URBAN ARCHAEOLOGY: HOW TO COMMUNICATE A STORY OF A SITE 3D RECONSTRUCTION BUT NOT ONLY

M. Capone

School of Architecture, University of Naples, Naples, Italy - mara.capone@unina.it

KEY WORDS: Urban Archaeology, Cultural Heritage, Communication System, Visual Communication, Virtual Archaeology, Video, Story telling.

ABSTRACT:

Over the past few years experimental systems have been developed to introduce new ways of enjoying cultural heritage using digital media. Technology had a lead role in this testing ground increasing the need to develop new way of communication according to contemporary iconography culture. Most applications are aimed at creating online databases that allow free access to information, that helps to spread the culture and simplify the study about cultural heritage. To this type of application are added others, which are aimed at defining new and different ways of cultural heritage enjoyment. Very interesting applications are those regarding to reconstruction of archaeological landscape. The target of these applications is to develop a new level of knowledge that increases the value of the archaeological find and the level of understanding. In fact, digital media can bridge the gap of communication associated to archaeological find: the virtual simulation offers the possibility to put it in the context and it defines a new way to enjoy the cultural heritage. In most of these cases the spectacular and recreational factor generally prevails. We believe that experimentation is needed in this area, particularly for the development of Urban Archaeology. In this case, another trouble to enjoy is added to the lack of communication, typical of archaeological finds, because it is "hidden" in an irreversible way: it is under water or under city. So, our research is mainly oriented to define a methodological path to elaborate a communication strategy to increase interest about Urban Archaeology.

1. GENIUS LOCI

Urban Archaeology is a sub discipline of archaeology that studies the relationships between archaeological finds and the transformation of urban space. In these cases, it adds further difficulty to the gap of communication, typical of archaeological finds, because they are *underground* forever. They are almost always remains hidden, embedded in the urban cities that were built on them or submerged to the transformation of the coastline. The excavation can't bring to light these archaeological finds, because we can't demolish the new city and we can't empty the sea. In these cases, the use of digital technology is not only useful, but it is really the only way that can help us to define a different level of enjoyment of archaeological heritage. The choice of a particularly complex case study allowed us to address a number of unusual issues, especially related to a stratified urban context, where it isn't enough to reconstruct the archaeological landscape to allow the virtual use but we must communicate the *genius loci*. In this case we have to solve two problems: first of all we have to choose the technologies to use in relation to different ways of reconstructing archaeological landscape, on the other side we have to develop a strategy to communicate the history of the site.

1.1 Naples Metro: archaeological excavations in Municipio station

Sometimes some of these archaeological finds emerges only partially and only for a moment, and so it is necessary to define a strategy to communicate what will never be enjoyed.
A particularly interesting case occurred in Naples during the construction of the Municipio station of new Naples Metro, in this case the excavations allowed intervention of urban archeology exceptionally large by offering the possibility to
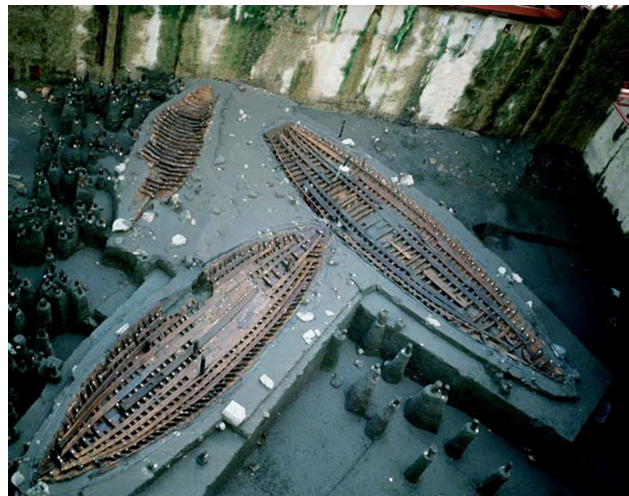

Figure 1: archaeological excavations of ancient Greek port. This place will never be visited.

