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Perspectives of Sustainable Development for the Italian University Museums

Introduction

Italian Universities are, among the oldest institutions, repositories of an extraordinary heritage that contributes to define the national cultural identity. The ancient tradition of the Universities is today preserved in a plurality of collections, and cultural institutions: among these museums, historical archives, libraries, botanical gardens, astronomical observatories, monuments, and the academic seats themselves. In this scenario, university museums are like one of the main narrative contexts of the history of academic institutions, representing a very relevant aspect, still partly submerged, of the historical, scientific, and artistic culture of the Country [23].

Thanks to two projects approved and financed by the Ministry of University and Research, many of the Italian university museums, joined for the first time in the Network, coordinated by the University of Modena and Reggio Emilia, have created a web portal. For this web portal the Network has realized narrative visit paths through the most significant objects of their collections, to be continued through the discovery of their territories, and experiential educational paths dedicated to the scientific method, with workshops in the museums [27]. These paths, already foreseen to be used online but also on site in the museums, have proved to be fundamental during the long period of pandemic that forced the museums to close and to use only virtual tools to keep in touch with their students and public.

During the pandemic, the Network's virtual activity continued with the creation of a new online, quarterly, bilingual magazine, the University Heritage, a virtual platform to share experiences among the university museums but also with all professional involved in the conservation, valorization, and protection of cultural heritage [30]. The magazine provides an interdisciplinary approach to the issues of good practices of sustainability, accessibility, and participation in the new digital culture. It aims at reaching an increasingly wide and varied audience also through the use of social networks.

An important milestone for Italian university museums has been the census promoted by CRUI (Conference of the Rectors of Italian Universities) among all Italian universities to check the presence of museums, their number, organization, main characteristics, functions, and activities. The results of this census with the characteristics of the 210 museums of 39 Italian universities will be published on a portal specifically created by CRUI (museiuniversitari.it).

This census can become a fundamental tool in view of the creation of an Observatory of Italian University Museums for accreditation in the National Museum System [26] constituted in 2018 with a decree (n. 113/2018) of the Minister of Cultural Heritage, Activities, and Tourism, now Minister of Culture.

The System has been activated and it's a work in progress: it will be a network consisting of museums and state cultural places, as well as museums and places not belonging to the state, both public and private.

The narrative paths for the Italian University Museums Network website

In 2012, twelve historical Italian Universities (Bari, Cagliari, Chieti-Pescara, Ferrara, Florence, Modena and Reggio Emilia, Parma, Perugia, Rome "The Sapienza", Salento, Siena, Tuscia), with the coordination of Modena and Reggio Emilia constituted the first Italian Universities Museums Network [31]. The following year the Network presented a project on information technologies and new realities for knowledge, networking, and enhancement of the scientific cultural heritage, approved and financed by the Ministry of University and Research, within the law 6/2000 for the diffusion of the scientific culture. The greatest challenge of this project was the creation of the Network web bilingual portal to disseminate accessible contents through narrative paths realized by 64 museums, 38 collections, and 9 botanical gardens involved in the project [7]. Through them, the web portal can activate and promote a wider audience's interest and emotional involvement. The digital technologies, characterized by a good usability and accessibility level, can guarantee interesting paths usable both online and onsite as in-depth tools for museum exhibitions through a lot of multimedia illustrative materials [8]. In the web portal each information object is going to be related with others in order to create a net of connections, linking concepts, images and situations, which the user can surf in infinite ways and directions according to his or her interests and capacity to rule the complexity of the relations [16]. The originality of the project stands in the prospect of integration among the competences of the various members of the University Museum Network as well as in the integrated system which is able to create links, sharing dialogues and communications. The project can contribute to the diffusion of scientific culture producing exhibitions and editorial materials publication, stimulate the e-learning to develop the university museums educational role, encouraging onsite education, lifelong learning in museums. Promoting development of relations with stakeholders, the project can increase the university museums visibility, engaging and involving publics diversified. For the bilingual portal, the museums of the Network have monitored their collections in order to verify their conservation and documentation, as well as to identify the most significant specimens to insert them in a coherent relation, for their the symbolic value, with four thematic narrative paths: environments, landscapes, stories, and history of scientific instruments [10].

