MULTIMEDIA INFORMATION SYSTEM ON CHILD CLINICAL PSYCHOLOGY

D.A.Esikov, R.A.Turevskaya, Moscow State University

Abstract

A multimedia system in the field of child clinical psychology is described. Developed in Asymetrix ToolBook 4.0+ CBT/WBT, the product with the open architecture and extended navigation and multimedia interface contains dozens of modules, the logical structure of which is based on the hypertext standard. The functional core of the system provides basic navigational features with the access to different data resources, including the interactive context dictionary on psychology and psychiatry. Over 2500 pages of the system were developed with the original batch technology. The paper reviews system organization and the technology of development of Toolbook products with a unified interface and discusses the peculiarities of its Internet implementation.

Introduction

The project was initiated in Moscow State University as a pilot for creation of a CD-ROM encyclopedia in the field of child clinical psychology. The system was to serve as a prototype of future computer-based training (CBT) product in this field. The authoring team included the leading specialists from several research and educational institutions, diagnostic and correction psychological centers of city of Moscow.

The fortunate choice of authoring tools and the great work on collecting materials have made possible the transformation of the created product into the full featured web-based training (WBT) system. The several years experience of development of the latter is proposed to be reviewed in this communication (see also http://users.garnet.ru/~turita/psy_cd).

Development Tools

Development tools included Asymetrix Multimedia ToolBook® 4.0 [1, 2] and ToolBook II Instructor 6.1 with the OpenScript programming language. The choice of ToolBook (TB) as a perfect instrument for the development of CBT and WBT products provided the creation of the system based on the open architecture and ready for the further expanding.

The main advantage of TB in comparison with the similar multimedia IDE products such as Director or Visual Basic is its internal expandability. The significant part of TB runtime or authoring versions exists in a form of so called “system books” (files with *.sbk extensions) with programs written in OpenScript and dialog interface. These external modules, available in the development to the end users, significantly increase TB performance and provides developers with the comfortable tools of creating user specific environments.

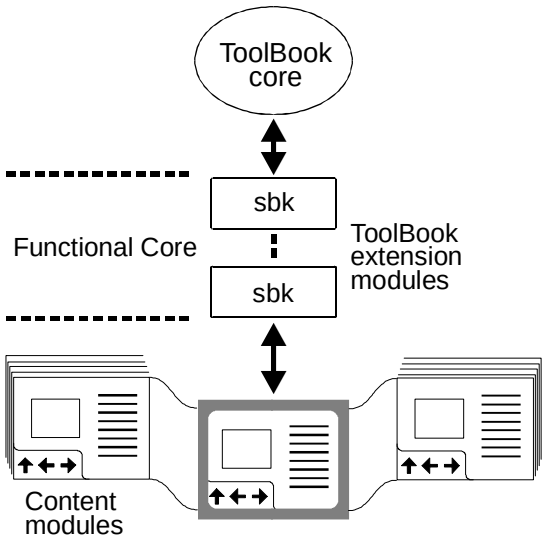

Fig.1 System architecture

Open architecture and system organization

Reviewing the system in general, we can outline two basic levels of open architecture: content modules and functional core (fig.1). Content modules based on the internal TB data format, hierarchy of TB objects and unified user's interface define the physical organization of psychological content. The functional core is responsible for the visual representation of data and unifies the number of TB system extensions (system books) that supports the interface with the user and operations with a content, e.g. access to multimedia files. Actually, a set of functional core extensions being used with the runtime core of ToolBook presented a viewer of psychological content with advanced features.

Physically, psychological materials were arranged in a form of TB files – containers for the different multimedia data: formatted text, pictures, audio/video clips etc. In accordance with TB data format, all information inside was arranged in a form of "pages", created from the templates. Each of the modules had a special service information reserved by the procedures in the functional core. This core processed not only user's actions and commands, but also the events associated with entering pages or books.

In addition to the TB files web version of the system used html pages created from original ToolBook modules.

Separation of the data located in content modules from the programs located in the functional core enabled us to create the information system with the open architecture and with following features:

- The independence of the content from the visual interface and system functionality significantly increases the efficiency of multimedia development support and update of the system.
- Highly unified interface and data structure have made possible fast and automatic generation of content modules both of TB and html format with the help of specially developed batch utilities.

Content modules

Each of "pages" with the information of different types had several standard data fields (or page properties) reserved by the hyperlinking engine of the functional core:

Reserved page property ...	with the reference to ...
Index page	local "index" page
Next page	next page in the data "chain"
Previous page	previous page

For example, when a user clicked the button associated with one of the reserved properties on the navigation panel thus executing one of the commands, the appropriate functional core module intercepted the buttonClick message and performed transition to the page target in the logical "chain" of pages (fig. 2).