investigate sites that are difficult to analyze for the depth of the finds and for the presence of groundwater. Since 2003 excavations have been joined to the works of the underground construction and the findings have been utilized to clarify the interpretations of scholars about urban development of the city. In fact, Naples is a city built on itself, the complex stratigraphy is characterized by a continuous urban development, which has always forced scholars to confront their theories with the discoveries made during the time. Sometimes findings confirm or they contradict the hypothesis, but in any case the cultural debate turns on and it raises the question of *how* to communicate the results of the complex work of archaeologists. During the excavations of the Municipio station of Metro Line 1 the old dock was discovered,

according to archaeologists it was built between the late fourth and early third century BC and it is located in the western part of the current between Piazza Bovio and Piazza Municipio (Giampaola, De Carlo, 2004).

By doing analysis of recent discoveries, archaeologists have speculated that the ancient port, built in the first century BC, consisted of a limestone pier and wooden poles perpendicular to the coastline which, in subsequent periods, were added two docks wood (Giampaola, 2009). Excavations have revealed the remains of three ships in exceptional condition and a considerable amount of common objects that document the life of the period (Figure 1). The ancient port was shown to the world for a short period, then the *scene* was completely disassembled and the archaeological finds were placed in an exhibition in the Archaeological Museum of Naples.

The findings value out of the contest is reduces especially when, as in this case, the finds haven't a great intrinsic value but they are important because they allow us to reconstruct the history of a place.

The other finds dated to later periods are very important too, they are from medieval times to the Angevin traces of fortifications that surrounded the first plant of the castle, and they are been essential to enable a more reliable reconstruction of urban space and a comparison with different assumptions supported by scholars.

These excavations are very important for urban analysis especially because they allowed the reliable definition of the evolution of the coastline from the first century BC. However it wasn't possible to make available to the public this discovery, because part of what has been painfully brought to light was already covered. (Giampaola, 2004).

In order not to make vane the very sense of discovery, whose interest remains alive only in the professionals, we have to find an appropriate way to communicate these results and certainly the use of digital media offers significant opportunities for the enhancement of the archaeological heritage. Through the Virtual Reality we can try to define a level of enjoyment of archaeological heritage, complementary and not alternative to those, to communicate the urban development from its origins to the assumptions of future development. In this case the communication may have another goal too, which is to open a cultural dialogue on the future arrangement of the place and it is an opportunity to know better the place and evaluate the hypothesis of transformation.
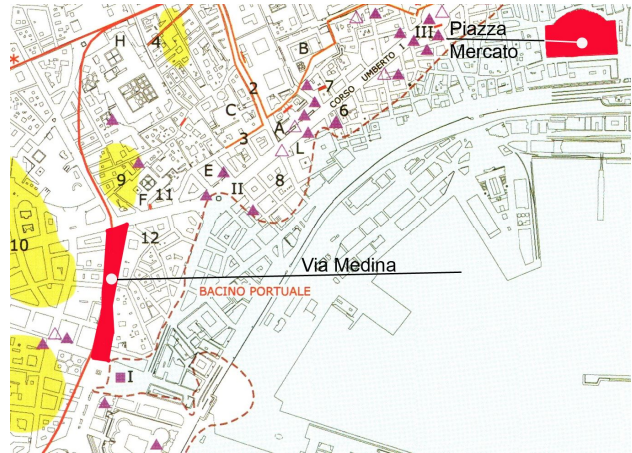

Figure 3: Naples in Greek-roman period according to reconstruction of archaeologists team led by D. Giampaola.
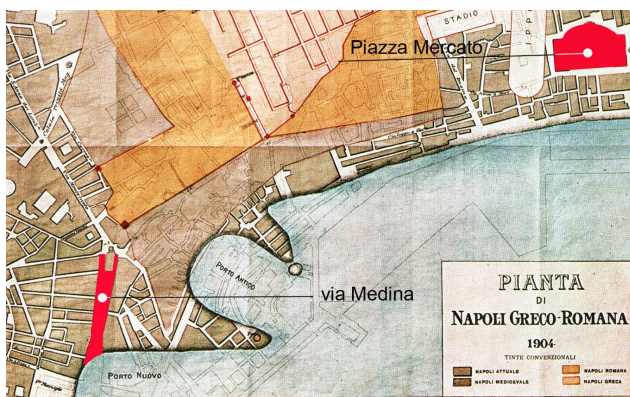