The museums of the Network have identified 28 000 specimens that have been described in detail, by each museum, within 17 specific catalog cards, corresponding to the same number of subject areas and to twelve disciplines fundamental to implement the paths in an inter- and trans-disciplinary way [9]. The cards are managed by the Central Institute for Catalogue and Documentation (ICCD) [3] of the Ministry of Culture through the SIGEC web (General Catalog Information System on the web)[4] for the realization of the General Catalog of Cultural Heritage [2]. In particular, the project of the Network has allowed to experiment, through the systematic use by the various university museums, 6 cards dedicated to naturalistic heritage, realized more recently, for Botany (BNB), Mineralogy (BNM), Paleontology (BNP; Petrology (BNPE), Planetology (BNPL), Zoology (BNZ)[5].

For the cataloguing, photographic shots of each specimens have also been made, which are essential to complete the cataloguing cards, for their correct identification and conservation. The photographs are fundamental to illustrate the thematic narrative paths and for their multimedia documentation. To complete the cataloguing activity, a manual (currently work in progress) has been drawn up, in collaboration with the ICCD, in which the testing of the 6 cards for the naturalistic heritage, the AT card for the anatomical specimens, and a specific MODI card for the copies and casts are included [6]. This testing is very useful for the project now in progress to realize ontological models for the cultural heritage description [1].

For the web portal 80 narrative paths have been realized, 19 dedicated to landscapes, 18 to environments, 25 to stories and 9 to history of the Universities involved in the project, 9 to the histories of scientific instrumentation. They have been structured in order to contextualize, through both historical and territorial frameworks, significant collections and to strengthen the semantic value of the specimens identified and chosen by individual museums for their specific value within the four general themes. These four themes have created multiple contexts that explain the relationships between objects and exhibits, not often easily understood upon their displaying [11].

The university museums of the Network, developing a narrative approach to information, have intended to activate an effective web-based communication and dissemination strategy, able to overcome the limits that an exhibition can have, taking advantage of the fact that the same specimen can be virtually inserted in numerous itineraries through the multimedia tool providing possible and multidisciplinary references and becoming a starting point for multiple links to other resources of all kinds [8].

The 19 paths dedicated to the landscapes belong the anthropic environments in which human beings and nature interact. The reference system develops on three axis: space, time, and disciplinary area. The same three axis system belonging to the landscape paths is also applied to the 18 paths dedicated to the environments. As for the collections referring to the landscapes, each specimen or collection provides every possible information on time, space, and disciplinary area. Characteristics of the whole itinerary are its interconnections, the possibility to jump from one object to other, from a typology to other, from one University to other [18].

The 25 narrative paths for the stories are based on the biographies of distinguished professors whose research has been fundamental to the advancement of various disciplines and on their contribution for the origin, growing, and valorization of the university collections. The 9 narrative paths for the history of the universities illustrate the history and development of the various Italian universities, which are key structures of Italian culture [14].

For the 9 paths dedicated to history of scientific instruments, the museums of the Network started from the assumption that the old Universities retain a wide range of scientific instruments collected and treasured during the centuries and from the relations between the instrumental equipment, its employment, and the various cultural connections developed during the research. The availability of a wide variety of technological equipment allows itinerary articulation under a triple profile: historical, as it is possible to reproduce the technological evolution and the development of the techniques for scientific investigations; instrumental, as starting from the analysis of the ancient technologies it's possible to verify the rash development of the new techniques that have supplanted the old ones; didactic, as the instruments have developed

towards models with research and didactic finalities: this is the reason why the ancient instruments still keep their role.

The chosen parameters for the development of each path are chronology, scientific disciplinary sector, and the application field.

