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ICTs IN MUSEUM EDUCATION

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As classical sociocultural institutions, museums actively conduct educational activities with the use of modern information technologies. The integration of educational and technological practices in the museum environment defines the field in which it is necessary to demonstrate a compelling combination of classical, traditional and new goals and tools of museum pedagogical communications.

The modern museum combines two attitudes to interaction with ICTs – media creativity and media skepticism. Media creativity implies a broad application of ICTs in the museum and serves as the foundation for state-of-the-art strategies in this area. At the same time, facts show that while accentuating the dangers of having modern technologies in the museum environment, skepticism towards the use of ICTs contributes to their non-invasive coexistence with such traditional and fundamental ideals and norms of museum communication as silent contemplation and deep understanding of objects and spaces. The unity of media creativity and media skepticism with a heavier focus on the former is viewed further as the basis of a perspective policy on ICTs in museum education.

In today's museum, ICTs serve to address three main goals: 1) to improve the museum's overall functioning; 2) to transform objects and space in the museum (e.g. a media installation can become an authentic museum exhibit item, or a computer terminal can greet guests in a museum room); 3) to provide new interactive opportunities for museum visitors.

The use of ICTs for working with museum audiences is defined by a combination of four interdependent approaches: the image approach, the service approach, the enlightenment approach and the educational approach.

The image approach allows museums to generate positive attention from various groups of society – the government and business elite, the media, etc. It contributes to building the foundation of reliable knowledge about museums. The service approach is addressed to audiences with digital communication skills and humanitarian interests. The enlightenment approach is addressed to audiences that view museums mainly as sources of knowledge and content. The educational approach is presented in the next sections of this Policy Brief.

ICTs IN EDUCATIONAL ACTIVITIES OF MUSEUMS

The key change in today's museum is associated with new distinguishing features of the museum patron. Generations of twenty-first century museum patrons have new visual abilities, which are integrated in the information and communication vision. This vision is based on the pragmatic selection of visual information and on the use of formatted and packaged data that arrives via several channels simultaneously and is processed at a high speed. The information and communication vision supports the perception of dynamic visual information, including video clips. At the same time, the ability to perceive motionless objects decreases. The information and communication vision is organic for person-to-computer interaction and office activities. However, it is the classical (traditional) visual thinking skills that are in demand at the museum environment.

Museum visitors actively use modern technological devices on a regular basis, and this experience affects their perception of museum objects.

The information and communication vision and the use of modern devices are integrated in the technology of augmented reality: young people select and view museum exhibit items on the screen of their personal ICT devices and simultaneously receive information on the chosen items. Using the screen as a facilitator in the personal interaction between the visitor and the museum represents a new experience that has no precedents in the history of culture. It underscores the problem of visual ecology in museum communications, the unity of traditional and new ways of perceiving museum objects.

Thus, the museum becomes the space for the realization of our abilities, those that have been accumulated over the centuries of human history, and those that have been formed recently to meet the demands of modern-day life and its information environment.

Let's look at the goals of ICTs in the museum education process:

- to create favorable conditions for new experiences of perception and interpretation of museum objects and spaces, which are possible thanks to the means of research and analysis that had been unavailable until recently;
- to create a multimodal interactive environment for active adoption and research of museum values;
- to achieve a new quality of cooperation and interaction of museum educators and to enhance their professional development;
- to shape visual culture as the key element in the development of personal creativity.

ICTs have changed the structure of the museum audience: visitors of museum sites have joined the ranks of traditional museum goers at the end of the twentieth century. People visit museum websites for a number of reasons. Here are some of the most important ones:

- People make inquiries on specific exhibitions.
- They enhance their overall cultural background.
- They view web surfing as a leisure activity.
- They are accustomed to online services.
- They satisfy their educational or professional information needs.

The museum community has a distinct view on museum website visitors and treats them as a member group of the museum audience. Therefore, the museum system of information and education activities should be revised with this new target group in mind.

In the 1990s and 2000s, many museums around the world developed their own task-specific pedagogical activities jointly with educational institutions. A key element to the effectiveness of those activities is the formation and realization of museum-and-education programs that define the goals, objectives, stages and expected results of the process of introducing the younger generations to museum values in museums and educational institutions.