Figure 4: finds from Angevin period

Figure 2: reconstruction by B. Capasso: Naples in Greek-roman period

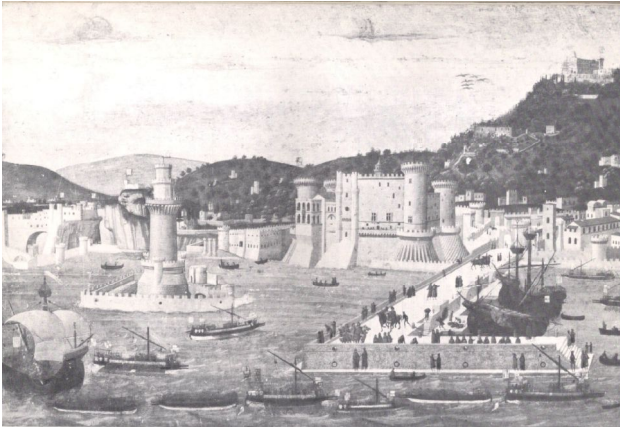Figure 5: plan of archaeological finds related to underground site

Figure 6: Strozzi 1464. The study of iconographic sources is very important to define a communication strategy

2. METHODOLOGICAL PATH

2.1 Communication strategy

From a methodological point of view the stages that characterize a communication project designed to increase the value of the archaeological heritage are: sources analysis, data acquisition in archaeological sites with different technologies, data processing, defining the Concept of communication project, Virtual Reality project.

The present study analyzed the problems relating to communication and particularly *how* to process the message so that the content reaches the *receiver* without alteration. We are more interested in the theoretical framework for defining the communication project than to the problems related to the methods of acquisition and data processing.

Message can generally be decomposed into two components to elaborate the Concept: *content* and *media*. So, to develop an effective communication project, it is therefore essential to know the message you have to send (content); only in this way you are able to operate the simplification necessary to provide an accurate information, and the selection of appropriate media (form of communication).

2.2 Content: source analysis for the virtual reconstruction of the contest

The first step to realize an integrated information system aimed at defining a new level of enjoyment of urban archaeology is the reconstruction of urban development of the case study area. The knowledge of the content to communicate is very important because you can choose what to rebuild, how to rebuild and what technologies to use.

In the study case, the elements that have helped to define the reconstruction of archaeological landscape are the study of iconographic sources, the comparison between different hypotheses and, in a special way, the results of recent underground excavations. Particularly, the excavations results in Piazza Municipio were able to document in detail a wide coastal area. Thanks to these results, now archaeologists are able to accurately reconstruct the evolution of the coastline and the location of the ancient port (Giampaola, 2009).

Figure 7: Lafrery 1566. Iconographic sources

Figure 8: Baratta 1629. Iconographic sources

Figure 9: Piazza Municipio, findings from the Angevin period. Most of these findings can't understood without the necessary additional information.
Most of them will be covered another time.

Figure 10: Napoli, Museo Nazionale, exhibition "Naples, city and sea" . The additional information into written form determines a communication stress.

century and the mid-third century BC and until the mid-fifth century AD, when the basin seems to have bogged down causing the displacement of the coastline (Figure 3). The traces on the bottom, about 13 meters under the current elevation, testified the use of the inlet as a port, while the stratigraphic analysis allowed us to accurately reconstruct the evolution of the place. According to the hypothesis of the archaeologists team directed by Dr. Giampaola, the ancient port was dropped since the fifth century AD onwards for the formation of a swampy environment, then it was completely covered up, causing the displacement of the coastline south-east (Giampaola, 2009). The place wasn't used since 1278 when Carlo I built the Castle. The reconstruction of this urban area is closely related to the transformation of the castle.

