Multimedia Educational Resources Used in the Music Education System

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Abstract: Multimedia – a multiform medium containing media combinations of video and photo images with texts that can be interactively accessed is an upward trend educational mean. In this article we present the D.I.M.A. product, a multimedia on-line data base created on Romanian performing examples including an approach of the Romanian artistic field at the terminology aspect, creation and performing level. The musical and bibliographic patrimony of Gh. Dima Music Academy was the research reference point in creating the product and in testing it, as well. For stimulating the participation of the entire artistic community in Romania, an open portal towards the academic community was created - easy to access, permanently upgraded and supplemented.

Key-Words: - multimedia, resource, music, interactive, experiment

1 Introduction
Multimedia means merging text, image, sound and cinematics into one entity. The power of this entity lies in the way in which pieces of information of any kind are linked together and become accessible one for another. Through this, a new way of writing takes birth, allowing to compose more efficiently any type of article that can be rapidly and easily assimilated by the reader. When creating a successful multimedia product, a good interactivity will have to be taken into consideration and the new technologies nowadays can make it more efficient in attracting users. This product has to be attractive, have a groundbreaking design, functional, user-friendly, and always up-to-date and, of course, fast.

The new informatics technologies anticipate a multimedia approach in which different devices are affiliated: PCs, webcams, video interfaces, network interfaces, video projectors, interactive boards, etc. Together, multimedia technologies and systems offer a diversified teaching and learning potential thanks to the different mediums that are approached: sounds, voices, texts, drawings, photo images, movies, animations, graphs, etc. Systemizing visual semantic knowledge is one of the key challenges towards multimedia concept, and one that is complementary to optimizing visual classification for individual approach [1].

Such interest in giving birth to new multimedia resources has risen in the music education system, as well. This movement has been triggered by various aspects:

- The need of connecting the music education system to the present education requirements;
- The possibility of accelerating the process of learning about music by using new technology;
- The need of creating more simplified and adaptable teaching processes
- The tendency of today’s education to pay more attention to creativity.

The accessibility and the flexibility of music education materials have led to an urgent need for the development of the on-line multimedia means in the art education. The aim of the development is to fill in the gap between the academic and commercial utilization of image processing. Thus the on-line libraries must be interoperable, open source and easy to access. To provide fast codes, assembler optimization, open platform, and classroom based, new technologies permit integration of GPU (Graphical Power Unit) use. [2].

At an European level, these requirements are comprised within the sphere of the musical technologies research, the TIC and ICT introduction into the education, creation (computerized music) and sound production processes having priority in many research programs: Teaching & Learning in the Digital Age, E-vocal learning, Prelude (Training Program on ICT in Music Education), Vemus (Virtual European School), I-maestro: Interactive, Multimedia Environment for Technology Enhanced Music Education.
and Creative Collaborative Composition and Performance etc.

By using such means, the following type of intercommunication can be initiated:

Fig. 1. Communication circuits determined by the new education technologies

2. Multimedia Resources in Music

The new communication technology is an important mean in the music education system, since it allows a teacher to establish connections with other teachers in order to share their ideas create teaching projects, exchange class materials with students. E-mail accounts can nowadays include a large variety of files: texts, photos, graphs and audio-visual materials. The present teaching system makes use of strategies of involving computed teaching technologies which aim at learning about the way of using computed instruments and especially at creatively using this knowledge in teaching music and even establishing connections with other fields of interest.

In this respect, the following have been developed:

- Educational software that can fulfill various teaching tasks that are efficiently adapted and integrated in the teacher’s own strategy
- Fully integrated teaching assisted platforms, e.g. Prelude, an e-learning platform which provides specific instruments of implementation of the courses together with other multimedia materials into an electronic format by applying a complex synchronous and asynchronous communication system.
- The resources delivered by the global computer network – the direct connection with the Internet development and with the joint communication means an increasing involvement in the education process of all free resources dedicated to music (as Audacity, Darkwave studio, Solfege etc.)
- Various software products that have been developed through individual or institutional initiatives: due to a multimedia boom over the last years, there has been a series of numerous educational programs that have been created for the artistic field, e.g. VR Encyclopedia of Art – an extensive collection of historical events that offers the users the key happenings in the art field. An online learning environment for stimulating creativity with innovative technological practice is Sonic Postcards. This is a national education programme devised and delivered by Sonic Arts Network, which promotes and explores the art of sound via the Internet (www.sonicartsnetwork.org).

Recent research has shown how online, mobile and wireless networks are creating new learning environments at the intersection of formal and informal educational settings [3]. The Internet has shown itself to be a dynamic teaching tool for exploring, discovering, creating, communicating about and playing in virtual music-making contexts.

3. The D.I.M.A. experiment – a multimedia resource for the music education system

The on-line D.I.M.A. product (Direct Impact Multimedia Application) is a multimedia resource in the music education system created by an interdisciplinary team within the Gh. Dima Academy of Music in Cluj-Napoca, Romania. The product contains the basic requirements of the on-line musicologic and performing data base that fulfill the specialized users’ and the students’ exigency regarding the characteristic feature of the approached subjects and also the Romanian cultural particularity in what concerns the new technologies assimilation.

