

# **ADVANCES IN MULTIMEDIA AND DISTANCE EDUCATION**

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# Multimedia textbook of photographic exposure theory

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## Abstract

*The paper presents a multimedia educational application offering basic knowledge of professional photography. The purpose of this multimedia demo application was to make the written textbook of Dr. Milan Miletin, Basics of photographic tone reproduction, more attractive to a wider audience. Especially by a clear structure, ease of use, careful use of multimedia elements and good user interface design.*

*The application was designed to be run from a CD-ROM. All capabilities for a future commercial use are implemented. There are two main parts of the application, the theoretical and practical part, which go hand in hand with one another. The first part explains theoretical aspects, the second one offers photographic images and user interaction for better understanding the topics discussed. Images were obtained by scanning color photographic transparencies. A navigational and information retrieval system is at the heart of the user interface. A short quiz is meant to keep the user motivated. Help and instructions for using the application are implemented in a minor scope. The user can also connect to the World Wide Web and visit some useful sites.*

**Keywords:** Multimedia, Education, Photography, User Interface Design.

## 1 Introduction

Photographic exposure theory is part of professional photography and therefore it is not widely known to amateur and advanced amateur photographers. Photographers, who wish to take control over the reproduction process and assure excellent quality of their work, have to carefully study and implement the theory of exposure [1]. The photographic reproduction process is long and complicated, with many factors which need to be considered. Therefore it is not enough to act by pure intuition or on a subjective basis. The knowledge of the exposure theory and its implementation is also extremely important.

The application gives basic knowledge of this theory to three groups of users, the amateur, advanced amateur and professional photographer.

The first part of the application (textbook) explains sensimetry, exposure and the reproduction process. The second one (workshop) presents the scene, the quality of positives, metering equipment, photographic material, its sensitivity and the system of lenses. There were 6 main considerations which marked the whole software development process [2]:

### Consistency.

It is a »must« in serious software development. Consistency is recognised at placing various screen elements, their size, position, colour, messages, menus, dialog boxes etc.

**Shortcuts.**

Frequently used commands have their shortcuts either by keyboard or by various pointing devices.

**Informative.**

Each user action has to be followed by appropriate information of success or failure.

**Stability.**

Irregular user entries, for example strings instead of numbers or vice versa, are not affecting the execution of the application.

**Undo.**

The user has the possibility to restore the previous condition.

**Short-term memory load.**

The human brain can store approximately 7+-2 information for a short period of time. It is necessary to keep the user interface as simple as possible.

**2 The development process**

Systematic application development was possible only by careful analysis, design, implementation and testing.

**Analysis**

The main topic of this phase was to study the photographic content [1] [5] [6], which is at the heart of the application, and the principles of good online design [2] [3] [4]. Valuable information was collected by evaluating some multimedia applications [7] [8] [9]. Three of the most important questions were how to implement a useful, visual attractive and user friendly learning application.

**Design**

The design phase resulted in a WBS structure (Work Breakdown Structure), based on the requirements and information from the analysis phase.

**Implementation**

Great multimedia capabilities and ease of use were the main reasons for choosing Asymetrix Toolbook Publisher as the development tool. The implementation phase included determining the page layout, navigational and information retrieval logic, transfer of text, scanning of illustrations and colour photographic transparencies.

The page layout had to follow some guidelines for screen layout design. There has to be less text and more graphical information. Text has to be grouped in manageable chunks or paragraphs. Careful use of

colour and bold text is extremely important. Red coloured elements are for example meant to pass a warning message. The positioning and size of text fields, pictures and illustrations is also very important. Information about the position in the application has to be assured each moment.

**3 Application structure**

The main parts of the multimedia application are:

**3.1 Preface**

This chapter explains the main idea of the application and who can benefit from it. It mentions also that the content is divided into three parts, which are suitable for amateur, advanced amateur and professional photographers. Each group of users naturally has a different knowledge background and personal preferences.

