

EEIA-2018
**2018 International Conference "Education Environment for
the Information Age"**

**CREATION AND PUBLICATION OF THE SCIENTIFIC AND
EDUCATIONAL COLLECTION IN THE INTERNET**

Sergey N. Tikhomirov (a)*

*Corresponding author

(a) PhD (Education), Professor, Chair of Pedagogy, Training and Scientific Complex, Moscow University of Ministry of Internal Affairs of Russian Federation named after Vladimir Ya. Kikot, Moscow, Russia, 5103720@gmail.com*

Abstract

The article is devoted to the problem of formation of the information-subject learning environment of the institution of higher education, which uses the resources of virtual mini-museums and scientific and educational collections. The author reveals the structure, content, functional and pedagogical capabilities of the individual modules of the proposed model of collection, as well as the steps to create it, and pedagogical "instrumentation". The author gives the following sequence of actions of teachers and students in the implementation of the project. The author demonstrates the technology of creating and publishing the scientific and educational collection "Anton S. Makarenko as a person, teacher, scientist, writer" in the Internet space. The conceptual model of the museum data is supported by the specialized application server, which forms an intermediate level with the web server. The application server functions in a special way, which differs from the generally accepted implementations of such systems. The server does not implement a specific data model, but can implement and interpret an entire set of data models, according to their descriptions.

The results of the introduction of the proposed model of the scientific and educational collection are:

- creation of an open repository of information educational resources in the field of theory and history of pedagogy, history of the Ministry of Internal Affairs of Russia;
- optimization of the use of information computer technologies to improve the quality of training of specialists for the departments for juvenile affairs;
- Strengthening, expansion of professional and cadet (student) communities.

© 2018 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Scientific and educational collection, informational and subject learning environment.



1. Introduction

Specialists and scientists have done serious work related to the 125th anniversary of the birth of A.S. Makarenko. In the corridors of the university and the cabinet of pedagogical skills, it is also necessary to present an exposition. I would like to save this work and use it in the educational process of the department of pedagogy. Analysis of the experience of modern museums, as well as many educational organizations (Belkina, 2013; Bowen, 2010) helped us solve the following problem: - the creation of an instrumental portal (Bishop, 2014), the foundation of which will be a specialized information system for the management of virtual museums and scientific collections. The information system will allow creating, filling, setting up and publishing virtual museums and collections of scientific and educational orientation, which is possible without the participation of specialists in the field of information technology and with minimal resource requirements.

2. Problem Statement

The object of research is a virtual museum. The subject of the study is the creation of a scientific and educational collection through the method of the project. The theoretical basis of the study is "Technical recommendations for the creation of virtual museums" (Girouda, 2012), issued by the Ministry of Culture of Russia, as well as scientific publications of the doctor of cultural studies L.E. Nol "Information technology in the activities of the museum" (Bowen). The source of the research was the websites of existing museums represented in the Internet space. The study was conducted in the teaching of the disciplines of the pedagogical cycle at the Institute of Psychology of Service Activities of the Moscow University of the Ministry of Internal Affairs of Russia named after V.Ya. Kikot. The project implementation consisted of the following steps:

- the description of the technology is described;
- the creation of a scientific and educational collection;
- the use of virtual tours.

3. Research Questions

In the process of implementing the project, it is necessary to solve the following tasks:

1. The study of the history and method of constructing a virtual museum, the presentation of the concept of selection of documents (museum exhibits and materials), and the principles for the formation of a virtual collection fund.
2. Define a set of interfaces for accessing collection documents.
3. Formulation of requirements for the linguistic processor of the system, as well as determining the order of formation of the ontology of the museum, dictionaries, thesauruses, classifiers, catalogues and other information structures.
4. Formation of basic information structures for the presentation of documents, museum and scientific materials.
5. Development of the architecture of a distributed information system capable of stable and continuous operation in the global network.
6. Development of software components to support the operation of a distributed system.

