player Code:**

```
<video controls width="640" src="movie.mp4" type="video/mp4"></video>
```

**Testing, publishing.**

**Fourth stage:** Testing is a process complementary to its development and management. Its overall behavior in working conditions is checked:

\*Checking whether a site is written according to the established standards and rules of the programming language - validation.

\*Testing the visualization and functionality of the website, regardless of the web browser and operating system being used.

\*Testing loading speed and accessibility of the website.

\*Web site security check. Testing the admin part - control panel, user access and registration, passwords, etc.

\*Testing the site for mobile compatibility with different types of displays and monitors on different mobile and desktop devices.

**Purpose and Architecture of CMS:** To work with WordPress, you need to install Apache or Nginx, PHP, MySQL or MariaDB. A large part of the companies Dom.bg, ICN.bg offer hosting services, they have automatic installers, through which the system can be installed easily. Another way to install is to upload your files to the server using an FTP client. After you have such a server and you have installed the necessary software, in the open form you fill in the data for the website, host, domain, password. The steps to install WordPress: Download WordPress, unzip the package. Upload the folder to the server directory you have designated for the future website. You can use the control panel or an FTP client. Create a MySQL database through the hosting control panel: from the Databases tab, select MySQL Databases. In the New Database field, specify a name for the new database and click on the Create button.

**Security and Optimization**

**Fifth stage:** One of the main vulnerabilities in applications used in modern CMS is unregulated code injection in open forms that are used to fill out forms and add interactivity to the website. It is well known that the JavaScript programming language adds vibrancy and interactivity to the website. But the functioning of the scripts are vulnerable points not only to the server, but also to the client part of the Internet browser toolkit. By stealing data

from the server side, hackers and crackers can infect the client side with malware through discovered vulnerabilities in the application code.

**IMPORTANT!!!** One of the most popular tools for vulnerability research is the OWASP ZED Attack Proxy – ZAP. It is actively supported by hundreds of international volunteers and this helps automate the search for vulnerabilities in websites and web applications.



SEO (Search Engine Optimization) is optimization for search engines and consists mainly in the promotion of the content of your site. The content itself is made easier for search engines to understand, thus achieving higher keyword positions.



Promotion is an important process, continuous maintenance, update and backup is the right path of a Good Web Designer!

After the pedagogical experiment, the hypothesis is proven, namely that the students develop in detail digital competencies for the construction of an interactive interface. The manual itself is a good training aid.

## 5. CONCLUSION

An important task in training is to develop thinking, digital, presentation and other skills of a higher order in the students, because by acquiring them they would easily deal with problematic situations even without experience. Video lessons, video materials, a list of useful links, incoming and outgoing surveys about the conducted training, tests with assessment, other didactic materials on previously prepared tasks for creating an interactive interface have been made in advance. Work in teams and independently, tasks are also set for independent work. The methods, knowledge and skills that are designed in the set tasks and based on the curriculum of the Ministry of Education and Culture are a prerequisite for the preparation of highly qualified young people in the field of software technologies and their successful implementation.

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