The findings from this period testify the intensive building activity near the new Castle, many houses for dignitaries of the court were built in this area, this activity continues from the reign of Charles I to the beginning of the fifteenth century AD, when the succession wars between Angevin and Aragon severely damaged this place (De Seta, 1969). Archaeologists have found a complete occlusion of the Angevin period buildings caused by the construction of access ramp to the *Aragon town*, that was done by Alfonso V of Aragon. After the conquest of the city, Alfonso V decided to completely restructure the Castel and he completely changed the construction of the Angevin period. . Excavations have unearthed the curtain of the western fortification, with the remains of the northern tower and the curtain with a semicircular structure that connects to the access ramp to the gate of the Aragon Town (Figures 4, 5).

Figure 11: Ancient Naples cost line, graphic elaboration by INKLINK. This kind of reconstruction it isn't enough to understand the story of the place.

To analyze the questions of the ancient port location and the coastline evolution we have always referred to studies by Bartolomeo Capasso (1904) and by Mario Napoli in the 50s (Napoli, 1967).

The Naples coastline has changed considerably over the centuries, for natural events, such as silting, or for human factors, such as filling linked to building activity

The hypothesis of Bartolomeo Capasso and Mario Napoli were compared with results of recent excavations linked to the construction of Metro, that allowed to verify the presence of a deep inlet near the castle (Figure 2). It seems that the bay was used as a port since the earliest phase of urban development, while it is sure that the area was used as a port in the late fourth

The results of archaeological investigations have substantially helped to integrate and test hypotheses about this period, that were exclusively based on the study of the rich iconographic documentation available (Figure 6, 7, 8). Of course we hope that not all archaeological finds will be covered and some of these will be integrated into the design of the subway station, in this way we will able to enjoy them not only virtually (Figure 9). In this case, it is necessary to elaborate a communication strategy which allows the reading of the context because most of the archaeological finds will be covered. So, the main goal of our project, the content, is to provide all the additional elements that allow us to understand the place and its history.

2.3 Communication form: theoretical framework

First of all we have to define the *content* to communicate and then we have to define the better communication strategy according to that *content*. The question has been discussed primarily from a theoretical point of view in accordance with the principles of cognitive psychology.

So, the theoretical framework to develop the communication strategy is necessarily related to communication theory. The concept of communication requires the transfer of information from a *transmitter* to a *receiver* and this is possible using a *code* and a *medium*. We mean for *code* all the signs that make possible a communication, for example, language and architectural drawing are systems of coded communication, of course all these systems assume that the *receiver* must know the *code*. The choice of symbols can't be decided regardless of the *receiver* and the process of *receiving* information, and, therefore the minimum target of a communication project is to use signs that are able to explain the meaning correctly (Antinucci, 2004). The communication strategy must be designed according to the public to whom the message is directed and it is necessary to identify the objective factors that make the communication possible, we cannot make the mistake of using a *secret code* that can only be understood by some people and which transmits the message to those who know it already (Munari, 1970).

The communication must respect the cognitive process which occurs by incorporating the sign with the knowledge previously acquired or deemed necessary. In the case of the Cultural Heritage the sign is always an iconic one, and additional information needed to understand this sign has traditionally been transmitted using a sign language into written form (panel) or oral (audio guides or guides) (Antinucci 2004). In the first case we obtain a communicative stress because we have to decode either the iconic sign and the language one, and so we force the viewer to *read* or to *look* (Figure 10). In fact the viewer has to switch between modes based on a cognitive analytic process to another one of gestalt kind. The result is that we have to leave one of two cognitive systems. Of course, the conflict is less, if linguistic information is transmitted orally in conversational way. This conflict can be eliminated by using a visual language and minimizing the verbal comment that *separates* us from the items.

So, from a theoretical point of view, to better communicate the archaeological landscape, it is advisable to use an iconic code and, to have an efficient communication system, we must also verify the following conditions: the information must be correct, the signs must be objective, and there must be no ambiguity to decode (Munari, 1970). A winning strategy is to simplify to give a clear message, and then universally readable, it doesn't mean to make obvious what is complex, but it means to remove everything is not necessary to give accurate information rather than complicating with adding information (Munari, 1970).