7. Filling of databases with documents.

4. Purpose of the Study

The introduction of new information technologies in the educational process involves the use of network resources, the formation of an information culture, the actualization and development of specialized banks and databases, the creation of a single information and learning space, the informational interaction of people, their access to educational information resources. The purpose of the article is to show the possibilities to use the resources of a virtual scientific and educational collection in a specialized information-subject educational environment.

5. Research Methods

The following methods have been used during the study: analysis, description, comparison, synthesis, project method.

6. Findings

1. The study of history and modern methods of constructing a virtual museum showed that in the early 1960s foreign museum specialists began using computers to process data on museum collections (Bishop, 2014; Maksimova, 2013).

In 1977, the Massachusetts Institute of Technology developed the first virtual reality system, there appeared 3-D graphics programmes that were used in the design of museums" (Osborne, 2013). R. Chinhall's specialized work on the computer cataloging of museum activities was published in the USA in 1975 (Miller, 1992). The first virtual museums appeared in the early 1990s (for example, the Museum of Computer Art (MOCA), which began work in 1993) (Osborne, 2013). D.P. Bowen notes that the term "virtual museum" appeared in the early 1990s, and as a "historical record" among the virtual museums opened by private individuals, refers to the virtual museum WebLouvre, created by the French student Nicolas Pioch (Nicolas Pioch) in 1994 (Bowen, 2010). The value of the research of D.P. Bowen is attributed to the fact that he not only studies virtual museums as a researcher, publishing individually and co-authored work on this topic, but personally created in 1994 the world's first catalog of online museums (Bowen, 2010). A number of researchers refer to the origins of the virtual museum as a cultural phenomenon by the beginning of the 20th century and to the works of avant-garde classics (Huhtamo, 2002). Since the beginning of the 21st century the concept of "virtual museum" has become firmly established in the lexicon of Internet users and museum specialists. Theoretical development of problems of interaction of museums and information networks was carried out in our country L.Ya. Nol, A.V. Lebedev (Belkina, 2013; Maksimova, 2013).

At the beginning of the 21st century. On the Internet there are the main types of sites of virtual museums: the representation of real museums; sites of non-existent museums, but created in accordance with the scientific concept, including the developed architecture, exposition design, funds, even staff, etc .; thematic catalogs and data banks, including information on monuments on the selected topic, located in different real museums, institutions. In an article in the field of media art and digital media, Professor E. Huhtamo "On the Origin of the Museum" one of the first projects in the field of virtual museums

mentions the exhibition "The Museum Inside the Telephone Network". This exhibition was held in Japan in 1991 (Girouda, 2012; Osborne, 2013), and at that time the Internet in this country was not yet "independent" and directly depended on telephone networks.

The term "Virtual museum" associated with museum collections was first used when the CD-ROM "The Virtual Museum" of Apple Computer Corporation was presented in 1992 (Miller, 1992). The team of authors, consisting of practicing specialists from Apple Corporation and scientists from New York and Massachusetts universities, in 1992 published the article devoted to virtual museums. In the article, the definition of "virtual museum" was presented as "an interactive electronic museum where users can move from room to room and choose any exhibit in the room for a more detailed examination" (Maksimova, 2013; Olick, 2013). The first virtual museum in Russia appeared in 1994 (Maksimova, 2013).

In the process of research on the Internet, we found the following analogues: Models of several virtual museums of educational organizations; the subjects of the virtual museum of the Ministry of Defense of the Russian Federation (<http://encyclopedia.mil.ru/encyclopedia/museums.htm>); All-Russian Museum of Decorative, Applied and Folk Art (<http://www.vmdpni.ru/museum/index.php>); The Louvre. Virtual tour (<http://www.louvre.fr/>). The Natural History Museum (London, England), Virtual Museum of Canada, Teacher's Centre.