Art museums are particularly important in this regard. As underlined by UNESCO in its *Art Education Road Map*, "the use of new technologies raises a role of art education and assigns new functions to teachers of art disciplines in the twenty-first century. New technologies can form an important basis of cooperation between teachers of art disciplines, and also between teachers of art disciplines, creative specialists, scientific and other educators" [1]. ICT integration in museum education should be seen as a complex proposition based on the principle that technology provision is only a tool for designing learning environments.

Policy- and decision-makers should play a key role in maintaining these developments through proactive strategies, which promote investment and allow museum education to benefit from technological innovations.

ICTs are among the key tools of modern museum education systems. Successful development of museum education doesn't depend only on the ICT infrastructure, but is strongly influenced by ICT competencies of the teacher. Insufficient museum-and-education resources for teachers and school students and a lack of standards and recommendations on museum educator ICT competencies hinder the progress of museum education. UNESCO's *ICT Competency Framework for Teachers* contains general recommendations to strengthen teachers' professional capacity in the field of ICTs. As the target audience of these recommendations, museum educators should take them into consideration.

New legal documents are necessary to address the following issues:

- terms of use of museum information (images, texts) in children and adult education outside the museum environment;
- conditions of inclusion of museum guided tours, creative workshops and related travel to museum destinations into the existing curricula of educational institutions;
- the teacher's rights and duties while working at museum expositions and with museum educational resources;
- information security in the museum and the security of its data in the wireless communication environment.

ICTs help to establish productive relationships between museum educators, teachers and young people:

- ICTs generate additional attention to particular exhibitions.
- They form new algorithms of perception and understanding of the museum and its exhibition space.
- They help museum educators improve their pedagogical skills that were formed in the pre-computer era.

The Internet, multimedia programs, etc. equip the museum teacher with an opportunity to engage into a dialogue with the younger generations. But "rare examples of educational products developed by museums offer the most advanced methods for integrating ICTs and arts aiming at creative personal development" [2]. This is directly related to the necessity to improve ICT skills of museum employees.

Museum educators should have general and specific ICT competencies.

General requirements to ICT competencies for the museum educator are identical to those for other education professionals. The museum educator: 1) can use office equipment, and is proficient with applications that deal with texts, tables and images; 2) can find required information on the Internet, save it in appropriate formats and retrieve for further work; 3) uses ICTs for professional communications; 4) cooperates with ICT experts (system administrators, designers, programmers, site managers, etc.) and understands their areas of specialization.

Special requirements to ICT competencies of the museum educator imply that he or she: 1) can use computer multimedia programs, Internet resources, and text and image processors to foster the creative growth of individuals in the museum education process; 2) participates in the development of technologically motivated scenarios of computer multimedia programs, web-based resources, and distance learning courses for museum education; 3) uses ICTs when organizing museum-oriented communicative, educational, social and cultural projects; 4) develops methodologies for applying ICTs in the museum education process; 5) applies ICTs when analyzing and researching museum education issues and social and cultural issues, and understands their importance in today's society; 6) ensures health and information safety of ICTs in the museum education process; 7) uses understanding of the information society, ICTs and the areas of their application for teaching children and adults in the design of relevant museum education activities.

Currently, two approaches to ICTs in museum education prevail. In the first one, museum experts specify particular devices and applications that help solve educational tasks in the museum. Regardless the number of such devices and applications, they become outdated very quickly and therefore cannot serve as reliable reference points for museum educators in the long term. According to the second approach, the choice of ICT tools should meet the requirements of the museum education process and address the educational needs of the museum audience. In this case, the boundaries of entertainment, information and education domains in the museum context should be clearly defined.

Museum websites[1], blogs[2], mobile applications, including augmented reality and geolocation applications[3], distance and mobile learning tools[4] form the museum information environment for informal and non-formal education. Virtual representations of museum collections (e.g. http://www.googleartproject.com) and virtual museums (i.e. collections that exist exclusively in the virtual environment, e.g. http://www.europeanvirtualmuseum.net, http://www.museum.ru/primitiv) provide vast learning opportunities for new categories of museum goers. The museum information environment complements our knowledge of the information potential of civilization and culture, enriches our understanding of career opportunities and professional development. It promotes a synergy between formal, non-formal and informal learning within the lifelong learning model.