We can affirm that a communication Concept consists of two elements: information and media. So, to get the target, it is very important to have accurate information and choose the media according to the *content* and according to the *recipient* of the message: choosing the right tools is essential more than in any other case. We believe that to build the cognitive map, more adherent to the study case, we have to use images in film sequence, with elements of interactivity, limiting the linguistic component and subordinating it to the iconic one (Antinucci, 2004). The video is the media best suited for this type of communication because it offers the possibility to combine, thanks to technological development, real elements with virtual reconstructions and to experience a lot of expressive potential. We believe that, in this particular field, testing is needed to

overcome the limit of some of these applications that are often more related to technological aspects rather than to communicative ones, in fact only some of these are designed from the start to reach the public.

Figure 12: to correctly set up the communication project is very important using a recognizable image. Communication is effective if you always use the same points of reference: the castle, piazza Mercato, Medina street.

2.3.1 Concept development

The result is related more to communication aspects than technological ones, so it is essential that the Concept arises from an established theoretical framework. The key elements for the development of the concept can be broadly summarized as follows: *information*, *media\medium*, *receiving\ who receives information*.

In our case the content to be transmitted is the story of a place, the urban area of Piazza Municipio, transformed over time and currently in changing. The selected media to transmit information is the digital media and the recipient is a non-specialist audience, for this reason, it is necessary to submit all disclosures to help decode the *signs* that are still present.

The objective is to expose the archaeological find so that it can communicate: to do that, we have to rebuild missing part so that it is readable, we have to contextualize it. In this way, we are providing all the additional factors necessary to undertake a learning path correctly and without conflict and we think that it can be done by using a visual language and a film sequence.

Virtual enables you to document what history has erased more or less intentionally, in fact the archaeological findings are only a *piece of matter* with high ambiguity level, and so we have to do virtually something to resolve this ambiguity (Antinucci, 2004). The rebuilding operation is essential to understand the meaning of archaeological findings, and the problem is to define what we have to rebuild and especially how to realize that reconstruction (Pescarin, 2007). The use of digital media broadens the scope because we can build virtually leaving intact the original and documenting *the passage of history*. However, the problem to communicate urban archaeology is further complicated because it isn't enough to reconstruct but we have to communicate a process of *change awareness* of the original that has been incorporated and transformed in a new and different product which must necessarily be assessed in relation to the previous one (Figure 11).

We think that the operations that allow to read correctly archaeological finds take precedence over all others, and so if we fail our communication project, the *receiver* will not be able to read or he'll read incorrectly. Often *ruin* is used like a way to get *an aesthetic result totally extrinsic to himself* (Antinucci, 2004). In this way you'll omit the reconstruction operations that allow a correct interpretation of the archaeological finds, which means to deceive the public. It is therefore clear that from a theoretical point of view the reconstruction of finding is essential to allow the interpretation. Of course the ability to rebuild "the sign" is based on a thorough assessment of the sources and on a formulation of one of the possible hypothesis, without distorting the meaning.

So, we have to determine a version that can be defined as *compatible* with the *sign* and that can be objectively measured and evaluated according to the sources and knowledge in the field.

From a theoretical point of view, it is therefore essential to determine what are the conditions that must be met so that the sign is understood correctly and the message reaches the recipient. Communication is primarily visual and generally to process the message you can work on the original or a reproduction as appropriate (Antinucci, 2004).

In the case of architecture and urban archaeology the two ways often intersect, but in both cases, we consider very important to preserve the recognizability reconstructive operation. By working on the model and not on the original, we are able to offer different reconstructive hypotheses and we can express the uncertainty of interpretation. In this case we can rebuild only virtually, on a replica, because in reality we can't eliminate *the addition* that over the centuries have determined the current configuration of the site. In these cases the use of virtual is a strategic choice that can significantly increase the value of the archaeological heritage allowing the understanding of the visible sign and fostering the cultural debate. The reconstructive operation aimed at allowing the understanding of cultural heritage damaged or fragmented, such as archaeological finds, must respect the fundamental principles of cognitive psychology.

The cognitive process is generally *constructive nature* and so it is appropriate to define a learning path that is able to make explicit as possible the construction phases that have characterized the evolution of the place. In order to make explicit the generating process of the site, we believe it is essential to use a dynamic communication system.