On the bilingual web portal, a similar interface has been created for each of the four sections of thematic paths that provides different ways to access different interactive menus on the same page: the paths, the geographic area, the disciplinary areas, and a timeline.

The contextualization of the objects/specimens within the different paths wants to be a stimulus to appreciate the museum, helping also to explore the collections and to trace new visits on the territory to recognize the most important monumental and natural testimonies and promote their preservation. This narrative approach to information is fundamental to increase the attractiveness of museums, their collections and territories, describing the ways in which a specimens connects to others, places, people, theories, and scientific discoveries.

Through this digital storytelling the museums of the Network have expanded and diversified cultural communication engaging diversified audiences.

The experiential educative paths for the Italian University Museums Network website

The Network of Italian University Museums, being aware of the great potential of its web portal to develop educational programs for the diffusion of scientific culture, in 2015 started a second project, also according to the main goals of the third mission of Italian Universities, after research and teaching, concerning scientific, technological and cultural transfer activities and the productive transformation of knowledge. In this project, approved and financed by the Ministry of the University and Research within the same law 6/2000 for the diffusion of the scientific culture [31], two more Universities, Genova and Pavia, and the Civic Museums of Reggio Emilia, always with the coordination of the University of Modena and Reggio Emilia, have been involved. The main goal was the realization of experiential educational paths to orient the students to the scientific method and culture [12].

The vision of the Network second project is the guidance to the scientific method as an important task to attribute a new social role to the university museums, a prospect of integration among the competences of the various members of the Italian University Museum Network to realize an integrated system for lifelong guidance able to create links, sharing, dialogues, and communications and to insert the orientation to the scientific culture in the guidelines of the European Lifelong Guidance Policy Network [24], through the role of the university museums according to the Orientation service of each University.

The target of this second project of the Network are the high-school students (particularly those of the last two years) to guide them towards university studies and job market, but also high-school teachers, the students' parents/families, cultural mediators, i.e. young professionals who will realize and manage the project activities. For them the university professors and the museums curators did a special training with literature and specific experiences into the museums [15].

The different disciplinary fields represented by the variety of the collections allow to establish and adopt common procedures to produce several educational experiential paths to transmit to the students, trough museums visits and laboratorial experiences, the accuracy of

the scientific method which underlies every discipline, focusing how the evaluation of research is subjected to a precise, replicable, and comparable acquisition of data. Starting from the formation and preservation of museums scientific collections as archives of knowledge built up during the centuries, the praxis of simple experimental activities, laboratories, and stages within the fascinating context of the museums permit the development of paths from and back to school through the working out of brief essays both individual or collective which meet the requirements of the experimental approach in particular the method rigor, control, and experiments reproducibility, distinction between results and inferences [18].

56 educational paths are achieved by combining two approaches: generalist school education with university education, which is highly specialized, experimental and technically advanced, to transmit the complexity of the scientific approach through the variety of collections related to multiple disciplines characterizing the Italian university museums and to trace back the history of the various disciplines through the study of the their collections representative of the scientific research, and their historical development. These paths employing the ICT are able to better stimulate and accompany the active student learning processes [22].

All the paths [54] are realized by the museums of the Network to create contexts for non formal and informal learning, to integrate and innovate the standard techniques of formal education in order to develop a new engagement to learning for the global skills: knowledge and understanding, activity, behavior and progression, enjoyment, inspiration, creativity, attitudes, and value [13].

All the 56 paths created with their underlying philosophies and different approaches to learning could be an example of five possible types of learning enhanced with information technologies: distributive learning, that is constructing and sharing interpretation; authentic tasks and complex inquiry, because the availability of large online archives allows researches and complex expression of their conclusions; dialogic learning, because interactive technologies allow for asynchronous and synchronous learning experiences and provide spaces for conversations and exposure; constructive learning, as technologies create environments for interdisciplinary and intellectual connections; public accountability, as it is easier to share the work, raise the stakes of participation; reflective and critical thinking.