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[1] Examples of educational resources on museum websites: http://www.hermitagemuseum.org/html_En/06/hm6_0.html, http://www.amnh.org/ology, http://edu.warhol.org, http://www.theirpast-yourfuture.org.uk, http//www.britishmuseum.org/learning.aspx

[2] Museum blogs with posts on museum education, two pilot examples: http://www.museumnext.org/2010, http://museumtwo.blogspot.com

[3] An example of augmented reality in the museum education: http://www.britishmuseum.org/whats_on/events_calendar/samsung_events/passport_to_the_afterlife.aspx

[4] Examples of mobile learning programs: http://newlearninginstitute.org/content/edlab-mobile-learning-institute-national-postal-museum, http://newlearninginstitute.org/digital-media-programs/2011-summer-programs/smithsonian-institute-launches-artlab-series

Technological innovations in museum education come across two kinds of difficulties:

- Compared to their younger audiences, museum educators clearly lag behind in the adoption of new ICTs.
- Today's devices and applications can undermine the traditional norms and situations of museum communications.

The first issue can be addressed through sustainable efforts to improve technology awareness of museum educators and by involving creative youth into the design of museum education programs and means of implementation of these programs.

The second issue is characterized by the following factors:

- The intrusion of mobile or stationary screens into the visual space between a museum object and its viewer disrupts the perception of this object.
- Technology undermines the integrity of perception and comprehension of the cultural heritage in the museum environment.
- There is a growing trend towards the replacement of direct interpersonal dialogues in the museum environment (with parents, friends and museum educators) with technology-mediated communications.

To address this issue thoroughly, it is necessary to work out the strategy *Museum Foundations and Their Transformation at a Time of Technological Innovations*. This should be done with careful consideration of opinions expressed in the museum community, public expectations associated with museum development and perspectives of technology advancements. The strategy will ensure the balance of positive factors and risk factors in the course of integration of technologies into the museum environment.

SYSTEM OF MUSEUM DISTANCE LEARNING

The museum has a special mission – to reveal the values of classical culture to the younger generations by following their naturally formed interests and social experiences. In light of this mission, functional resources of the distance learning model and its attractiveness for children and youth are viewed as valuable assets for the museum educator.

The analysis of modern museum distance learning solutions in Europe and America shows the following trends:

- Museums actively develop distance learning opportunities based on their own collections through their official websites.
- Distance learning courses are distinguished from other Internet services offered by museums.
- Distance learning courses are listed in the category of paid services.

- Distance learning is addressed to people with various physical abilities and education needs.
- Museums use latest technological innovations (first of all, those popular with youth).
- Collaboration of various museums helps them improve resource development.
- High-quality resources of distance learning require considerable private, corporate or state investments.

The fundamental situation of museum distance learning is described by two statements:

- The museum defines subjects and types of student activities that involve its digital resources in the education process.
- Motivated and result-oriented work with digital museum resources provides for further communication with actual museum objects.

At today's stage in the development of museum business, information and communication and education technologies, one can clearly see that the creation of an innovative sustainable system of museum distance learning should be viewed as an attainable goal.

The system of museum distance learning can be defined in the following aspects.

In the aspect of content, distance learning implies additional education for children and adults, as well as retraining for museum employees based on modern museum and education research and approaches, achievements in the humanitarian knowledge and disciplines relevant to the museum's focus. Leading scientists, methodologists and museum business practitioners should participate in this process, which should be carried out on terms most convenient for everyone involved.

In the aspect of equipment and technology, distance learning implies that territorially distributed hardware-and-software solutions are connected to the global computing network and provides for efficient training based on distance learning museum technologies.

In the aspect of structure and organization, distance learning implies listeners (students, users), administrators, technical experts, teachers (tutors), museum methodologists and authors of programs. It also implies didactic materials and other relevant tools.

The goals of the museum distance learning system are: 1) to use opportunities of the twenty-first century in order to accomplish the sociocultural mission of the museum and to incorporate new museum resources into the system of lifelong education; 2) to improve interaction efficiency of museums in popularizing museum collections via educational activities; 3) to realize the innovation potential of the museum community and the education system in children and adult education.