Our communication project comes from the theoretical framework that we summarize in this article. It foresees the use of a dynamic iconic language, a film sequence, in particular this sequence reflects the story of the site and it becomes interactive in some particular points.

Interactivity is very important because it encourages the construction of personal knowledge pathways that are enriched through the exchange of information between the real and the virtual, but we feel that it should be the means to communicate knowledge, not the end of the communication project.

In our case study, the stratification of the urban setting is particularly suitable to be treated as a history and it can be communicated through analogy and then the comparison with the current state. First of all, it is very important to choose easily a decodable image to make the message understandable to a broad audience. We believe that the cognitive path always starts from a recognizable map and therefore we felt it appropriate to use as a basis for developing the concept of aerial views of Google, then switch to flights 45 ° Bing 3D Maps (Figure 12).

The presence of the castle, which is the characteristic of the urban landscape, makes the place easily identifiable and so our story begins from here (Figure 13).

Figure 13: in our communication concept, the current image of the castle is used as a link between real and virtual environment. We can travel into and visit the castle in Angevian period, or we can walk into the future, in the new place designed by Alvaro Siza.

Figure 14: Piazza Municipio, virtual simulation of the project by Alvaro Siza

Figure 15: Napoli, Museo Nazionale, exhibition "Naples, city and sea". Communication of the results of archaeological discoveries are still made in traditional way. This often happens because there aren't the economic resources.

Figure 17: Napoli, Museo Nazionale, exhibition "Naples, city and sea" Reconstructive hypothesis is essential to understand the archaeological finds. You use the means available but digital media applications in archaeological heritage opens up new perspectives. We have to test new technology but we have to build a theoretical framework too

From 2D satellite images and from cognitive maps built on them, the tale wins the 3D dimension through the views of flights to 45 ° that are the medium to enter into virtual landscape.

The real key to tell the story of the place is the castle, thanks to digital technology we can dynamically switch from the current configuration Aragon and then again in reverse image of the first configuration of the Angevin period. At this point, the communication project provides that the system becomes interactive and the user can interact with 3D objects, the Anjou and the Aragon castle, which is assumed for the creation of a Virtual Reality project.

In this way, Virtual Reality is not the final goal but it is integrated into a general cultural debate whose most important purpose is knowledge communication and so the 3D reconstructions become the interface to access some other information.

In our project, interactivity is not extended to all stages of communication, in fact our aim is to firstly provide the minimum information to understand the phenomenon, and then we are going to offer the user the ability to track custom cognitive paths that can lead to different levels of knowledge. In this case the communication project becomes the essential support to the use of the archaeological finds that will be integrated in the new metro station, according to Alvaro Siza project (Figure 14). We are sure that without this additional information, and therefore without the communication project, the use of the "ruins" into Siza project is simply a means to achieve an aesthetic result, totally extrinsic to the archaeological site.
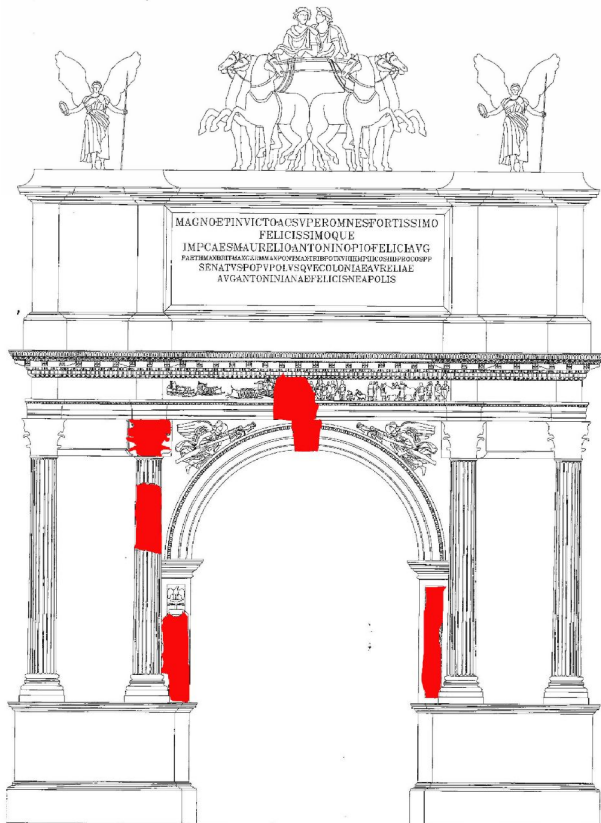