All the 56 experiential educational paths of non-formal education, published in the second section of the web portal of the Network [27], are realized with the same structure: conceptual map, general objective, specific objective, how to achieve it, the method, path articulation, path detailed description, bibliography, sitography.

The paths are dedicated to three thematic areas, biodiversity and agrobiodiversity, color and time. In these three thematic areas, graphically represented through a conceptual map, created to summarize the process of developing the theme, 9 paths are dedicated to biodiversity and agrobiodiversity, the others 47 to the color and to the time: also all the paths are graphically represented by conceptual maps. For the color 9 paths are dedicated to the color in nature, 7 to the color in art and science, 4 to the color in Physics [20]. For the time 10 paths are dedicated to the Geology and the fossils, 6 to the measurement of the time, 9 to the human evolution, 2 to the evolution of Antarctica.

In order to evaluate the progress of the project, questionnaires were developed to be administered online, one for the teachers and others for the students, dedicated to each path, with a

common part to test the students' knowledge, skills, interests and curiosity. In the web portal, detailed results of the development of each path have been published [14].

The 23 Educational Paths dedicated to "work related learning projects"

The pathways dedicated to work-related learning, recently named pathways for transversal skills and orientation, are a formative stage experience for the students of the last three years of the high school. Thanks to a law for the reform of the national education and training system (107/2015) called "the good school", the students can be involved in a stage with the purpose of combining the "knowing" and the "knowing how/being able to do", opening the school didactics to the external reality.

The museums of the Network have developed 23 educational paths to shape programs that effectively engage students in work-related experiences with a reference to museum activities, laboratories, and professional profiles of the people who work in the field.

These educational paths are dedicated to the same themes used for the first and the second project: environments, landscapes, stories, scientific instruments, biodiversity, color, and time [17].

They have a structure similar to the experiential educational paths realized by the Network museums for the second project: a conceptual map to illustrate the process of developing the educational pathway, a general and a disciplinary objective, how to achieve it, and also the articulation of the path, workshop activities, the use of new technologies, the acquisition of knowledge and skills, and the dissemination of results.

At the end, a report has been elaborated and published in the web portal. Moreover, to verify criticality the development of each path, the questionnaire published in the printed guide to School Work Alternation was administered online to each student at the end of each school year.

The new online magazine University Heritage

This difficult period of pandemic, on one hand, forced the closure of museums, on the other, it enhanced the planning of virtual paths for public and for students, the involvement with the museum objects from ancient or recent past, each one with its own story. In order to maintain a close relationship with the public, the strengthening of multimedia tools and social networks has become increasingly necessary. Within the Network of the Italian University Museums, the curators of 22 Italian university museums promoted a bilingual online magazine, University Heritage [30]. It's a virtual platform to share experiences not only among the university museums but also with all professionals involved in conservation, valorization, not only and protection of cultural heritage.

The magazine aims at being an open space for spreading of research, insights, and experiments on heritage, as a tool of knowledge and integration for the cultural memories of communities. It provides an interdisciplinary approach to the issues of good practices of sustainability, accessibility, and participation in the new digital culture as well as to the use of storytelling and gamification. The first six issues of the magazine are the result of a shared work, which highlights a wide range of professionals dealing with multiple aspects of cultural heritage.

The new digital showcase of the entire University Museum system

In order to have a general picture of 210 museums of the Italian Universities, CRUI (Conference of the Rectors of Italian Universities) has promoted the first census among all the 87 Italian Universities, from which it emerged that 39 of them have museums but with diversified managements: 28 have museum a coordinating body, Pole or System or Centre. The census, the first step towards the creation of a coordinated system, will be published in a dedicated web portal (museiuniversitari.it) to represent a digital showcase of the university museums system, built on the basis of the information collected in the census and referring to the years 2017–2019, in order to offer the user an overall view while enhancing the specificity of each museum and giving visibility to the society and the territory of reference. Through this detailed census it is possible to know the characteristics, history, images, subject areas, size of exhibition spaces, barrier-free access, number of objects, and number of visitors for each museum. In addition, the services that each museum offers to the public, opening hours, social inclusion activities, educational activities for schools and university students, the catalogue/guide, and scientific publications. This detailed census can become a fundamental tool in view of the possible creation of the Observatory of Italian University Museums for accreditation in the National Museum System.