2. The steps of creating a scientific and educational collection:

1. Creation of creative groups of teachers and students. Choice of the form of scientific and educational collection and virtual excursion;

2. Search and selection of the optimal virtual environment;

3. Development of a single structure for placement;

4. Definition of meaningful landmarks;

5. Development of virtual tours.

6. Placement of the collection;

7. Using the contents of a virtual museum.

3. The experience in the development of media education technologies is used today in the Ministry of Internal Affairs of the Russian Federation for the courses "History of Education and Pedagogical Thought", "Theory and Methods of Education," and "Techniques and Technologies for the Work of the Social Teacher" (Tikhomirov & Evseeva, 2015). The creation of a scientific and educational collection allowed future social educators working in the units of the departments for juvenile affairs of the Russian police to better orient themselves in the diversity of approaches and ideas existing in the practice of working with deviant adolescents.

One of the most effective technologies used to implement this project, as practice has shown, is the creation of a virtual museum by students. This involves the organization of museum expositions that promote the socialization of the individual, stimulate her cognitive activity, increase the effectiveness of her education through the introduction of interactive and network forms. The choice of this technology was due to the fact that the virtual (interactive and network) forms significantly expand the scope of the traditional museum and represent a synthetic construction that unites the "museum-exposition", "museum - workshop", "museum - game space, leisure centre", "museum - creative laboratory ».

We would like to single out two aspects in the work on creating a virtual museum. The first is the definition of content, namely the search for necessary information on topics and sections. The second is to provide convenient navigation, which would increase the interactivity of the electronic resource. Based on the analysis of terminology and data structures used in museum activities and the basic requirements usually imposed on the management systems of virtual museums and scientific and educational collections (Maksimova, 2013; Mysheva, 2013), the following modules of the scientific and educational collection were designed and implemented: - the "Anton S. Makarenko as a person, a teacher, a scientist, a writer"; - the module of museum objects and fund groups is the main module that is responsible for the various types and attributes of objects available on the portal. We have created the following functional modules: 1. Biography of Anton S. Makarenko; 2. Anton S. Makarenko: pedagogy of difficult childhood; 3. The problem of homelessness and ways to solve it in the experience of Anton S. Makarenko; 4. The humanistic essence of the educational system of A.S. Makarenko; 5. Educative team - the "field" of development and education of the individual; 6. A.S. Makarenko about education in the family; 7. Anton S. Makarenko is a writer; 8. Pupils of Anton S. Makarenko - teachers; 9. Anton S. Makarenko and A.M. Gorky; 10. The ideas of Anton S. Makarenko in the USSR and Russia.

The exposition module is a module that allows us to create exhibitions in a virtual museum. Lecture module is a structure for creating and using in the educational process video lectures on the history of pedagogy. The module of video lectures was built on the basis of the V.Ya. Kikot` system of remote lectures "Multimedia lecture", supporting interactive demonstration materials with the possibility of expansion, including the museum area (Maksimova, 2016; Milaykin, 2017; Mysheva, 2013).

This module is associated with the development of testing capabilities (based on the Bench test system (bench.nsu.ru)). The search module searches for museum objects, lectures, electronic depositories, and the collection of CD. The reference module is a separate structure that contains reference articles, definitions.

The structure of the information content of the scientific and educational collegium is built on the basis of existing data schemes - open international standards (OIS) and is based on the use of the following basic information structures (BIS):

- persons - with links to the institutions in which Anton S. Makarenko, (scientific biographies, achievements, results, etc.);
- organizations - with links to the institutions in which Anton S. Makarenko, (activities, projects, achievements, major developments, etc.);
- artifacts - with links to organizations and individuals;
- achievements - with links to organizations and individuals;
- projects and developments (development of institutes and scientists);
- key events;
- documents including movies, photos and audio documents;
- catalog of publications (reference resource);
- electronic publications and electronic copies of publications;
- pages - exhibition halls - classification resource;
- thematic collections;

- Catalogs, dictionaries and classifiers, dictionaries - linking resources to a term.