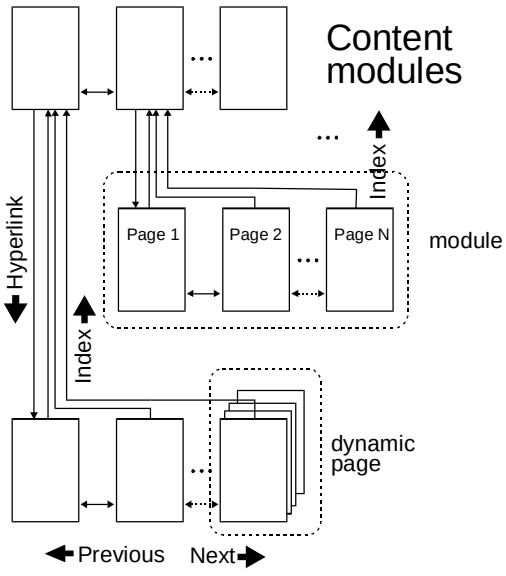

Fig.2 Content modules structure

Besides the reserved ones that were the part of unified user's interface, other TB objects contained hyperlinks, e.g. hotwords in text field, buttons, pictures etc. Because hyperlinks may also contain the reference to the "books" or modules, the hyperlinking system supports a structure of almost unlimited complexity. Moreover, the hyperlinks in TB are quite compatible with the "html" hypertext for the Internet applications, which makes it possible to export pages from the books in html format.

The navigational interface of the information system did not require any serious OpenScript programming at content level, however, for the extended interactivity, one could create regular TB

applications linked to the logical “chains” through their title page. These “dynamic pages” were not convertable to html, nevertheless, ToolBook provided other solutions for transferring and showing files in native TB format over the Internet.

For the entrance into the system, initially designed as a multimedia CD-ROM product, program used the conception of a “virtual museum” with the halls in a form of “ and icons as an entry points into the content modules. In accordance with the open architecture, the “virtual museum” wrapper provided a visual interface to the data in a form of 3D tree (fig. 3), that was created “dynamically”.

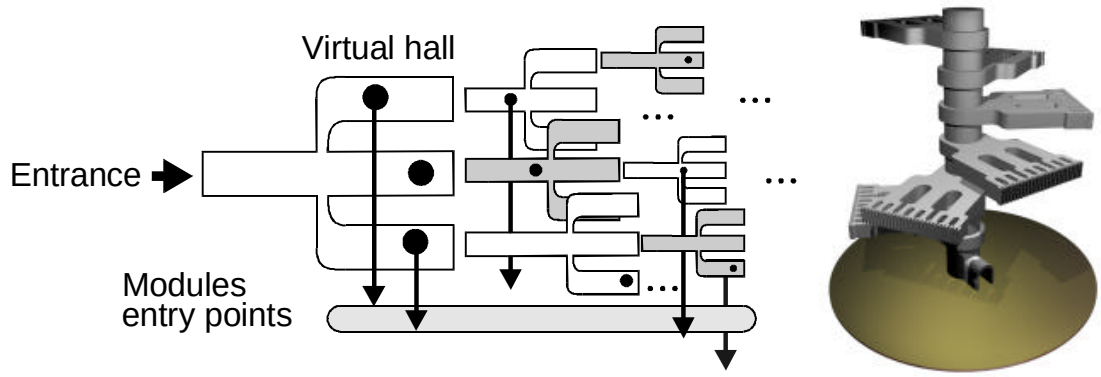

Fig. 3 “Virtual museum”

Psychological content

The main part of the system included the original illustrated text contributions from the authors sometimes with audio/video files from the real clinical practice or videos demonstrating the use of experimental techniques. As one could expect, the most difficult stage of the work was associated with the initial materials processing and shooting of real patients with their unique clinical manifestations.

The current version of product contains about 30 modules (all in Russian language) in various fields of child psychology, however, only the minor part of material was actually published in modules. The latter now contains about 2500 pages. such as: - psychological development assessment of early childhood; - the neuropsychology of child development; - diagnostics and correction of the early child autism; - different techniques of psychological correction (for spatial disorders, art-therapy methods, katathimo-imaginative therapy etc.); - substance and alcohol abuse prevention, etc.

The encyclopedia of psychological assessment inventory for the intellectual and emotional spheres, projective, graphic and many others tests, illustrated with an examples from the clinical practice, were also incorporated into the system.

Some of the modules were realized as a separate Toolbook applications, incorporated into the logical page structure in a form of “dynamic page” (see example on fig. 2). In this manner, we

(a) (b) (c)

Fig. 4 Examples of content modules
(a) The historicalarchive of psychological methods: the Rossolimo’s profiles,
(b) The reference book of psychological methods for the school readiness assessment.
(c) The title page of IDC-10 module (“dynamic pages” type).

developed the "International Disease Classification - 10" reference book –the special text database system with the treelike data structure and searching facilities (fig. 4c)

Functional Interface

The functional core (shared by all content modules) contained several TB modules being loaded on system startup provided, in addition to the basic navigational and multimedia interface, some of extended features. Below is presented a list with short description of currently available modules. Some of them (marked with *) are under development.

a) **dp.sbk**– basic hypertext navigation
b) **dict.sbk**– online dictionary on psychology and psychiatry (fig. 5), contains about 5800 entries and over 3 Mbytes of text. Popup glossary panel is activated from the content modules with right mouse button click on interested word of. Provides further references to the articles in the content modules.
c) **video.sbk –**audio/video player of various media resources of the system. Supports annotated clips.
d) **voice.sbk***– voice synthezier module.
e) **printer.sbk*–**printing and export utilities.
f) **bookmark.sbk***– creates bookmarks with automatic replay feature of marked pages anfd articles. Maybe usable with the voice synthezier.
g) **navigator.sbk***– searching system based on dynamically created hyperlinks, contrary to the static links of basic navigation.
h) **help.sbk***– help service.