The National Museum System

The National Museum System, constituted in 2018 with a decree (no. 113/2018) of the Minister of Cultural Heritage, Activities, and Tourism, now Minister of Culture, has been activated. It will be a network consisting of museums and state cultural places, as well as museums and places not owned by the state, both public and private which are to be accredited for an unified vision of the development of Italian museums regardless of their ownership, size, type, and form of management [26].

The implementation of the National Museum System takes place by means of an accreditation carried out through an articulated questionnaire on a voluntary basis, based on very advanced quality levels, the LUQ (Uniform Quality Levels), which will makes it possible to verify their activities in three most significant macro areas: organization, legal and economic management of the collections, and relationship to the surroundings [21].

The National Museum System is open, participated, integrated into the territory, founded on the voluntary participation of museums and based on the possession of common requisites.

It arises from the need to define shared rules that guarantee preservation and public use of cultural heritage in harmony with international principles and best practices, first of all with the Code of ethics for museums of the International Council of Museums (ICOM) [25], with the UNESCO Recommendation concerning the protection and promotion of museums and collections, their diversity and their role in society, adopted by the General Conference at its 38th Session in Paris (17 November 2015), and with the *Resolution passed by Association of University Museums at International Conference "Academic heritage for the future of science" (28.04.2022, Warsaw)* [28].

The creation of the National Museum System is founded on Italian ministerial guidelines. The technical and scientific criteria regarding standards for the functioning and development of museums was written in a decree by the Ministry of Cultural Heritage and Activities, now Ministry of Culture, on May 10, 2001, which combines the need for conservation, enjoyment,

and promotion of museums, identifying minimum standards in eight areas: legal status, financial structure, museum structure, personnel, museum security, management and care of collections, museum relations with the public and related services, relations with the territory [29].

The System may be a relevant opportunity to verify the museums proper functioning, their educational and social function, and may constitute a useful contribution to the improvement of the museums by helping them to elaborate rules and guidelines for a correct management of the collections, for a wide openness to the contemporary society to become well-being multipliers and an opportunity for an economic and sustainable development in the respect of regional and provincial autonomies and of their different kinds.

In case of lack of some requisites by a museum, an adjustment path will be available in order to reach them and to join the National Museum System. For this adjustment path, the governing bodies of the Universities will have to commit formally.

Inevitably, the Universities will be faced with important choices for the future of their museums, if they want to be part of the System and become part of a national network that will enable them to share knowledge and exchange good practices for a common development.

The National Museum System is based much more on the inter-connections than on the ownership of the museums themselves, fostering collaboration between the central Government, Regions, Municipalities, other local authorities, Universities, and the entire educational system, in order to create a shared process, aimed at improving management culture not only of the museums, but also of the entire cultural heritage of Italy Culture. The possibility of connecting approximately the Italian museums is fundamental to consolidate meaning and value of their cultural heritage and to promote significant development of cultural tourism.

For the activation of the National Museum System, a commission has been established (art. 3 DM 113/2018) in the Department of Museums of the Ministry of Cultural Heritage Activities and Tourism, now Ministry of Culture; the commission is chaired by the Director-General of Museums.

The connection and the accreditation of museums, able to reach the minimum quality levels, will allow the cooperation with the new Central Institute for the Digitization of Cultural Heritage of the Ministry of Culture.

A national accreditation system, respecting regional and provincial autonomy along with the different types of museums or cultural sites, in addition to the promotion of the development of culture, can generate economies of scale, in particular for the shared development of professional skills and services with specific reference to the training of staff.

