LUIGI SERRA

I am an IT Engineer and I work as Technical Collaborator of Research Institutions at the Institute of History of Mediterranean Europe (ISEM) of the National Research Council of Italy. Specifically, I am the Network Infrastructure and IT Security supervisor and administrator. The ISEM is an interdisciplinary institute, which aims to study Mediterranean political, institutional, social and economic history from the middle Ages to the present day. So I give my contribution taking care of various aspects of the enhancement of research and cultural heritage, dedicating myself to Digital Humanities and Digital Heritage, with innovative IT and technological suggestions and solutions. I have had working experiences before, in which I applied practically several concepts we have studied during this experience, such as designing new integrated complex infrastructures, network services, planning timesheets and managing Gantt charts, acting as Project Manager or Team Leader in several projects.

The **Mu.SA Specialisation course** gave me the opportunity to develop a useful work project for the place in which I am working. During the whole Work based learning experience, I provided technological consultancy for all the IT technical needs of the Museum employees, the Director and the Direction's Staff. Therefore, giving help for new technology acquisitions or analysing proposals to enhance the technological endowment and IT solutions. On the other hand I treasured the lessons I followed, learning new things to apply profitably also in my daily work.

The added value of Mu.SA Specialisation course is to enhance transversal skills thanks to the theories we have studied during the training path, adding more theoretical skills to the practical expertise elsewhere acquired during different working environments. The context in which I performed my Working Based Learning experience is much smaller than the contexts in which I have always worked as IT Senior Network and Security Engineer, so many of my skills have not been fully expressed. However, I was able to provide support in analysing the critical issues of their infrastructure, which is in less than optimal conditions mainly due to the lack of specialized and dedicated IT technical figures. I have the possibility to give some suggestion to the Direction Staff, and I have been lucky in meeting smart and forward-looking people as the Museum Director and her staff, proposing some solutions to enhance their IT potential. The topics studied during the Mu.SA blended course experience, have been very stimulating and attractive and many techniques or tools studied during this demanding course, have been very useful in other contexts in which I could applied them, adding or refreshing many concepts reviewed.

The activities I was dealing with during the project work while being specialised in the role profile of **Digital Strategy Manager**, did not underway at the Museum. On the contrary, I introduced the activities in the museum having an initial idea, even before starting the WBL. But, the lack of time and the compelling needs of the staff, lacking of technicians and greedy for technical assistance, have led me to reorganize the initial intentions, giving all the support they needed during my presence there. While carrying the activities for the Mu.SA project work, I was working in a team formed by the Director and the Direction staff. The museum has many employees, so I involved them in helping my understanding their job, or asking them to do targeted guided tours into the museum.

During my training in the Specialisation course, I did have encountered any difficulties, the only drawback is finding more time, or not having any other personal economic resources for the involvement of other external figures. However, the great availability and logistical support of the museum staff contributed profitably to the continuation of the experience.

I would like to have to ability to pass on my knowledge and skills to others in the museum, but many of my specific activities were too technical for them. I have been able to transfer only some tips and good practices, because their humanistic training and different cultural background did not match with mine, making the technical knowledge transfer not so spontaneous and natural. In this sense, we have made a translation between different registers, Archaeological vs Informatics and vice versa. On the other hand, despite this background differences, they have a nice approach with technologies and some of the technical operations the Direction Staff does every day, using informatics and new technologies, like keeping updated their social network profiles, managing their website, I do not do. Other few floor assistant employees, offering virtual guided tours with Virtual Reality headsets to explore archaeological sites with Virtual Archaeology tours and virtual reconstructions. One thing I feel to say is that the museum have given knowledge to me through the staff, guiding me through the collections and telling me a new short story every time and at every step, increasing in me the love for my land and its history.

I am not an employee of the Museum but rather the museum has hosted me to perform my Mu.SA work – based learning and my project work activities. Nevertheless due to this fortunate agreement, a scientific collaboration agreement has been stipulated between our ISEM Institute of the CNR, with the Sardinian Museum Pole of state museums. Based on the Frame Agreement between the National Research Council of Italy (CNR) and the Ministry of Cultural Heritage and Activities and for the Tourism (MIBACT), I predisposed a local agreement with the Polo Museale della Sardegna and my Institute (ISEM). Both parties have signed the agreement aimed at promoting scientific collaboration and for research purposes. This collaboration will last five years and is aimed at the collaboration between our Institute and all state museums under the direction of the Polo Museale della Sardegna. In the boundaries of this agreement, the ISEM will provide historical knowledge of the western Mediterranean History, especially in the relationships between Sardinia the Iberic peninsula, but not limited to this since my contribution is mainly technological and regarding IT. On the other hand, the museum will give the knowledge and skills in personnel and facilities, to promote dissemination initiatives about Archaeological topics related to the unicity of archaeological finds stored there.

A permanent restricted commission has been set up, consisting of the Director of the Museum and his delegate officer for technologies, while, for ISEM part, a history researcher (colleague of mine and supervisor), and me for all the technical aspects related to Digital Strategies. The museum could undergo a new organizational structure towards an autonomy proposed by the Minister, but this would change some balances, invalidating the agreement just signed. There are all the good intentions to continue the collaboration, and also to continue the work project done for **Mu.SA Specialisation course**, but the whole thing would have to be remodelled to better reconcile with the ongoing and in progress activities of our Institute. The co-processing is not limited to my advice or experience, but is also extended to the researchers of our Institute who welcome this collaboration for carrying out and organizing new joint activities. Every new solution considered useful by the Direction for the Museum, has been taken into consideration under IT aspects and its impact in the museum environment. Have been evaluated several proposals and technologies, anyway the limited resources available and the lack of autonomy respect to the central ministerial head office, it limits further improvements of the current set of solutions.