The product includes specific procedures and instruments which facilitate the individual study according to the students’ own pace and interactive means. It is also easy to be accessed, by offering diversified information means. Our multimedia user interface is both: a design method and an assistant tool which covers specification of user requirements and information architecture, selection of appropriate media to represent the information content, design for directing attention to important information and interaction design to enhance user engagement. The method was evaluated in a case study design of a crowd control simulation training system, which demonstrated the method was usable and gave good solutions against an expert gold standard design. The tool provides advice on media selection and attention effects that match specification of the information content expressed as information types and communication goals. As usually the evaluation was carried out to measure the usefulness and effectiveness of the tool in comparison to the method, and the results showed that the tool has a positive impact on multimedia design [4].

The D.I.M.A., seen in a material form and as a multimedia anthology of terminology, includes the following titles:
An approximate of 1000 musical creations (focused on Romanian works and performing activities). The musical example corpus will serve as a base for all levels of education, study and research.

An anthology of musical terms interactively connected to information about their cultural and historical context and to links towards other websites. This anthology is based on a Romanian reference book comprising specialized works, courses, guide books, dictionaries and lexicons.

The platform takes full advantage of ICT that will be used as a tool to accomplish various tasks. By accessing the D.I.M.A. platform, the students may want to search for the list of terms, to have access to various information, have access to various materials format (text, video, audio, link on the web), to download teacher assignments for various homework, to reflect on suggested materials and upload their feedback, to use the communication facilities and to present his/her own questions and answers

Fig.2 - D.I.M.A. platform

Having been made ready in about a year by a team with no previous experience in developing such products, this platform proves that the multimedia field can be efficiently approached in the music education system, as well. Multimedia is no longer a trend or a miscellaneous need – it has to be regarded as a high technology that has to be assimilated during school. The online world is able to combine professionally various ways of communication: text, audio, photography, video, infographics and the D.I.M.A. product uses the following configurations in order to give value to these means of communication:

- **Text** – printer-friendly and written in an informative manner. This configuration gathers information in the field of interpretation (instruments, singing), about composers and music styles, musical theories and their applications and it also includes teaching tutorials for using computing and communication technologies in music. This configuration’s availability to be constantly updated by the team working on this product, but also by musicians and other outside users has to be reinforced.

- **Images** – bringing text to life. This rule remains unchanged for both the print media and the online world. The current technology allows the insertion of images in both texts and attractive photo galleries.

- **Audio samples** – represent a true piece of information. The audio samples and the music notes turned into images add a great value to the tool of exemplifying.

- **Video examples** for which there are two options: either uploading the original file on the own server, or embedded [...] For the first option the user can download the file from the site and then she/he can view it off-line at any time (this is an advantage for users that have slow Internet connections). The second option offers video-streaming directly from the site and this is an advantage for the workflow, even though the server and the application connection become more overloaded.

- **Infographics** contain schemed information that offers results „at a glance” and they can be animated or static. In the case of animated infographics there is the possibility of choosing software technologies that ensure the interactivity.

A material source of assistance for the D.I.M.A. users will be provided through the following applications:

- on-line tutorials for IT skills improvement and for an introduction into music notes reading;
- a data base including Romanian publications (music related books and articles).

The implementation of this application is based on the research team, the methodology and the infrastructure. The research team is made up of 6 musicologists who collect the terms during the most part of their activities, approximately 40 teachers from the distance learning field who will test the resulted materials in educational programs and, finally, a technical team.

Concerning the hardware aspect, D.I.M.A. is assisted by an IBM server and the software factor is ensured by a MediaWiki version adapted to the needs of a musical data base – audio and video examples, scores, etc. Maintenance is carried out by an experienced firm. The data will be entered either by using the network of the
“Gheorghe Dima” Music Academy, or by using any browser connected to the Internet.

Fig. 3 Information flow on editorial board

In fact, the methodology proposed for creating the database is divided into four stages. Each stage has a number of specialists in musicology that is content responsible and he assisted in technical matters by a specialized team. In the following table is described the term formation stages in multimedia form.

Table 1. Article building stages

<table>
<thead>
<tr>
<th>Methods used</th>
<th>Content</th>
<th>Technical means</th>
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<tbody>
<tr>
<td>Conceptualization</td>
<td>Suggestion</td>
<td>Evolving choice</td>
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<tr>
<td>stage</td>
<td>Alternative examination</td>
<td>Evolving adopted option</td>
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<td></td>
<td>Ideas distribution</td>
<td>Choices examination</td>
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<tr>
<td>Evolution stage</td>
<td>Mixed media scheme</td>
<td>Technological fulfillment</td>
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<td></td>
<td>Outset audit</td>
<td>Particularized architecture</td>
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<td>Application stage</td>
<td>Activity scheme control</td>
<td>Achievement generation</td>
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<td></td>
<td>Assess contexts</td>
<td>Assess and audit</td>
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<tr>
<td>Finishing stage</td>
<td>Estimate aim achievement</td>
<td>On-line production</td>
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<td></td>
<td>Fulfillment examination</td>
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</table>

The D.I.M.A. application is sustained by a MediaWiki portal adjusted to the specific needs of a music media anthology. The main objective is to offer a suitable platform for developing new ways of offering high level information in the music field that should be easy to access and that can be used in learning environments.