**3.2 Using it**

The user interface is quite intuitive, but instructions for using the application are at the very beginning of the application. The user gets a brief look at the interface, the navigational and information retrieval elements. In this way the user can learn to efficiently navigate through the application and find the desired information quickly right from the start.

**3.3 Textbook**

This part presents the theoretical content of the written textbook. All chapters are included, the first in a greater scope, the second and third in a minor one. Illustrations were scanned or made in Asymetrix Toolbook, images were obtained by scanning colour transparencies. The layout of the content mimics the layout from the paper textbook and is translated into Slovene.

The page layout of the original textbook is shown in Figure 1. As we can see, the layout is somewhat condensed and the formula's and corresponding text are not separated enough. Let's take a look at the textbook GUI of the application. At the top of the screen is the menu bar which enables us to choose between the:

**Index**

The index let's us quickly go to the desired table, illustration or image in the application.

**Workshop**

By pressing F4 we can switch between textbook and workshop

### Quiz

There's a quiz for the current chapter.

### Internet

Links for the Zone system theory, as well as other well known photographers and manufacturers of photographic material and equipment.

### Settings

It is possible to enable/disable the sound effects.

### Help

The help includes a glossary and standard help topics.

The menubar is designed wider and each menuitem has a maximum of 4 choices. This layout keeps the menu simple and assures that users are not forced to remember the position of choices in a particular menu. Choices have keyboard shortcuts.

A banner at the left side of the screen gives Information about the current part of the application (either textbook or workshop). Illustrations and text are clearly separated from each other. Each page has a chapter heading, beneath that is the illustration and the appropriate description text. The borders of the main text field are thicker at the right side and at the bottom. We read from top to bottom and from left to right so this layout supports the natural flow of reading. Pages have no text fields with scrollbars so users get what they see so there is no annoying scroll.

Text and corresponding graphics are therefore on the same page to assure continuity in the learning experience. In cases, where there are more pictures necessary, multiple choices are implemented and each picture has it's own dynamic explanation section. The only place where scrollable text fields are used is at the glossary section. Choosing a letter brings the specified starting letter into focus. Each page is therefore unique, but several template designees where made to keep the consistency of presentation at the highest possible level. The templates where obtained by transferring the content of the original textbook into the application and arranging all elements.

Main topics, equations or keywords are clearly stated. Large sections of text are supported by graphical elements to keep the user interested. References are presented by hypertext links and popup fields with immediate information.

Chapter headings are supported by visual transition and sound effects to make the use more exciting. If we had used visual transitions and sound effects between all pages, then we would significantly slow down the speed of progression through the application and would decrease the user progression speed and would put the willingness to use the application at risk. Only two

kinds of visual transition effects are used. The zoom effect is naturally chosen because of the photographic content. Sound effects are careful chosen (type of sound) and wisely used (number times and situation). Sound effects can be also disabled. The sound of the welcome theme at the beginning of the application is a gentle one and its duration is a little bit shorter than it takes to read all the text, which is displayed by moving the mouse pointer over the buttons. Each chapter heading in the textbook area has also a theme, its duration is according to that rather short.

The underlined provide access to the World Wide Web (WWW), the other ones provide information at the current page. Some hyperlinks provide popup windows, where additional images are presented. The navigational bar is at the bottom of the screen and its primary use is too easy navigate and retrieve information. Its design is simple and follows the 7+2 guideline. The contents navigational window shows contents according to the textbook or workshop section. Full text search and page selection is also implemented.

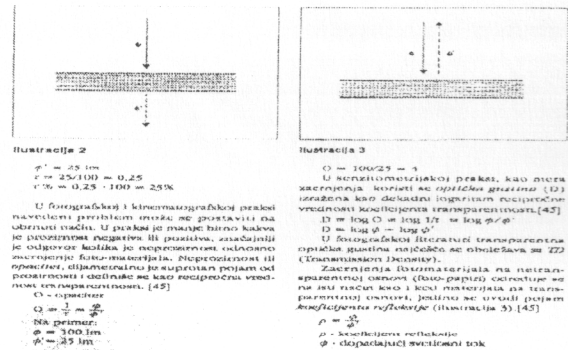


Figure 1: Original textbook.