Fig. 5. Context dictionary panels

Content development

In spite of visible simplicity of authoring in Asymetrix ToolBook, this process implies significant efforts in assembling application from different available objects - pages, text fields, buttons, pictures, etc. The presence of well designed templates, however, does not free the developer of the tedious work of importing text and graphic resources. There are know several tools increasing the efficiency of ToolBook development: (a) "Designer's Edge/Synergy" a story board type application from Allen Communications for generating ToolBook modules (http://www.allen.com), and (b) set of authoring tools from Platte Canyon (http://www.plattecanyon.com).

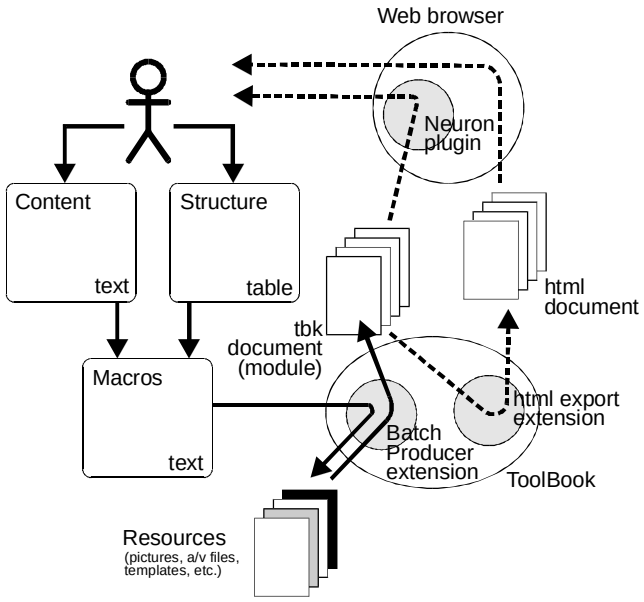

Fig. 6. Batch mode generation of content

In a similar way, we have developed a family of extensions for the automatic generation of TB files on the base of content description. One of the first plug-ins named "Batch Producer" interpreted a special "macro" file and performed different operations on assembling

ready to use module from various objects and resources (fig. 4). This macro file being compiled from the module scenario list was written in a special macro language with special commands for creating pages from templates, filling text fields, setting properties of objects, creating hyperlinks, etc. Additionally, the Batch Producer Pro version of the plug-in allowed user create his own macro commands. In this batch mode, the application of several hundreds pages containing text with illustrations was usually generated in several minutes. (the detailed information about plug-ins http://users.garnet.ru/~esdmm/toolbook).

A similar method was used for the creation of the html version of the product, however at this time, the converter plug-in was from Asymetrix as part of ToolBook system.

Transfer of multimedia content to the Internet

The first version of product, distributed on the CD-ROM, installed a computer runtime version of ToolBook on the host and launched informational system from the CD. The ability to use the product in the Internet environment applies serious limitations to the system associated mainly with the HTTP protocol and low data transfer rate.

Asymetrix Learning Company has developed for Netscape and IE web browsers, a Neuron extension program for playing toolbook files, which can be downloaded by HTTP (fig. 6). This browser plugin is available for ToolBook 5.0+ versions. Nevertheless, this method of net access to toolbook modules being very slow especially for the applications of several Mbytes in length, is not fully compatible with some features of our system. For example the operation of the context psychological dictionary or “ICD-10” modules supposes the quick access to the reference database files, located on the disk and is not available with HTTP.

The next opportunity is to convert huge Toolbook modules (we have at least 60 Mbytes without audio/video resources) into compact HTML (or DHTML for ToolBook 7.0) format documents which are transportable over the Internet communication channels. The main part of our system, except modules of functional core, is fully compatible with HTML format, and ToolBook has tools for fast creation of html pages from existing Toolbook files. This method is preferable for Russia with rather poor telecommunication facilities and does not demand for the serious work on adaptation of content.

In practice, Internet implementation of existing psychological Toolbook resources will need both of mentioned options, with main part of the content presented as html pages with Real or MPEG video/audio resources, and interactive TB modules embedded into html documents as supported by Neuron plug-in.

Project Sponsor

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Authors

Dmitry Esikov, Ph.D.
Moscow State University, Physics Department
119899 Moscow, Russia
E-mail: esd@garnet.ru

Rita Turevskaya, P.D.
Moscow State University, Department of Psychology
103009 Moscow, Russia, K-9, Mohovaya, 18, bld. 5,

E-mail: turita@garnet.ru