Museum distance learning is focused on bringing the values of the museum environment closer to museum audiences. These values are:

- museum objects – exhibit items presented as cultural values;
- the emotional and spiritual atmosphere of the museum;
- the logic of expositions and their visual organization, their esthetics;
- a set of self-imposed requirements to the museum's place in society, and to the representation of its corporate image to its audiences.

The system of museum distance learning is addressed to prospective students of all age groups with various physical and social abilities.

The system of museum distance learning represents an innovative direction for Russian museums[5] due to a number of first-time situations:

- Distance courses are developed in specific museums in such a way that their content can be interesting for museum audiences in all the regions of Russia and their pedagogical support can be carried out by tutors in local museums.
- Regional modules will be developed in addition to the general content of museum courses. The didactics of these modules is applicable for any system of museum education, and their content is based on collections of individual local museums.
- Distance learning is accompanied by thematic guided tours at museum expositions. Museum and education tourism resources will be used in the organization of this system.

We deem it appropriate to define some general professional requirements to museum distance learning specialists: 1) to plan the use of distance learning technologies jointly with museum educators, visitors and partners; 2) to organize the museum education process on the basis of distance learning technologies; 3) to provide content, organization and technical support to existing and potential users of distance learning courses; 4) to gather and analyze information on the efficiency of museum distance learning; 5) to maintain security and updates of museum distance learning systems.

Professionals involved in museum distance learning initiatives should be aware of the advantages of mobility and cloud computing, and view those as future channels of growth when designing new or improving existing distance learning systems.

[5] The system of museum distance learning in Russia is initiated by the Russian Centre of Museum Pedagogy and Children's Creativity of the State Russian Museum in Saint Petersburg (http://muzped.net, http://www.rusmuseum.ru/eng/home) in cooperation with the Union of Russian Museums and with support from the Boris Yeltsin Presidential Center and the Yeltsin Foundation.

CONCLUSIONS AND RECOMMENDATIONS

Despite certain achievements in the use of ICTs in informal and non-formal learning in the museum environment, it is necessary to emphasize several problems:

- There is a gap between public expectations from ICTs, their state of the art, and actual ICT skills of museum employees.
- There is a significant need in legislative, science and methodology frameworks to govern the use of ICTs in museum education.
- Key competencies necessary to apply ICTs in museum education have been defined but haven't generated enough professional discussion and therefore are not practiced.

Socio-professional consensus as an important element of responsible policy-making for ICTs in museum education:

- is based on key values of the museum environment;
- reflects on changes in the visual sociocultural environment and in human interaction with the world;
- urges museum specialists to apply creative approaches, which at the same time should be checked for appropriateness in museum education communications.

In museum education activities, it is necessary to apply ICTs creatively to solve the following actual tasks:

- to use and create digital educational resources to work with visitors on expositions, in museum rooms and studios, and for self-education of all audiences;
- to use and create an informative, educational and entertaining virtual environment connected to museum expositions and studios;
- to create a system of museum distance learning based on global network and case technologies and further integrate it with mobile training technologies;
- to implement projects that integrate communicative, representative and educational opportunities of the museum environment, including its virtual and multimedia components;
- to use Web 2.0 services and technologies of augmented reality in museum education.

Positive changes and successful innovations in the process of applying ICTs in museum education demand a greater adoption of respective competencies by museum educators. These competencies should be widely discussed at professional conferences, round tables and in publications and subsequently included in basic and advanced training programs for museum educators.

To develop a strategy on the use of ICTs in museum education, it is necessary to establish experimental collaborations between IT companies, museum administrations and education departments (in the areas of device and application development, etc.). Youth and children should be involved in the preparation and evaluation of ICT solutions for museum education and self-education. Legal, science and methodology foundations regulating the use of ICTs in museum education should be developed through joint efforts of museum employees, psychologists, teachers, technology researchers and legal advisers, with interdisciplinary project grant support from governments and socially responsible companies.

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The key objective of this Policy Brief is to analyze current requirements to ICTs in museum education. The Policy Brief contains a general overview of ICT implementation strategies in museum education worldwide, as well as the description of challenges of integrating ICTs into the museum education environment, and provides recommendations for organizers, managers and implementers of museum education policies and activities.

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