A homogeneous model for the fruition of cultural institutions and sites, uniform and verifiable procedures for the conservation and enhancement of buildings, places, collections, codes of conduct, and shared museum policy guidelines, will guarantee quality access to visitors and an improvement in the protection of Italy's cultural heritage.

The creation of a national accreditation system responds to international best practices, in particular, in some Latin countries, such as France, Spain, and Portugal and in some Eastern European countries, such as Latvia and Poland, where a law is defining the basic rules and principles that govern the creation and management of museums, their functions and activities, while regulations, decrees, and circulars specify the requirements and procedures for accreditation in a network or in a museum system.

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Title. Perspectives of Sustainable Development for the Italian University Museums

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Abstract. The Italian university museums are characterized by the multiple disciplines they represent, both scientific and artistic. The article presents some future perspectives of sustainable development that can be obtained as the result of their activities in the network and attempts to overcome the difficulties of their organizations with different management systems, in many cases still connected to the departments of reference. The starting point is the first census made by the Rectors of Italian Universities Conference (CRUI). From this census, a detailed review of the museum heritage of 39 Italian Universities and their organization is emerged. It can make possible the creation of a National Observatory which is essential first of all to offer advice for the accreditation procedures provided by the National Museum System. Through this accreditation, the university museums will be able to join the network of the Italian museums and cultural places (state, public, and private) for a unified vision of the development of Italian museums regardless of their ownership, size, type, and form of management to create a governance of heritage based on sustainability, innovation, participation, and accessibility. The accreditation will allow to strengthen their mutual knowledge and a useful exchange of good practices for a common development and to verify their organization, the management of their juridical and economic profiles, of their collections and their relationships with their regions. Since the university museums lacked an updated space to rapidly disseminate the free expressions of their ideas and projects and to keep in touch with all professionals involved in conservation, valorization, and protection of cultural heritage, an online bilingual monthly magazine was created.

Keywords: university museum, National Museum System, network, education, online magazine, educational path

Название статьи. Перспективы устойчивого развития итальянских университетских музеев

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Аннотация. Музеи итальянских университетов характеризуются разнообразной направленностью, как научной, так и художественной. В статье предпринята попытка представить некоторые перспективы устойчивого развития, которые могут возникнуть в результате объединения музеев в единую сеть, и преодолеть сложности их организационных структур, в которых применяются различные системы управления, во многих случаях все ещё связанных с отделами, соответствующими тематике музея. Отправной точкой является первая перепись, проведенная конференцией ректоров итальянских университетов (CRUI): результаты. Из этой переписи, опубликованной на специальном веб-портале, сделан подробный обзор музейного наследия 39 итальянских университетов, а также форм его организации. Исходя из этих результатов, возможно создание Национальной обсерватории, которая необходима прежде всего для выработки рекомендаций по процедурам аккредитации, предоставляемым Национальной музейной системой, созданной Главным управлением музеев Министерства культурного наследия, культурной деятельности и туризма (MIBACT) (DL 113/2018). Для поддержки этих процедур недавно было подписано соглашение между CRUI и Главным управлением. Благодаря этой аккредитации в Национальной музейной системе музеи университета смогут присоединиться к сети, состоящей из итальянских музеев и государственных культурных объектов, а также музеев и сайтов, не принадлежащих государству, для внедрения единого видения развития музеев, независимо от их собственности, размера, типа и формы управления, для создания управления наследием, основанного на принципах устойчивости, инноваций, участия и доступности. Аккредитация музеев позволит укрепить полезный обмен передовым опытом для развития музеев и проверить их организацию, способы решений юридических и экономических вопросов, характер управления коллекциями и их отношения с регионами. Наконец, поскольку в университетских музеях не было пространства для распространения и свободного выражения собственных идей и проектов, а также для поддержания связи со всеми профессионалами, занимающимися сохранением и защитой культурного наследия, был создан на ежемесячной основе онлайн-двуязычный журнал «Университетское наследие».

Ключевые слова: университетский музей, Национальная музейная система, сеть, образование, интернет-журнал, образовательный путь