The main activity of the virtual museum is an excursion. During the preparation of the virtual excursion, the following order of methodical requirements and stages was respected: the organizational aspect, goal-setting and motivation; the virtual tour or the independent virtual tour of the proposed route; the choice of the exhibit and preparation of a story about it; the choice of the most interesting story composed during the lesson; the reflection. The preparation of the virtual tour consisted of the following stages: 1) diagnostic; 2) preparatory; 3) performing; 4) final; 5) analytical. Students who have common interests begin to work together, creating working groups in 1-4 stages. Members of these groups can perform different functions: "researchers", "artists", "teachers", "photographers", "animators", "editors", "tour guides".

4. The university's portal can be a solution of the problem. The portal provides the chair of the university not only the opportunity to create its own virtual museum or scientific and educational collection, but also offers tools for its publication in the university's local network or on the Internet. For this, a virtual museum or a scientific and educational collection is created on a remote server. We believe that the exclusion of direct communication between the customer and the developer will simplify, speed up and reduce the cost of creating a virtual museum or scientific collection. The customer's communication with the developer of the museum is replaced by the system of user settings of the portal. The database model is constructed in such a way as to ensure the joint operation of all functional modules that are connected when setting up the system. The developer of the museum offers the customer a number of questions concerning the structural features of the virtual museum. The customer chooses the closest one from the list of proposed answers, characterizing the most accurately the desired settings. Then, in an automatic mode, a website is created using software tools. A virtual museum or a scientific and educational collection has a restricted area, namely the possibility of administration.

The architecture of the collection management system is a content management system (CMS). The architecture is a classic three-tier client-server model with a web browser that implements the function of a universal software client as the only pro-client support. The function of the electronic depository is provided by the SQL server. The conceptual model of the museum data is supported by a specialized application server, which, together with the web server, forms an intermediate level.

The application server, however, is implemented in a special way, different from the generally accepted implementations of such systems: it does not implement a specific data model, but can implement and interpret a large number of data models, according to their descriptions. The most important features of implemented data models are:

1. Data models have some features that are inherent in object-oriented databases, the main one of which is the representation of entities by classes that have methods that allow to integrate the interface layer into the data model.

2. The creation of a complex hypertext space in an information resource, with full support for the integrity of links, is made possible through the implementation of associative context-sensitive relationships. Such directed links can be drawn from a special type of attribute designed to accommodate formatted texts with cross-references, Internet applications and demonstration programs. These attributes contain high-quality images, multimedia encyclopedia, XML documents, some of which are sources of

links. The purpose of such links is database objects. Associative links in the database are typed: each link is an instance of an association that determines from which class to which class a link can be made. The selective data processing can be organized according to the principle of associative linkage to a particular type (Ross, 2013; .

All modules of the scientific and educational collection are implemented in the form of classes and methods in the CMS object-oriented system and stored in the MSSQL database. A specialized tool portal is also designed as a CMS system. The system processes applications of users who intend to create their own museum, adjust museums to the subject area, connect additional functional modules, etc. All settings are generated as a configuration file and saved in the database system. When creating a new museum, an autonomous ".NET" application is automatically executed, which, using the CMS tools and the configuration file, collects a new virtual museum and configures it. The new web resource is registered in the portal and becomes available to both students and those wishing to familiarize themselves with the activities of the university.

7. Conclusion

The scientific and educational collection can be used as a visual aid. The use of such tools contributes to the formation of cognitive motivation in students and provides a more solid assimilation of educational material (Povroznik, 2015; Sidorov, 2017).

The model of the scientific and educational collection "A.S. Makarenko - the person, the teacher, the scientist, the writer », and also interactions of information-educational resources of university have led to following results:

- the creation of an open repository of information educational resources in the field of theory and history of pedagogy, history of the Ministry of Internal Affairs of Russia;
- the optimization of the use of information computer technologies to improve the quality of training of specialists for the departments for juvenile affairs;
- the strengthening, expanding professional and student communities, identifying them, interests, problems and methods of solution;
- the integration of efforts of professional and educational institutions in the field of training (advanced training) of specialists for working with deviant and delinquent adolescents.