One of the D.I.M.A. project’s objectives is to implement this product in the distance learning process system and to observe, verify and monitor the users’ rate and the research impact in coordinating teachers and students, as well.

There are some of the facilities provided by the D.I.M.A. platform that are illustrated below:

4 4. The advantages of using multimedia educational resources in the music education system

One of the major advantages offered by the multimedia resources is interactivity. High levels of interactivity are made possible by putting together multiple forms with media contents. The online multimedia content becomes more and more focused on objects and databases and this allows the end user to insert her/his own innovations and personalization. One can find such examples on websites with photo galleries and image labels that are uploaded and modified by users at any time or on websites where the described events, the illustrations, animations and the video files are changeable. This allows the users to experience the multimedia world without having to possess any programming knowledge that is so challenging and inaccessible for the most of the public.

One of the purposes of our research consists in investigating suitable methods of creating a multimedia resource with different cultural specific features for optimizing the man-machine interaction adapted to the music education. In this respect, a data base with Romanian performing examples including an approach of the artistic field at the research level (terminological aspects) was created. Moreover, this database also includes an approach of the creation field. After implementing such multimedia resources on a group of our students with different levels of education we reached the following conclusions:

- the students gained a different point of view regarding the content of the curricula. Previously they thought about it as being too vast, but looking at it on-line they considered the curricula a compulsory factor for their education (fig.5 and 6)
- The students opinion before and after using D.I.M.A.
The students are more keen on learning at home at their own pace and in using the multimedia resources as an interesting way for practicing their knowledge. The students’ opinion regarding their free choice regarding their learning process (Fig 7 and 8).

The curricula becomes more relevant for the students provided that the following aspects are insisted upon: the practical part, the applicability of their knowledge, the way of establishing their music education, but also the way in which the latter is combined with their other habits that they developed in school.

Other advantages of on-line learning materials (in a multimedia format):

- smaller global costs in comparison with the traditional teaching practices;
- information is delivered when and where the student requires it, at her/his own pace and in her/his own environment. Many studies have pointed there are at school-level and teacher-level barriers and practical constraints within the workplace [6].
- interactive schemes bring a considerate contribution to developing one’s self-teaching abilities, while still staying in a comfortable environment. Although music education ‘enjoys’ the educational potentials of creativity and technology, in order to do so vigorously, teachers need to recognize the problems besetting music education as opportunities for change [7].
- this teaching method is more flexible and it leaves room for improving the act of studying, having a direct result on the co-operation with persons from external fields of activity that show interest in
entering the music education and that are now qualified to do so.

Studies of collaborative creativity using music technologies [5][8] and of students’ perspectives on composing with MIDI or using web-enhanced learning establish that technology provides an enabling environment in which learners and teachers enter a co-participative process around activities and explorations where learners can take back control of their learning [9].

4 Conclusions

The traditional music education system that makes use of old methods and strategies has become anachronistic and unattractive. The media impact on the individuals that find themselves in the current education system is so strong that converting them to a set of real esthetical values can be primarily done by using similar methods. Bringing the focus of the teaching process on using multimedia resources brings a direct advantage for concentrating on the peculiarities of the studied phenomenon, leaving the details aside. This aspect makes room for better understanding and remembering of the studied subject area.

After implementing the D.I.M.A. product in the Gh. Dima Music Academy, there has been an increasing interest of the students for using the IT resources. The reason behind this was that a multimedia database can make an individualized learning process become possible. Each student has her/his own learning rhythm and type of memory (audio or visual) when learning. D.I.M.A. can answer these needs by creating learning solutions that fit the learning profile of every student.

Moreover, the specific character of the multimedia resources creates the possibility of presenting a content in various forms; having movies, audio examples, animations and simulations as tools that bring the student from one medium to another allowing him the possibility of making comparisons; the content is learned consciously and the interest is kept awake.

Several studies [10] have identified the way in which such approaches have pointed to time-saving matters when teachers use online technologies and collaborative tools, which include blogs, podcasts and wikis used instrumentally in their practice. This approaching amplifies and extends pre-existing instructional practices and develops reflective practices which increase collaboration within and beyond formal school settings [11].

Another advantage of on-line resources is the fact that most of the materials on the Internet are constantly updated and this is possible at a low price; the available information can be found in a digital format so that the text, images and sound can be used in music classes or in own projects.

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