Figure 16: An example of a typical reconstruction is a 2D drawing in which the finds are collocated

The reconstruction of the history of the place is made using a film sequence by accelerating the processes that slowly have defined the current urban structure: the ancient Greek port, changing the shoreline, building the castle in Angevin period, restructuring during Aragon period, the arrangement of the square at a later time, the current configuration of the site characterized by underground construction and in the immediate future the Alvaro Siza project, that is not yet realized.

The path is articulated from the present to the past, looking to the future: the assumptions of the archaeologists, the reconstructions made on the basis of recent findings, the images of places that have appeared only for a moment and then they buried forever, such as the ancient port, they overlap on to satellite imagery.

3. CONCLUSION REMARKS

The case study is a very complex example of Urban Archaeology, we believe that, in the cases like this, it has been necessary to test a methodological path appropriate to the content to communicate. In this experimental path the digital media are a powerful tool to develop an effective communication strategy.

Our goal is to highlight issues, propose possible but not unique solutions, stimulating cultural debate, and for this reasons we have chosen a case study particularly complex. The principle behind the experiment is to do an *hybrid* product in which anyone can build a different cognitive path that allows a custom study. The guiding

principle is to subtract the product from a recreational use only, because we must not forget that our priority is to communicate the cultural message (Figures 15, 16, 17). This is a work in progress, because we believe that no software product dedicated to the enhancement of the archaeological heritage can be effective without testing new forms of communication that integrate bottom-up and top-down approaches in the same digital environmental (Pascarin, 2006).

.

References

Antinucci F., 2004. *Comunicare nel museo*. Editori Laterza. Bari.

Antinucci F., 2007. *Musei virtuali. Come non fare innovazione tecnologica.* Editori Laterza. Bari.

De Seta C., 1969. *Cartografia della città di Napoli : lineamenti dell'evoluzione urbana.* Edizioni scientifiche italiane. Napoli.

De Seta C., 1988. *Napoli*. Laterza. Bari.

Forte M. Pescarin S., 2006. *Behaviors, Interaction and Affordance in Virtual Arcaeology.*, in *Advanced ICT Methods Guide,* edited by Lorna Hughes

Giampaola D., 2004. *Dagli studi di Bartolomeo Capasso agli scavi della metropolitana: ricerche sulle mura di Napoli e sull'evoluzione del paesaggio costiero.* In *Napoli Nobilissima*, quinta serie, volume V, fascicoli I-II, Gennaio-Aprile 2004. pp. 35-56

Giampaola D., De Carlo S., 2004. *La Metropolitana approda nel porto di Neapolis.* In *Civiltà del Mediterraneo*. Guida Editore. Napoli. pp. 49-75.

Giampaola D., 2009. *Archeologia e città: la ricostruzione della linea di costa.* TeMA - *Trimestrale del Laboratorio Territorio Mobilità Ambiente, 2* (03.09). pp. 37-46

Giampaola D., 2010. *Napoli la città e il mare.*: Electa. Napoli.

Munari B., 1970. *Design e comunicazione Visiva. Contributo a una metodologia didattica*. Editori Laterza. Bari

Napoli M., 1967. *Topografia e archeologia.* In *Storia di Napoli*. Società Editrice storia di Napoli. Napoli. pp. 372-483

Pescarin S., 2006. *Open Source in archeologia. Nuove prospettive per la ricerca,* Archeologia e Calcolatori 17, 2006, pp. 137-155

Pescarin S., 2007. *Reconstructing archaeological landscape. Interpretation an integration in spatial real-time open system.* In *Space – Archaeology's Final Frontier*. New Castle: Roderick B. Sailsburg and Dastin Keeler. pp. 69-92