This approach, used in museum activities, is the approach of specialized hosting, as well as in the projected generalized conceptual model of the virtual museum and methods of its adjustment to the subject area of the museum, focused on the features of the "small" museum. This solution is of practical value, as it can be used to solve problems of publishing virtual museums and scientific collections in the Internet.

References

- Belkina, Yu.A. (2013). The addressee's factor in designing a regional model of virtual museums in scientific schools. *Izvestiya of the Samara Scientific Centre of the Russian Academy of Sciences*. N 2-3. pp.720-723. [in Rus.]
- Bishop, K. *Radical Museumology* (2014). Moscow, Ad Margin Press, 96 p. [in Rus.]

- Bowen, J.P. (2010). A Brief History of Early Museums Online. *The Rutherford Journal*, V.3. Retrieved from: www.rutherfordjournal.org/article030103.html (date of access: 23.02.2018)
- Bowen, J.P. *Virtual Visits to Virtual Museums. Museums and the Web LLC*. Retrieved from: www.archimuse.com/mw98/papers/bowen/bowen_paper.html (date of access: 19.02.2018)
- Girouda, J.M. (2012). Web based "Global Virtual Museum of Congenital Cardiac Pathology". *Progress in Pediatric Cardiology*. V. 33. Issue 1. January. P. 91-97.
- Huhtamo, E. *On the Origin of the Virtual Museum*. May 26-29, 2002. P.3-4. Retrieved from: https://www.nobelprize.org/nobel_organizations/nobelfoundation/symposia/interdisciplinary/ns120/lectures/huhtamo.pdf (date of circulation: 20.02.2018)
- Maksimova, T.E. (2013). Virtual museums VS traditional museums: advantages of virtual exhibits. Historical, philosophical, political and legal sciences, culturology and art history. *Questions of theory and practice*. N 4. Part 3. P.109-111. [in Rus.]
- Maksimova, T.E. (2016). Recommendations for the creation of virtual museums: the concept, text and visual series, structure and sections. *International scientific journal*. № 1. P. 76-89. [in Rus.]
- Milaykin, E.O. (2017). Virtual museums: history and applied technologies. *Student: electron. scientific journal*. N 19 (19). Retrieved from: <https://sibac.info/journal/student/19/89660> (date of access: 24.03.2018). [in Rus.]
- Miller, G. (1992). The virtual museum: Interactive 3D navigation of a multimedia database. *The Journal of Visualization and Computer Animation*. V.3. Is.3. P.183-197.
- Mysheva, T.P. (2013). Creation of a virtual museum as an effective media education technology in the history of pedagogy. *Media Education*. № 4. P.117-125. [in Rus.]
- Olick, J. (2013). *States of Memory: Continuities, Conflicts and Transformations in National Retrospection*. NY: Duke University Press. 246 p.
- Peter Osborne, (2013). The Fiction of the Contemporary, Anywhere or Not At All. *Philosophy of Contemporary Art*, Verso, London and New York, pp. 15–35.
- Povroznik, N.G. (2015). Virtual museum: preservation and re-presentation of historical and cultural heritage. *Bulletin of Perm University. Series "History"*. N 3 (30). P. 213 - 222. [in Rus.]
- Sidorov, V.A. (2017). Virtual museum space in the context of cultural and educational activities. *Bulletin of Voronezh State University. series: problems of higher education*. N 2. P. 84-88. [in Rus.]
- Tikhomirov, S.N., Evseeva, I.G. (2015). Research competence of cadets and listeners of educational organizations of the Ministry of Internal Affairs of the Russian Federation and the methodology of its formation. In the collection: *Philosophical researches and the present: the collection of scientific works*. Moscow. P. 181-194. [in Rus.]