The museum in which I have done the Mu.SA work based learning is going through a digital transformation. With the limitations due to a central management of the State Museums, this museum aims at offering newer proposal keeping its traditional approach to the collections, without disdaining any possibility of innovation keeping itself up to date. Among the initiatives being activated are e-ticketing, online booking visits, a further digitization of the collections.

The digital offer is being completed with innovative 3D VR headsets. There is a constant presence on social channels and event sharing via video streaming is active. Statistics are analysed through analytics, UX feedback via online reviews (TripAdvisor, Google). There is one touch device with accessibility for the disabled and for the disabled in a wheelchair with which you can explore the collections and play. It is possible to explore some 360° photographic shots of archaeological sites that can be enjoyed, by appointment, during special dedicated sessions, with the use of VR 3D headset viewers. There are room monitors with looped content and VOD. There are touch screen monitors to explore, interactively, contents and collections. The addition of further monitors has been scheduled recently for all floors. There are 3D models, for which further multimedia enhancement is being planned, and the related 3D tactile prints of the key exhibits of the Museum. There is a section dedicated to the "Giganti di Mont'e Prama" (Stone statues found and coming from a hill locality called *Mont'e Prama*) with an interactive touch device in which it is possible to view 3D models of the Giants in a very detailed way, both the pieces present in the Museum and those kept in the Museum local at the finding site. There is a database for almost all the objects and collections on display, but not everything has been migrated to the institutional website due to the low capacity web spaces provided by the Ministry, which are too small compared to the needs and consistency of the entire Data Base.

The "Liquid Museum" Project, recently created in 2014, allowed a digitization of many aspects of the Museum [LCD monitors, haptic reproductions, LIS – aided descriptions of findings] and laid the foundations for further interventions in this sense], pending further economic resources.

This is a transition period for the National Archaeological Museum of Cagliari, which has gained the status of an independent institution in January 2020, but having some organizational issues still undefined due to the change of organization structure. The imminent change of the Director, leaves opened many possible scenarios including a potential growth or a stable period, until the organization will reach its balance again and could dedicate itself to new projects regarding the digital strategy. The museum has its own contacts with external partners and through collaborations with universities, private companies, research bodies and other relationships with different partners and museums, the National Archaeological Museum of Cagliari has developed and implemented some digital solutions running still today.

Everything could be solved with the aid of IT and Informatics: every need could be transformed into algorithms, and these latter into software, procedures and automation. Thinking about current technologies I mean all the solutions, even for Archaeology, use IT tools or software to function like Geo Radar, GIS, WebGIS, Virtual Reality, Augmented Reality (and I want to remind the Diminished Reality) 3D technical surveys, Total Stations, Photogrammetry, Laser Scanners as LIDARS (Light Detection and Ranging or Laser Imaging Detection and Ranging), image recognition and image reconstruction, holography and software modelling, CAD (Computer Aided Design), CAM (Computer Aided Modelling) with modern precision CNC (Computer Numerical Control) Machines, 3D printing, Open Data, databases, LOD (Linked open Data).

Technology is a powerful mean, but the mere technologies could only be as empty boxes. The meanings are given by the places, by the people, by ancient things, by their stories, and by History. The reuse of the same technology in different acceptations, it is a constant feature of technological progress: sometime the progress runs itself and many needs unfulfilled before, are immediately satisfied, other times it is the thrust of a need that triggers technological progress through the research.

The staff of the museum is very competent, but they are too few and would need more time to develop and design new valorisation actions. Any external contributions are fundamental, in order to propose new projects and renewed approaches. Even when the projects remain into a drawer, they stimulate and update the transversal competences of the staff.

The greatest potential of my project work for Mu.SA Specialisation course is the replicability in more complex environments in which we can better appreciate the scope of the innovative idea proposed. If there were no restrictions or limitations such as the lack of structured data available of the collections (for current security reasons), the lack of resources to involve other external colleagues in Informatics and Engineering or the lack of time to predispose an organic design, the work project idea would be an original one. The attempt to export the database of the objects' collections, currently managed in a proprietary software into a Personal Computer, will be done soon, thanks to the agreement with the Director. The aim is to export it and render it, in open and portable formats, to be embedded into a web based platform and not in a stand-alone pc client, as it is now.

During my Mu.SA work – based learning experience at the National Archaeological Museum of Cagliari, I lived the reciprocal needs to have a meeting point, a synergy between these two worlds so distant butut attracting each other. The eclecticism of the Informatics well spouses every need, even in the Archaeological field, potentially giving answers to all human questions and making available every solution thanks to the constant technological progress. While the Humanists need a Technological Transfer, Technicians needs a Humanistic Transfer for cross talking enrichment, to give sense to the technology itself with real meanings, transposing the real into the virtual, generating vice versa new results in the Human Thinking exploring so, and projecting us towards, new borders.

Despite the demanding commitment required by the Specialisation course, the temptation in the most difficult moments not to keep up due to work or family issues, I have firmly believed from its beginning, in the intrinsic value of this hybrid experience between different entities, diverse but complementary professionals, for a fruitful growth.