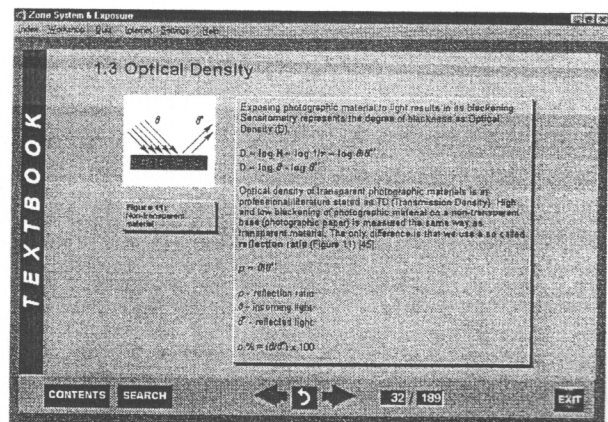


Figure 2: GUI of the application.

### 3.4 Workshop

The workshop offers photographic images and user interaction for better understanding the theoretical topics discussed. It has a similar layout than the textbook. Images are presented in a simple camera viewfinder, which offers information about EV (Exposure Value), shutter speed and f-stop. Some images have marked areas to point to them by the mouse pointer and then the user reads out the photographic values. Chapter headings are not supported by visual transitions and sound effects, which could only divert the attention of the user. The table of contents makes it possible to easily switch between the three levels of interest and the desired chapters. A shutter sound is implemented by clicking on buttons who show different images. This effect can also be disabled. Information about the current level is shown at the top left side of the screen.

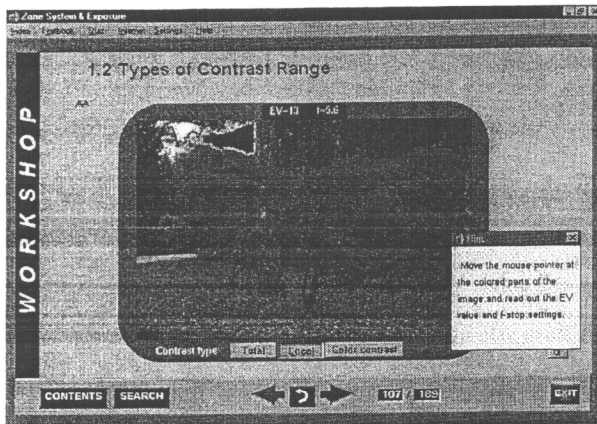


Figure 3: At the workshop.

### 3.5 Quiz

A short quiz is meant to keep the user motivated. All questions require choosing between available answers. Some of them are so designed, that the user points at the right spot on a graph. There is a success/failure statistics at the end of the quiz. It shows the results only at completion of all answers.

### 3.6 Help

Help is implemented in a minor scope. It consists of a short general help, a glossary of terms and information about the application.

### 4 Outcomes

The application consists of:

- 203 pages of content
- 59 photographs
- 31 illustrations
- 22 World Wide Web (WWW) links

### 5 Conclusions and recommendations for further work

The intelligent design of user interfaces and careful use of multimedia is a time consuming and not so easy task. Humans have cognitive, visual and motor limits. The design has to take note of these limitations and has to minimise their effect. This application was designed and implemented following some general user interface design principles [2].

It is necessary to make a new study of page layout if we want to assure the best possible representation of some different (non-photographic) content. Further work should include the completion of this demo application, testing the usefulness by photographic experts, GUI design enhancements and the implementation of various metering possibilities on included photographic images.

This work is by opinion of Dr. Milan Miletin, the author of the original textbook, a rare application, because there is no similar product on the market.

The paper is written upon the Dipl. Ing. thesis of Tomaž Hožič [10].

### 6 Acknowledgements

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We thank also prof. Milan Miletin from the Institute for Theatre, Film and Television, University of Belgrade for cooperation.

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